



XML Applications OpenScape Desk Phone IP OpenStage Phones

Programming Guide

A31003-S2000-R100-13-7620

Our Quality and Environmental Management Systems are implemented according to the requirements of the ISO9001 and ISO14001 standards and are certified by an external certification company.

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1 Introduction

1.1 Overview

With their graphical user interface, OpenStage 60/80 and OpenScape Desk Phone IP 55G models allow creating applications for a multitude of purposes. The available features depend on the appropriate phone's software version.

The functions Chapter 6, "Push Capability (All Phone Types)" and Chapter 8, "Using Additional Phone Keys (All Phone Types)" are applicable for all phone types, not only for OpenStage 60/80 and OpenScape Desk Phone IP 55G.

As XML and HTTP/HTTPS serve as client/server interface, the technologies commonly used in web applications can be used: Java Servlets, JSP, PHP, CGI etc., delivered by servers such as Tomcat, Apache, Microsoft IIS.

The Push feature enables the server-side application to send data to the phone in an unsolicited way.

The XML application interface is available in the SIP firmware (from V2R2) or the HFA firmware (from V2R0.x) for OpenStage 60/80 and OpenScape Desk Phone IP 55G phones.

This document describes the XML interface and the error handling in case the XML data is invalid. Please note that the error handling is not visible to the user. If, for instance, some elements of an object are missing, the remaining objects are displayed anyhow. It is recommended to validate the XML documents using the XML schema provided here (see Section 9.2, "XML Schema for XML Applications").

This document is aimed at Unify and Third Party developers and covers the following areas:

- Operating Mode and Features
- Setup, Start, and Use
- XML Structure and Encoding
- XML Object Reference
- Push Capability (All Phone Types)
- Using Additional Phone Keys (All Phone Types)
- Appendix

Introduction

Prerequisites

1.2 Prerequisites

For developing applications for OpenStage or OpenScape Desk Phone IP 55G phones, the following components and tools are required resp. recommended:

1. OpenStage 60/80 SIP/HFA phone with appropriate firmware version (V2R2 or higher) or OpenScape Desk Phone IP 55G SIP/HFA.
2. Infrastructure:
 - Connection to an IP network.
 - Web browser to set up the application on the phone using the phone's Web Based Management. Alternatively, the phone's local admin menu can be used.
 - Web server for sending and receiving XML data, like Tomcat, Apache, Microsoft IIS. Please note that the MIME type for the XML documents has to be set to `text/xml` on the server.
 - Application platform running on the server, for instance Java Servlet, ASP, CGI, PHP.
3. XML Editor:

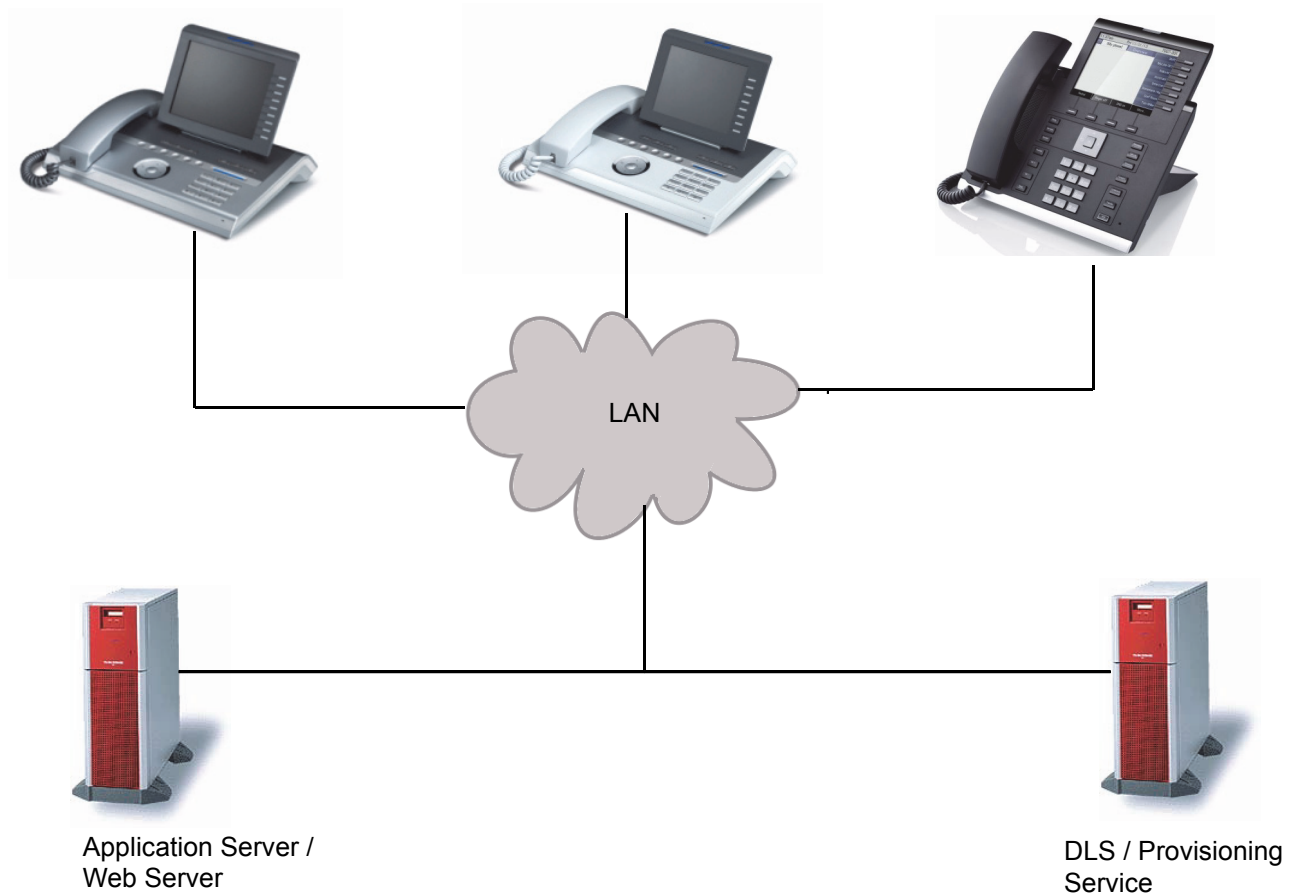
A validating XML editor is recommended, like Oxygen, XMLWriter, EditiX, XMLSpy.
4. For developing Java Servlets: An applicable development environment, for instance Eclipse, NetBeans, IBM Websphere Studio.

2 Operating Mode and Features

2.1 Infrastructure

The phones are connected to a LAN. The application/web server can be connected to the same LAN, or alternatively be reachable via WAN/internet. Optionally, the DLS (Deployment Service) or the phone's provisioning interface can be used to configure XML applications on the phone. For details, please refer to the OpenScape Deployment Service Administration and Installation Manual and to the OpenStage Provisioning Service Developer's Guide.

The following diagram shows the communication between the components:

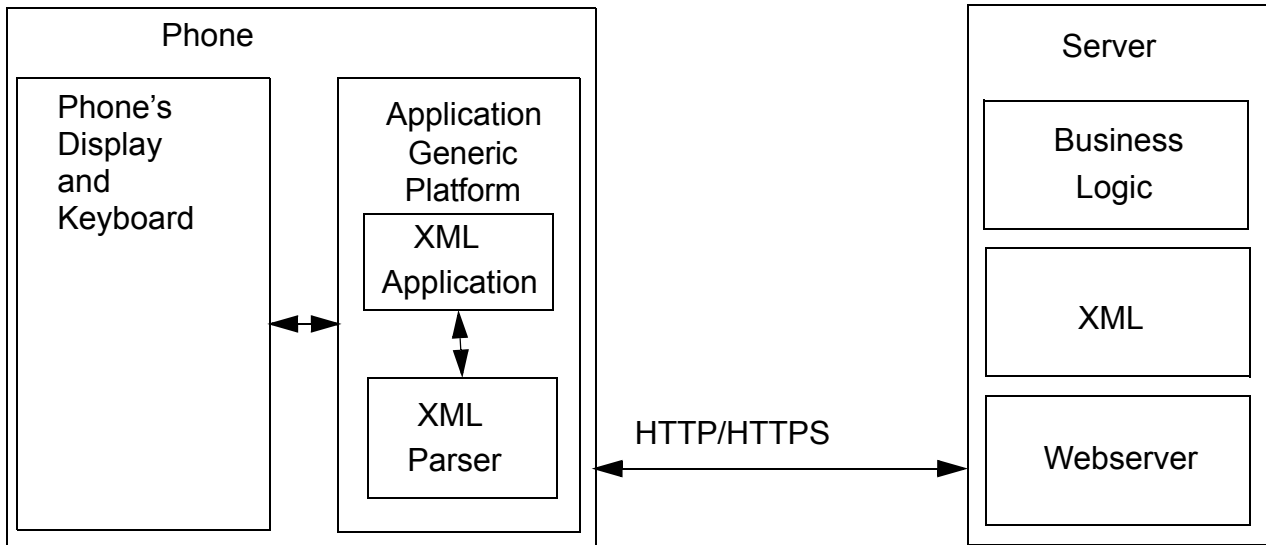


Operating Mode and Features

Basic Operating Mode

2.2 Basic Operating Mode

The following diagram shows the basic components involved in the operation:



The operation can be described as follows:

1. The administrator configures one or more applications on the OpenStage phone.
2. The user selects a program from the list of available applications and starts it.
3. The phone sends an HTTP/HTTPS request to the URL of the server-side application.



The HTTP/HTTPS GET request sent by the phone on application startup contains the phone's IP address and call number as well as the device type.

Example:

```
GET /ipp/example?ipaddress=192.168.1.244&
phonenummer=3338&devicetype=OpenStage
```

4. The server-side program generates an XML document which is valid according to the XML schema (see Section 9.2, "XML Schema for XML Applications"). The web server delivers the XML document to the phone over an HTTP/HTTPS connection.
5. In the phone, the XML document is parsed and displayed on the graphic display.
6. The user enters commands and data using the phone's TouchGuide and keypad on OpenStage 60/80, Navigation Keys or Softkeys on the DPIP55G.
7. Listeners in the phone software recognize the commands and data entered by the user.

8. The phone transmits the user entries to the server-side program in the form of key/value pairs.

2.3 Push Mode

The push mode enables the server-side program to control and start a phone-side XML application.

The basic operation of the push capability can be described as follows: A program running on a server calls a special URL of the phone, which is based on the phone's IP address. Through this, a specific XML application on the phone is triggered to load an XML document from a URL given in the push request. If the specific XML application is not already running on the phone, it may be started automatically.

2.4 Using Predefined Graphics

Besides linking images stored on a server, it is possible to use predefined graphics, e. g. for buttons. These images are already stored in the phone software. Using predefined images reduces data traffic, which accelerates the application. For further information on images see Section 5.23, "Image".

2.5 Cache

The cache stores up to 20 screen contents of any type (form, list, text box, alert, or player) on the phone. When the cache is full, the oldest entry in the cache is deleted and the new screen is added to the end. However, there is an exception to this rule: If the cache consists of only one full screen and the rest alerts, the deletion of the entries in the cache will retain the full screen so that there is a screen to go back to when all of the alerts have been dismissed.

Any screen in the cache may have links to other screens in the cache. They are linked by BACK and SCREEN commands (see Section 5.5, "Command"). These links create page history - a structure which enables to navigate through the pages in the cache. An alert or player is removed from the cache when there are no links to it from any other screens.

When new screens are received from the remote server, the new screen may:

- Overwrite an existing screen in the cache, or
- create a new screen in the cache.

When a screen is overwritten, the existing display items are deleted and a new set of display items are created for the new screen.

The Table 2-1 Screen Caching Rules details the list of screen caching rules when a new screen is received:

Operating Mode and Features

Cache

The server can manage whether the screen should be added into page history, into cache or how long the content of screen will be stored in the cache. The cache is managed via HTTP/HTTPS headers 'Cache-Control' and 'Expires'. In case of 'Cache-Control' header following directives are supported: no-cache and max-age. Other directives are ignored when received.

In the 'Expires' header the time stamp is supported. For further information see Section 7.7, "Response headers".

For the priorities for cache headers, if more than one cache header is received, see Table 2-2 Priority of Caching Headers Priority of Caching Headers. The priority 1 means the most important header.

To manage the screen in page history the server can use the attribute 'History', see more details in Section 5.3, "Screen".

Screen Type	Has BACK Command		No BACK Command	
	Screen ID already exists in cache	Screen ID does not exist in cache	Screen ID already exists in cache	Screen ID does not exist in cache
Alert	When alerts are pushed, a new alert is created. Otherwise, the existing alert is overwritten.	A new alert is created.	When alerts are pushed, a new alert is created. Otherwise, the existing alert is overwritten.	A new alert is created.
Form	An existing form is overwritten.	A new form is created.	An existing form is overwritten.	A new form is created.
List	A new list is created.	A new list is created.	An existing list is overwritten.	A new list is created.
Player	The existing player is overwritten.	A new player is created.	The existing player is overwritten.	A new player is created.
Text Box	The existing text box is overwritten.	A new text box is created.	The existing text box is overwritten.	A new text box is created.

Table 2-1 Screen Caching Rules

Header	Priority
Cache control:no-cache	1
Cache control:max-age	2
Expires	3

Table 2-2 Priority of Caching Headers

3 Setup, Start, and Use

3.1 Configuring an Application on the Phone

For setting up an XML Application, the WBM (Web Based Manager), the local admin menu, the DLS (Deployment Service), or the phone's provisioning interface can be used. For details, please refer to the OpenScape Deployment Service Administration and Installation Manual and to the OpenStage Provisioning Service Developer's Guide.



A maximum number of 20 XML applications can be configured on OpenStage 60/80 or OpenStage Desk Phone IP 55G phones.






Please ensure that the following prerequisites are fulfilled:

- The phone has firmware version SIP V2R2 or higher, or HFA V2R0.x or higher
- The terminal number is set (for details, see the OpenStage Administration Guide).
- The phone has intranet/internet access, directly or via proxy. For details about setting a proxy, see Section 3.2, "Setting a Proxy", or the OpenStage Administration Guide.

3.1.1 Application Types

From the user's standpoint, there is a choice of several types of XML applications, which mainly differ in the way they are started and stopped:

- Regular XML applications are started by navigating to the applications menu using the ☰ or **Services** key, or by pressing a programmable key (see Section 3.4, "Starting the Application"). They can be stopped via the applications menu. Via the web management, regular XML applications are configured under **Applications > XML applications > Add application**.
- Xpressions is a special Unified Communications application which also uses the XML interface. Thus, the configuration is just the same as with other XML applications, except a few parameters, which are pre-configured. For details, please refer to the relevant Xpressions documentation. When configured on the phone, a press on the messages mode key ☑ or **Messages** will invoke this application. Via the web management, an application Xpressions is configured under **Applications > XML applications > Xpressions**.
- A messages application is configured like a regular application. It is started via the messages mode key ☑ or **Messages**, thus enabling the deployment of an alternative voicemail server. From firmware version V2R1 onwards, the XML application can control the white LED which indicates new messages. Via the web management, a messages application is configured under **Applications > XML applications > Add messages application**.

- A phonebook/directory application is configured like a regular application. It is started via the phonebook/directory mode key  or **Directory**, thus enabling the deployment of a remote phonebook in place of the personal (local) or corporate (LDAP) phonebook. Via the web management, a phonebook/directory application is configured under **Applications > XML applications > Add phonebook application (OS60/80)** or **Applications > XML applications > Add directory application (DPIP55G)**.
- A call log application is configured like a regular application. It is started via the call log mode key  or **Call Log**, thus enabling the deployment of a remote application that handles call history. From firmware version V2R1 onwards, the XML application can control the white LED which indicates missed calls. Via the web management, a call log application is configured under **Applications > XML applications > Add call log application**.
- A help application (OS60/80 only) is configured like a regular application. It is started via the help mode key , thus enabling the deployment of a remote help. Via the web management, a help application is configured via **Applications > XML applications > Add help application**.

3.1.2 Required Data

An XML application is set up by providing the following parameters:

- **Display name:** Name of the application which is displayed on the application tab of the phone's display. The following criteria must be satisfied:
 - It must be unique on the phone.
 - It cannot contain the '^' character.
 - It cannot be empty.
 - Its length cannot not exceed 20 characters.
- **Application name:** Used internally to identify the XML application running on the phone. The application name must meet the following criteria:
 - It must be unique on the phone.
 - It cannot contain non-alphanumeric characters, spaces for instance.
 - The first character must be a letter.
 - It must not be empty.
 - Its length must not exceed 20 characters.
- **Protocol:** The protocol used for communication to the server. HTTP and HTTPS are supported.

Setup, Start, and Use

Configuring an Application on the Phone

- **Server address:** The IP address or domain/host name of the server that provides the application or the XML document.
Examples: `192.168.1.133`, `backoffice.intranet`
- **Server port number:** The number of the port used by the server to provide the XML documents for the application.
Examples: `80` (Apache default port), `8080` (Tomcat default port).
- **Program name:** The relative path to the remote program, e. g. to the servlet or to the first XML page. With static start pages, for instance, the relative path refers to the root directory for documents on the web server. For instance, if an XML document is saved in:
`C:\Program Files\Apache Group\Apache\htdocs\ipp\ippTest.xml`
the entry is:
`ipp/ippTest.xml`.
The program name cannot be longer than 100 characters.
- **Auto start** (V2R1 onwards) determines whether the application is started automatically on phone startup or, with V2R2 onwards, on mobile user logon. Please note that, for being started on logon, the application must be part of the mobile user's profile. When activated, the application will be ready without delay as soon as the user presses the corresponding start key or navigates to the application in the application menu.
- **Use proxy:** Enables an HTTP/HTTPS proxy for communication with the server, if desired. If disabled, a direct connection is used. For details, see Section 3.2, "Setting a Proxy".
- **XML trace enabled:** Enables or disables the debugging of the XML application back to the designated program specified by **Debug program name**. When enabled, trace information about the XML elements and key internal objects is sent to the remote debug program.
- **Debug program name:** The relative path to a special program on the same server as the program specified by **Program name**. This program must be able to receive the debug information sent by the phone as HTTP/HTTPS POST requests with `Content-Type` set to `application/x-www-form-urlencoded`.
- **Number of tabs:** Required if the application has internal tabs. Specifies the number of internal tabs for this application. The maximum value is 3.



For an XML application with a number of tabs > 0, one of the entries between **Tab 1 Application Name** and **Tab 3 Application Name** must be set to the same value as the **Application Name** that it is associated with. This tab will have the focus when the XML application is started.

- **All tabs start** (V2R1 onwards) determines whether all tabs of the application are started automatically when the application is started.

- **Tab 1...3 Display Name:** Required if the application has internal tabs. Provides the label text for the specified tab.
- **Tab 1...3 Application Name:** Required if the application has internal tabs. Provides a unique name for the specified tab. The remote program will use this name to provide the tab with specific content. For more information, please refer to Section 3.4, "Application Suite Using Predefined Tabs" and Section 3.4, "Application Suite Using Tabs On Demand".
- **Restart after change:** If checked, a running XML application is automatically restarted after it has been modified. After the XML application has restarted, this option is automatically unchecked.

Setup, Start, and Use

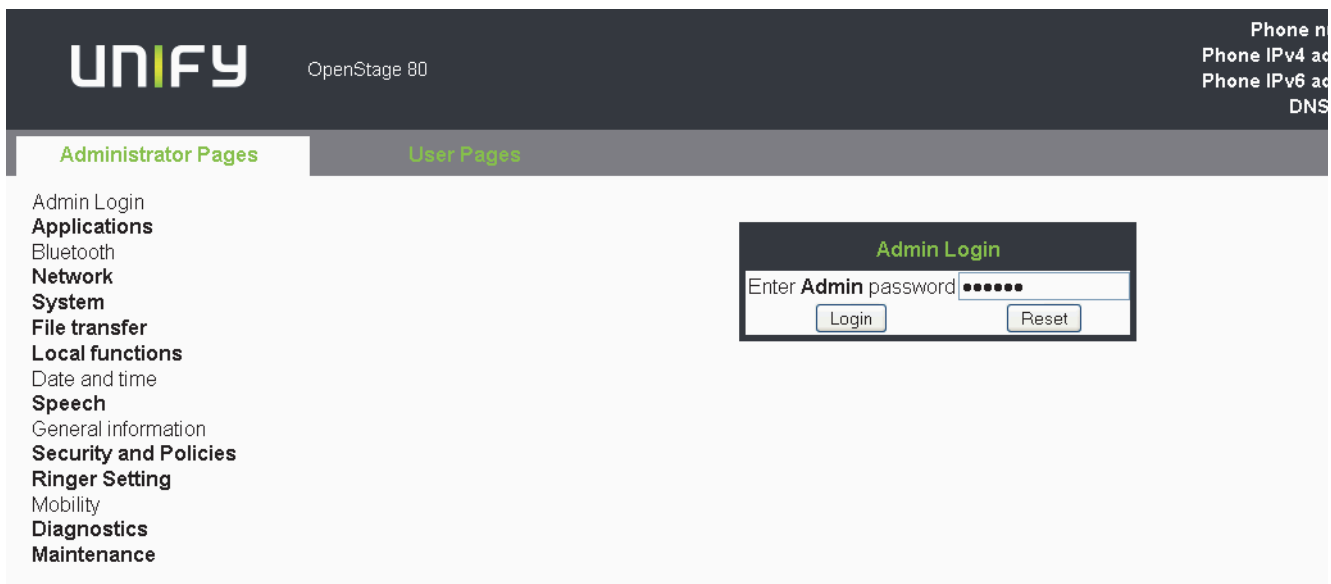
Configuring an Application on the Phone

3.1.3 Using the Web Based Management (WBM)

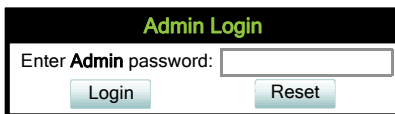
1. Open your web browser (MS Internet Explorer or Firefox) and enter the appropriate URL. Example: `https://192.168.1.15` or `https://myphone.phones` (firmware V2)

For configuring the phone's DNS name, which is possible with firmware V2, please refer to the OpenStage Administration Manual.

If the browser displays a certificate notification, confirm it. The start page of the web based management appears. In the upper right corner, the phone number, the phone's IP address, and the DNS name assigned to the phone are displayed. The left column contains the user menu tree.



2. Click on the **Administrator Pages** tab. In the dialog box, enter the admin password:



3. The administrator main page opens. The navigation column to the left contains the menu tree. If you click on an item which is printed in normal style, the corresponding dialog opens in the center of the page. If you click on an item printed in bold letters, a sub-menu opens in the navigation column.

4. Navigate to **Applications > XML applications > Add application** (or **Add messages application**, or **Add phonebook application**, or **Add call log application**, or **Add help application**) and enter the required data (see Section 3.1.2, "Required Data"). When the configuration data is correct and complete, click on **Submit**.

Add application

Display name

Application name

HTTP Server address

HTTP Server port

Protocol

Program name on server

Auto start ☐

Use proxy

XML Trace enabled

Debug program on server

Number of tabs

All tabs start ☐

Tab 1 Display Name

Tab 1 Application Name



Tab 2 Display Name

Tab 2 Application Name

Tab 3 Display Name

Tab 3 Application Name

Restart after change ☐











5. Now you can test the application. For a regular XML application, press the  or **Services** key on the phone to activate the **Applications** tab. If everything went well, the new application is listed and can be started by pressing . For Xpressions, or a messages, phonebook, call log, or help application (OS60/80 only), press the corresponding mode key.
6. To modify or delete an application, repeat steps 1 to 3, and then navigate to **Modify/Delete application**. Choose the desired application in the **Select application** menu and click **Modify** to change parameters, or **Delete** to delete the application.




Setup, Start, and Use

Configuring an Application on the Phone

3.1.4 Using the Local Admin Menu

The basics for accessing the phone's local admin menu are described here. For more detailed information, please consult the OpenStage 60/80 User Guide or the OpenStage Administration Manual.

1. Press the  or **Services** key once or repeatedly until the **Settings** tab is active. (The  or **Services** key toggles between the settings menu, the applications menu, and the applications currently running.)
2. With the TouchGuide or Display/Navigation Keys, navigate to the **Admin** menu and press .
3. You are prompted to enter the admin password.
If the password is numeric, just type it using the number keys. On typing the first digit, an input text field will open up.
For entering non-numeric characters, press the # key once or repeatedly, depending on the desired character. The # key cycles around the input modes as follows:
(Abc) -> (abc) -> (ABC) -> (123) -> back to start.
To correct an entry, use the  key.
4. Press . The admin menu opens.
5. With the TouchGuide or Display/Navigation Keys, navigate to the **Applications** item. To navigate, you can either run your finger around the sensor ring (OS60/80), or press the  or  key.
6. Press  to open the **Applications** item and select **XML**. On , **Add application** appears in the context menu. With firmware version V2R1 onwards, the other application types appear, too.
7. Press  to open the menu for configuring a new application.
8. In the **New application** menu, enter the configuration data (for details, see Section 3.1.2, "Required Data"):
 - **Display name:** Application name for display.
 - **Application name:** Internal name for the application.
 - **Server address:** IP address of server hosting the program.
 - **Server port:** Server port used by the server-side program.
 - **Protocol:** Client/server communication protocol (HTTP or HTTPS).
 - **Program name:** Path to the server-side program.
 - **Auto start** (V2R1 onwards): Determines whether the application is started automatically on phone startup or, with V2R2, on mobile user logon.

- **Use proxy:** Use of a direct connection or proxy for client/server communication.
 - **XML trace enabled:** Sending trace data to a debugging program.
 - **Debug program name:** Path to a server-side debugging program.
 - **Number of tabs:** Number of internal tabs for this application.
 - **All tabs start** (V2R1 onwards): Relevant for application suites, that is, applications with internal tabs. Determines whether all tabs of an application suite shall be started on application start.
 - **Tab 1...3 Display Name:** Label text for the specified tab.
 - **Tab 1...3 Application Name:** Unique name for the specified tab.
 - **Restart after change:** If checked, a running XML application is restarted automatically after it has been modified.
9. When the configuration data is correct and complete, navigate to **Save & exit** and press .
 10. Press the  or **Services** key to activate the **Applications** tab. If everything went well, the new application is listed here. It can be started by pressing . For Xpressions, or a messages, phonebook, call log, or help application, press the corresponding mode key.
 11. To modify or delete an application, repeat steps 1 to 6, and then select the desired application in the menu. You can change the parameters and select **Save & exit** afterwards, or delete the application by selecting **Remove & exit**.

Setup, Start, and Use

Setting a Proxy

3.2 Setting a Proxy

The HTTP/HTTPS data transfer between the phone and the server on which the remote program is running can be handled by an HTTP proxy, if desired. The use of a proxy can be enabled or disabled separately for each application (see Section 3.1.2, "Required Data").

3.2.1 Using the Web Interface

1. Open the web interface as described in Section 3.1.3, "Using the Web Based Management (WBM)", steps 1 to 3.
2. Navigate to **Network > IP Configuration** and enter the IP address of the proxy to be used.

General IP configuration

Protocol Mode	IPv4
LLDP-MED Enabled	<input checked="" type="checkbox"/>
DHCP Enabled	<input type="checkbox"/>
DHCPv6 Enabled	<input checked="" type="checkbox"/>
VLAN discovery	Manual
VLAN ID	
DNS domain	
Primary DNS	0.0.0.0
Secondary DNS	0.0.0.0
HTTP proxy	

Submit Reset

3. Press **Submit**.
4. Navigate to **Network > Port Configuration** and enter the port of the proxy to be used.

Port configuration

SIP Server	5060
SIP registrar	5060
SIP gateway	5060
SIP local	5060
Backup proxy	5060
RTP base	5010
Download server (default)	21
LDAP server	389
HTTP proxy	0
LAN port speed	Automatic
PC port speed	Automatic
PC port mode	disabled
PC port autoMDIX	<input type="checkbox"/>

Submit Reset

5. Press **Submit**. The proxy is now configured.

3.2.2 Using the Local Admin Menu

1. Repeat steps 1-4 in Section 3.1.4, "Using the Local Admin Menu".
2. With the TouchGuide or Display/Navigation Keys, navigate to the **Network** item. To navigate, you can either run your finger around the sensor ring (OpenStage 60/80), or press the ▲ or ▼ key.
3. Press Ⓞ and navigate to the **IP configuration** item. On Ⓞ, the submenu opens.
4. Navigate to **HTTP proxy** and press Ⓞ.
5. In the phone's editor, enter the IP address of the proxy. For details about using the editor, please refer to the OpenStage Administration Manual or the OpenStage 60/80 User Guide.
6. When the configuration data is correct and complete, navigate to **Save & exit** and press Ⓞ.

Setup, Start, and Use

Reconfigure and Remove an Application

3.3 Reconfigure and Remove an Application

3.3.1 Using the Web Interface

3.3.1.1 Reconfigure

1. Open the web interface as described in Section 3.1.3, "Using the Web Based Management (WBM)", steps 1 to 3.
2. Navigate to **Applications > XML applications > Modify/Delete application** and select the application to be modified.

Modify/Delete application

Select application: testxml

Modify Delete

Settings

Display name: testxml

Application name: testxml

HTTP Server address: 192.168.1.150

HTTP Server port: 8080

Protocol: http

Program name on server: testxml/servlet

Auto start: ☒

Use proxy: No

XML Trace enabled: No

Debug program on server:

Number of tabs: 1

All tabs start: ☐

Tab 1 Display Name:

Tab 1 Application Name:

Tab 2 Display Name:

Tab 2 Application Name:

Tab 3 Display Name:

Tab 3 Application Name:

Restart after change: ☐

Mode key: 0

Submit Reset

3. Click on **Modify**. The configuration data of the selected application is loaded into the input fields.

Modify/Delete application

Select application: testxml

Modify **Delete**

Settings

Display name: testxml

Application name: testxml

HTTP Server address: 192.168.1.150

HTTP Server port: 8080

Protocol: http

Program name on server: testxml/servlet

Auto start: ☒

Use proxy: No

XML Trace enabled: No

Debug program on server:

Number of tabs:

All tabs start: ☐

Tab 1 Display Name:

Tab 1 Application Name:

Tab 2 Display Name:

Tab 2 Application Name:

Tab 3 Display Name:

Tab 3 Application Name:

Restart after change: ☐

Mode key: 0

Submit **Reset**

4. Change the data as desired. When the configuration data is correct and complete, click on **Submit**.

Setup, Start, and Use

Reconfigure and Remove an Application

3.3.1.2 Removing

1. Open the web based management as described in Section 3.1.3, "Using the Web Based Management (WBM)", steps 1 to 3.
2. Navigate to **Applications > XML applications > Modify/Delete application**.
3. In the **Select application** menu, choose the application to be deleted.



Although the contents of the **Settings** section will not change automatically when an application is selected in the menu, this selection will be valid.

Modify/Delete application

Select application: testxml

Modify Delete

Settings

Display name: testxml

Application name: testxml

HTTP Server address: 192.168.1.150

HTTP Server port: 8080

Protocol: http

Program name on server: testxml/servlet

Auto start: ☒

Use proxy: No

XML Trace enabled: No

Debug program on server: ☐

Number of tabs: 1

All tabs start: ☐

Tab 1 Display Name:

Tab 1 Application Name:

Tab 2 Display Name:

Tab 2 Application Name:

Tab 3 Display Name:

Tab 3 Application Name:

Restart after change: ☐

Mode key: 0

Submit Reset

4. Press **Delete** to remove the application.

3.3.2 Using the Local Admin Menu

Here, the basics for accessing the phone's local admin menu are described. For more detailed information on using the local menu, please consult the OpenStage 60/80 User Guide or the OpenStage Administration Manual.

3.3.2.1 Reconfigure

1. Repeat steps 1-5 in Section 3.1.4, "Using the Local Admin Menu".
2. Press **OK** to open the **Applications** item and select **XML**. On **OK**, **Add application** and the names of the previously configured applications appear in the context menu.
3. Navigate to the program that you wish to reconfigure and press **OK**.
4. In the application specific menu, enter the data required for the configuration of a program (see Section 3.1.2, "Required Data").
5. When the configuration data is correct and complete, navigate to **Save & exit** and press **OK**.

3.3.2.2 Removing

1. Repeat steps 1-5 in Section 3.1.4, "Using the Local Admin Menu".
2. Press **OK** to open the **Applications** item and select **XML**. On **OK**, **Add application** and the names of the previously configured applications appear in the context menu.
3. Navigate to the program that you would like to delete and press **OK**.
4. The **Save & exit** option is highlighted. Open the context menu by pressing the **→** key.
5. With the TouchGuide or Display/Navigation Keys, navigate to **Remove & exit** and press **OK**.

3.4 Starting the Application

The user can start an XML application in one of the following ways, provided that the keys are configured appropriately:

- by navigating to the applications menu using the **≡** key or **Services**,
- using a free programmable key,
- using the messages key **✉** or **Messages** (messages application),
- using the phonebook/directory key **☎** or **Directory** (phonebook/directory application),
- only with firmware version V2R1 upwards: using the forwarding key **↔** (OS60/80 only), the release key **☎** (OS60/80 only), the voice recognition key (OS60/80 only), the call log key **☎** or **Call Log** (call log application), or the help key **?** (help application, OS60/80 only).

Setup, Start, and Use

Starting the Application



With firmware V2R1 onwards, an XML application can be configured so that it will be started in the background on phone start. If so, the start document is loaded during the phone's startup process. Hence the application will be ready without delay when the user starts it. Please refer to the description of the **Auto start** parameter in Section 3.1.2, "Required Data".

The composition of the HTTP/HTTPS GET request sent by the phone depends on the target URL. If this URL has an `.xml` extension, the phone expects to receive a static XML document. In this case, the request URL will contain no additional information. Otherwise, if the requested URL has no `.xml` extension, the phone assumes it is communicating with a dynamic application, e. g. a servlet. If so, the phone will include its IP address, telephone number, and device type using key/value pairs in the request. The request URL has the following format:

```
http://<server ip address>:<port>/<program name>?ipaddress=
<phone IP>&phonenumber=<phone number>&devicetype=OpenStage
```

In both cases, whether the request URL has an `.xml` extension or not, the language currently selected on the phone is sent to the server in the `Accept-Language` field of the HTTP request header, for example:

`Accept-Language: en`

The following example shows a complete GET request sent by an OpenStage phone:


```
GET /ipp/example.txt?ipaddress=192.168.1.244&phonenumber=3338&device-
type=OpenStage HTTP/1.1
Host: 192.168.1.151\r\n
Connection: Close\r\n
Accept-Language: en\r\n
Accept-Charset: UTF-8
```

Application Suite Using Predefined Tabs

In addition to single applications, it is possible to run an application suite, which is divided in up to 3 internal tabs. With regular XML applications and phonebook applications, these tabs can be predefined by the administrator. For configuring an application suite, please refer to the descriptions of the tab-related parameters in Section 3.1, "Configuring an Application on the Phone".


The HTTP/HTTPS GET requests sent by the phone depend on the target URL. If this URL has an `.xml` extension, the phone will request the same XML document for each tab. If it has no `.xml` extension, the phone will append the unique tab name to the request URL. The request URI has the following format:

```
http://<server ip address>:<port>/<program name>?ipaddress=<phone  
IP>&phonenumber=<phone number>&devicetype=OpenStage&tab=<unique tab  
name>
```

Depending on how many tabs have been configured for the application, the phone will send 1 or 2 further similar requests for the other tabs. Each of these requests will be sent right after the response to the preceding request has been received. The focus will be on the last tab started. With firmware version V3R0 and upwards, the user can switch between the tabs of a regular XML application using left/right arrow keys while focus on tab bar. To move focus use up arrow key. To return the focus to the Application OK button has to be used. With Xpressions applications, the  or **Messages** key is used for tab switching, and with other application types, the correspondent mode key or free programmable key is used.

Application Suite Using Tabs On Demand

As an alternative to predefined tabs, it is possible to start tabs on demand. The content for the tabs is delivered by the server using push requests (Section 2.3, "Push Mode" and Section 6.2, "The Push Request"). Xpressions always uses tabs on demand. With tabs on demand, it is possible to deliver different content for every tab. The tab that has been started first uses the start URL configured on the phone. The remaining tabs use the URL supplied by the remote server.

The focus is on the first tab started by the phone. With Xpressions applications, the  or **Mes-**
sages key is used for tab switching, and with other application types, the correspondent key is used.

3.5 Mobile Users And Privacy

As some XML applications may process personal user data, it is important that the remote application is aware of the user currently logged onto the phone. This can be achieved by mapping the phone number against the phone's IP address. Both parameters are available to the remote program, as they are sent by the phone on application start. Please note that this will not be the case if the program name has an **.xml** suffix. For details please see Section 3.4, "Starting the Application".

3.6 User Interface

3.6.1 Display

When an XML application is started, an application tab appears underneath the status bar. It is labeled with the display name assigned to the application (see the **Display name** parameter in Section 3.1, "Configuring an Application on the Phone").

In the title bar, the title of the currently displayed XML document is shown. The title is an element within the structure of the currently displayed XML object.

The options bar provides a context menu for the commands associated with the XML objects in a screen. However, commands can be configured to be displayed only on the item they are associated with. If no command is configured to be displayed in the options bar, the options bar is not shown. For details about commands, please see Section 5.5, "Command".



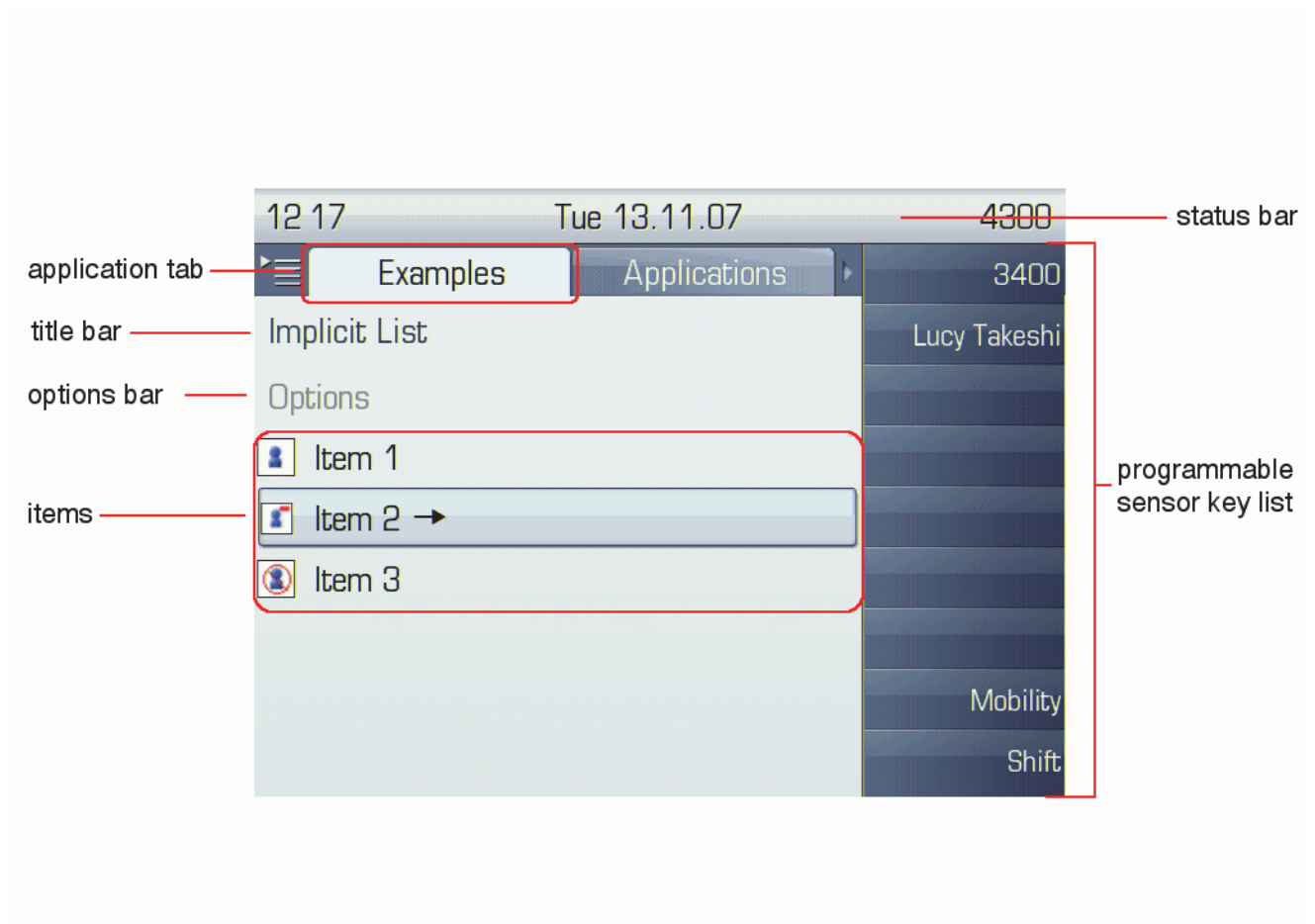
The label for the options bar depends on the current language setting for the phone. For details about setting the language, please refer to the OpenStage 60/80 User Guide or OpenScape Desk Phone IP 55G User Guide.

Some of the XML objects described in Section 5, "XML Object Reference" are rendered as displayable items with which the phone user can interact, for instance item lists (see Section 5.8, "List"), text boxes (see Section 5.9, "Text Box"), or buttons (see Section 5.20, "Form/Button").

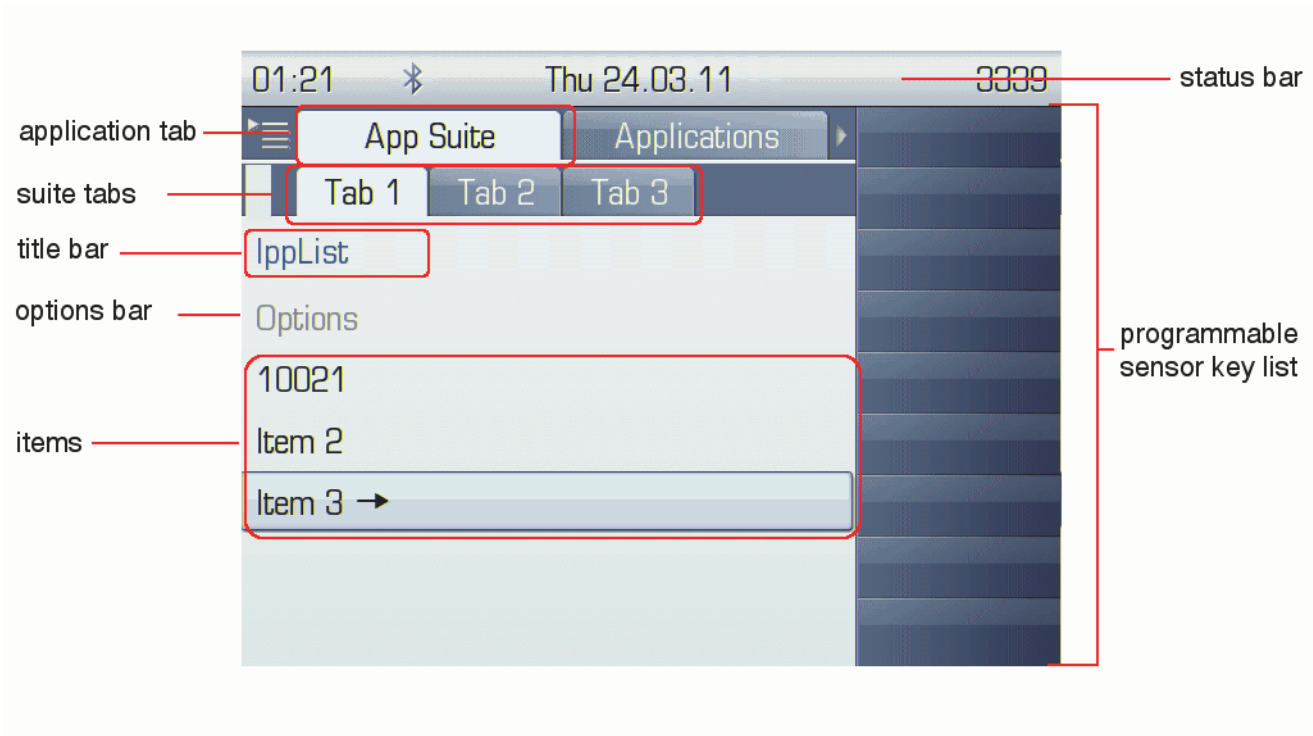


The screenshots in this document may deviate slightly from the current look of your phone display. This is due to possible skin or firmware changes.

Screenshot of a Single XML Application



Screenshot of an XML Application Suite



3.6.2 TouchKey and Navigation Keys

For navigating in an XML application, for selecting items, and to send commands and data to the server-side program, the TouchKey (OpenScape 60/80) or Navigation Keys (Desk Phone IP 55G) is used. The following table associates user operations and the corresponding function in the application.







Operation Open-Scape 60/80	Openeration Open-Stage Desk Phone IP 55G	Function
<p>▲ key or run finger counterclockwise</p> 	<p>⏶ key</p> 	Navigate up, or to the previous item.
<p>▼ key or run finger clockwise</p> 	<p>⏷ key</p> 	Navigate down, or to the next item.
<p>→ key</p> 	<p>⏵ key</p> 	Open the right context menu (OpenScape 60/80) or move to right in context sensitive Soft-keys (DPIP55G).

Table 3-1





Operation Open-Scape 60/80	Openeration Open-Stage Desk Phone IP 55G	Function
↶ key 	↶ key 	Depending on the context, one of these functions can be triggered: <ul style="list-style-type: none"> • Open the left context menu (OpenScape 60/80) • Leave the context menu (OpenScape 60/80) • Go back to the previous screen
Ⓞ key 	Ⓞ key 	OpenScape 60/80: Execute a command in the context menu or directly associated with an item. DPIP55G: An entry is selected: <ul style="list-style-type: none"> • Perform action • Confirm selection

Table 3-1

3.6.3 Keypad

The keypad is used for entering alphanumerical data in input fields, or for direct keypad input in hotkey manner (see Section 5.6, "Direct Keypad Input"). For inputting alphanumerical data, the display keyboard is used; for use instructions, please refer to the OpenStage 60/80 User Guide, to the OpenStage Administration Manual, or to the OpenScape Desk Phone IP 55G User Guide.

3.6.4 TouchSlider (Sensor Slider)

On OpenStage 60/80 in normal phone operation, the sensor slider is used for audio control. When an XML application is active, it can be used to set a numerical value. The value is read by means of the gauge object (see Section 5.21, "Form/Gauge").

3.6.5 LEDs

For some mode keys, the associated white LED of can be controlled by an XML application. Please refer to Section 5.4, "Action" and Section 3.1, "Configuring an Application on the Phone".

3.6.6 Additional Keys for Application Control

The free programmable function keys (FPKs) and, with firmware V2R1, the fixed function keys can be configured to send a customizable HTTP or HTTPS request to a URL (see Section 8, "Using Additional Phone Keys (All Phone Types)"). This provides an additional possibility to control the remote program that is associated with the XML application. The remote program can send feedback to the phone via a push request (see Section 6, "Push Capability (All Phone Types)").

4 XML Structure and Encoding



Please ensure that the XML documents used by the application do not exceed the maximum size of 25kB.

4.1 Encoding/Internationalization

The OpenStage XML interface supports UTF-8 and ASCII. If a different character set is used, e. g. ISO 8859-1, special characters can be encoded by the appropriate numeric character references.

Example: `ä` will be rendered as the german umlaut "ä".

For details, see <http://www.w3.org/TR/2000/REC-xml-20001006#sec-references>.



Some text editors add the leading sequence `0xEF 0xBB 0xBF` to an UTF-8 file. This is a Byte-Order Mark (BOM), which is conventionally used to indicate that the text is encoded as UTF-8. As the phone's XML parser does not support UTF-8 files with BOM, please make sure you use an editor that does not insert this mark. The problem exists, for instance, with older versions of Notepad++, and with Windows XML Notepad 2007. There are reportedly no problems with Notepad2, Notetab, or Altova XML Spy.



Please ensure that the encoding specification in the XML header is in capital letters, e. g. `<?xml version="1.0" encoding="UTF-8" ?>`

URIs sent by the phone are UTF-8 encoded; reserved characters are percent-encoded. The BNF grammar is used according to <http://www.ietf.org/rfc/rfc2396.txt>, appendix A.

5 XML Object Reference

This chapter describes the usage, content and error handling for the individual XML objects. The objects are comprised of a main element, its attributes and one or more child elements and their attributes. The names of the basic XML elements are prefixed with "Ipp", which stands for "IP phone"; for example, **IppAction**.

For each individual XML object, an example is provided. All examples from this document are available for download from the Unify Community Portal. For downloading,

1. register with the Community Portal under
<http://www.unify.com/us/partners/developer-program.aspx>
2. and navigate to
<https://app-enterprise.unify.com/gdmsproxy/retrieve?id=40777895>

5.1 Phone

IppPhone is an optional root element which enables the integration of special objects in the XML application. These objects are not displayed. They will be available in future versions of the OpenStage 60/80 and DPIP55G phone software. Using **IppPhone** in current XML applications has the advantage of allowing easy extension in the future.

The use of **IppPhone** as the root element is not mandatory, **IppDisplay** (see Section 5.2, "Display") can also serve as the root element of an XML application.

Syntax

```
<IppPhone>  
  <IppDisplay/>  
</IppPhone>
```

5.2 Display

This object enables multiple screens within a single XML document. A "screen", in the context of this guide, means the content that is simultaneously shown on the display, comparable to a web page. The `IppDisplay` element functions as the root element of an XML document (unless `IppPhone` is used; see Section 5.1, "Phone"). Therefore, as the container for screen objects, the `IppDisplay` element is comparable to a deck of cards in a WML document.

An XML document may contain up to 5 screens, one of which may be the `InitialScreen` and another the `UpdateScreen`. If there are more than 5 screens in the XML document, the surplus screens are ignored.

Attributes

The following attributes are available to the `IppDisplay` element:

Attribute	Value	Functionality/Remarks
<code>InitialScreen</code> (optional)	ID of the initial screen (integer)	Used when there are multiple Screens within the same XML document. Determines which Screen is shown when the XML document is opened. If the attribute is not present, the initial Screen displayed is the first Screen in the XML document.
	0 or greater than the number of Screens, or negative, or not a valid number	The first Screen in XML document order is displayed as initial Screen.
<code>InitialScreen</code> (optional)	ID of the first screen to be displayed	The screen whose ID is given here is displayed when the document is loaded.
	Missing, negative, or invalid	The first screen in document order is displayed when the document is loaded.
<code>UpdateScreen</code> (optional)	ID of the second screen to be updated (integer)	Used when two screens have to be updated simultaneously. Provides the ID of the second screen to be updated.
	Missing, negative, or invalid	There is no second screen to update.

Syntax

```

<IppPhone>
  <IppDisplay UpdateScreen="[ID]" >
    <IppScreen/>
    <IppScreen/>
    <IppScreen/>
    <IppScreen/>
    <IppScreen/>
  </IppDisplay>
</IppPhone>

```

5.3 Screen

The **IppScreen** element serves as a container for displayable items and commands. Switching between different screens contained in a document, i. e. an **IppDisplay** element, is possible using the **ID** attribute. The screen switching is done via the **SCREEN** command (see Section 5.5, "Command"). The screen which contains **IppAction** element does not need to contain any displayable element (V3R3 and upwards).



If a new screen is loaded whose screen ID already exists, elements of cached screens may be overwritten. For details, see the table in Section 2.5, "Cache".

Attributes

The following attributes are available to the **IppScreen** element:

Attribute	Value	Functionality/Remarks
ID (optional)	ID of the screen element (integer)	Enables referencing of the screen object, so that the screen can be accessed directly. If missing, negative, or invalid, it will default to 0.
HiddenCount (mandatory)	Number of Hidden objects	All hidden objects (see Section 5.11, "Hidden") are displayed.
	0	All hidden objects are ignored. If missing, negative, or invalid, it will default to 0.
	A number lesser than the actual number of Hidden objects	All the hidden objects that exceed the number indicated here are ignored.

XML Object Reference

Screen

CommandCount (mandatory)	Number of Command ob- jects	All command objects (see Section 5.5, "Command") are displayed. If missing, negative, or invalid, it will default to 0.
	0	All command elements are ignored.
	A number less- er than the ac- tual number of Command ob- jects	All the command elements that exceed the number in- dicated are ignored.
History (optional)	YES	Default value. The screen will be added in the page his- tory. Thus it is possible to navigate to the screen via BACK command or left arrow key. Available with V3R2.
	NO	The screen won't be added into the page history. Avail- able with V3R3 and upwards.

Syntax



The IppScreen element must contain one of the following elements. With V3R3 and upwards, except the case when the screen contains IppAction element:

- IppAlert
- IppList
- IppTextBox
- IppForm
- IppPlayer
- IppTable

```
<IppPhone>  
  <IppScreen ID="[ID]" HiddenCount="[Number]" CommandCount=  
" [Number]" History="YES|NO">  
    <IppKey/>  
    <IppAction/>  
    <IppCommand/>  
    <IppAlert/>  
    <IppList/>  
    <IppTextBox/>  
    <IppTicker/>  
    <IppHidden/>  
    <IppForm/>  
    <IppPlayer/>  
    <IppTable/>  
  </IppScreen>  
</IppPhone>
```

5.4 Action




Actions provide a request mechanism to the phone to perform specified tasks: make a call to a specified number and end the call, or control mode key LEDs. The optional attribute 'Focus' defines whether the screen gets focus after call is established.



For security reasons, an XML application can only clear a call that it has initiated. Thus, in order to be able to clear a call down, the application must be running whilst the call is in progress. If the application is stopped and restarted whilst the call is in progress, the newly started application can not clear the call, because this new instance of the application did not initiate the call.

Attributes

For the `IppAction` element, the `TYPE` attribute is required with the following values.

Attribute	Value	Functionality/Remarks
Type (mandatory)	MAKECALL	A call to the telephone number specified in the child element Number is initiated. The possible formats for the call number depend on the phone's dial settings. Please refer to the OpenStage Administration Manual.
	ENDCALL	Ends the call made by a MAKECALL action.
	TURNLEDON	Turns on the white LED of the mode key on which the application is configured. (The white LED is always switched off when the blue LED is on, so that the white LED will only be visible when this application does not have the focus.) With firmware earlier than V2R1, this function is available only for Xpressions applications. Thus, only the white LED of the messages key  can be controlled. With firmware from V2R1 onwards, the white LED of the messages key  can be controlled with an Xpressions or messages application, and the call log key  can be controlled with a call log application.

XML Object Reference

Action

Attribute	Value	Functionality/Remarks
	TURNLEDOFF	Turns off the white LED of the mode key on which the application is configured. (The white LED is always switched off when the blue LED is on.) With firmware earlier than V2R1, this function is available only for Xpressions applications. Thus, only the LED of the messages key ☒ can be controlled. With firmware from V2R1 onwards, the white LED of the messages key ☒ can be controlled with an Xpressions or messages application, and the call log key ☒ can be controlled with a call log application.
	PLAYTONE	Tone defined with IppTone is played, see Section 5.26, "Tone". Available with V3R3 and upwards.
	HIDEPOPUP	Hides the Alert popup window, see Section 5.7, "Alert", identifiable by the 'ID' attribute of superior screen. If the window is not shown no action is taken. 'HIDEPOPUP' is ignored if the superior screen contains any of the following element: IppAlert, IppList, IppTextBox, IppForm, IppTable, or IppPlayer. Available with V3R3 and upwards.
	Missing or invalid	No action will be performed.
Focus (optional)	YES	Default value. The screen will be in focus after the call is established. For Type=MAKECALL only. Available with V3R2.
	NO	The screen won't be in focus after the call is established. For Type=MAKECALL only. Available with V3R3 and upwards.

Syntax

```
<IppAction Type="MAKECALL | ENDCALL | TURNLEDON | TURNLEDOFF | PLAYTONE |  
HIDEPOPUP"  
Focus="YES|NO">  
  <Number> [Phone Number] </Number>  
</IppAction>
```

Child elements

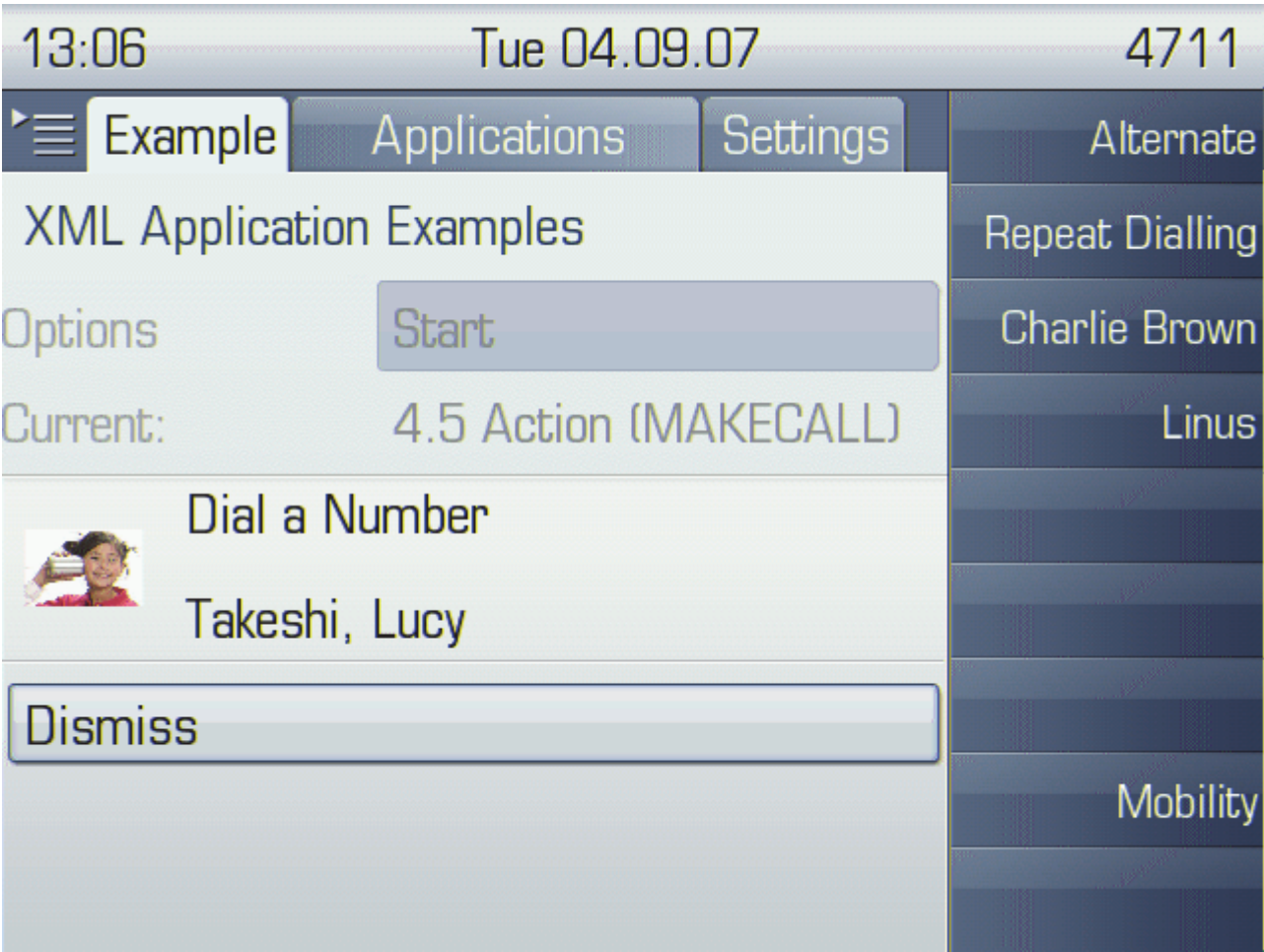
- **Number**

The telephone number to be dialed.




Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="0">
      <IppAlert Type="CONFIRMATION" Delay="FOREVER">
        <Title>Dial a Number</Title>
        <Text>
          3290
          <IppPhoneNumber ImageType="PICTURECLIP"
NumberType="NAME">
            <AltText>No image available for this entry</AltText>
          </IppPhoneNumber>
        </Text>
        <Image></Image>
      </IppAlert>
      <IppAction Type="MAKECALL" Focus="YES">
        <Number>+49897223290</Number>
      </IppAction>
      <IppAction Type="PLAYTONE">
        <IppTone Length="SHORT"/>
      </IppAction>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```


Screenshot



5.5 Command

On OpenStage 60/80 phones, commands generally appear in context menus which are associated either with the options bar or with the clickable area of a specific item. There are 2 different context menus: a click on the  key invokes the left context menu, and a click on the  key invokes the right context menu. The user can leave the context menu by pressing the  key.

The right context menu shows all commands, according to the settings of the `DisplayOn` attribute. The left context menu only shows CANCEL, BACK, and EXIT commands. For more information, please refer to the attribute table underneath. On OpenStage 60/80, these command types may be associated with the click wheel left-arrow key. On DPIP55G, these command types may be associated with the left-arrow navigation key. The XML Application running on the server is not aware of this association.

If a command is specified accordingly and associated with an implicit list, it can be started directly with the  key (see the attribute table underneath, and Section 5.8, "List").

With alerts (see Section 5.7, "Alert"), the commands are displayed at the bottom of the alert.

On DPIP55G, commands generally appear as Softkey bar. The same or different labels in Softkey bar may be displayed from "Options" or other items in the screen. Some commands are associated with navigation keys on the phone.

Attributes





The following attributes are available to the `IppCommand` element:

Attribute	Value	Functionality/Remarks
Type (mandatory)	SELECT	Transmits the key/value pairs from the current list, text box, form, table, or player, to the URL indicated in the relevant object. Key/value pairs from hidden objects and the key/value pair associated with the command, if present, are also sent to the server.
	BACK	Switches to the cached version of the screen displayed previously. The command will always go back to the previous full screen, i. e. form, list, or text box. If the previous screen is an alert (see Section 5.7, "Alert") or player (see Section 5.24, "Player"), it will be skipped. If there is only a single screen in the XML document, no menu item is generated for this command.
	UPDATE	Replaces the current screen with the screen specified in the current list, text box, form, or player. The data for this screen is fetched from the server using the URL associated with the current screen. Key/value pairs from hidden elements and the key/value pair associated with the command, if present, are sent to the server. As opposed to a SELECT Command, no key/value pairs from the current list, text box, form, table, or player, are sent to the server.
	SCREEN	Switches to the screen specified in the child element ScreenID . This screen must be contained in the same display element (IppDisplay). The server-side program is not informed of this action. If the data in ScreenID are missing or invalid, the current screen will continue to be displayed.

	CANCEL	Used to undo a selection made in selection lists (see Section 5.8, "List", and , Form/Choice Group) or an entry made in input fields (see Section 5.9, "Text Box", Section 5.17, "Form/Text Field", and Section 5.19, "Form/Date Field"). The contents of the current screen revert back to their preset values cached on the phone.
	ACTION	Up to 3 lppAction elements are performed, but each of them must have different value in lppAction-Type attribute. If there are two actions of same type only the first is executed otherwise they are executed in the same order as listed in the XML document. Available with V3R3 and upwards.
	EXIT	Ends the application.
Priority (optional)	Priority (integer)	Determines the order of the command objects, whereby 0 represents the one with the highest priority, followed by 1 and so on.
Auto (optional)	Total duration in seconds	The command object is automatically executed after the specified time, that is, without the user doing anything. If multiple command objects containing this attribute exist, the one that is set for the shortest total duration is executed. This means that only one command per screen is executed automatically. If there are both 'Auto' and 'Event' attribute in the command the 'Auto' attribute is ignored.
	0 or missing, or negative, or invalid	The command is only invoked through user action.
Key (optional)	Key	The key for the key/value pair that is sent to the server-side program. Please note that the key must be unique within a screen.
Value (optional)	Value	The value for the key/value pair that is sent to the server-side program.

XML Object Reference

Command

DisplayOn (optional)	OPTIONS	Default value. The command is displayed on the options bar. See Table 5-1 Positioning of Commands for Different Types of Screen on OpenStage/DPIP55G.
	LISTITEM	The command is displayed on a list item (see Section 5.8, "List") or on an individual item in a form, if included in a form item (see Section 5.13, "Form/Item"). See Table 5-1 Positioning of Commands for Different Types of Screen on OpenStage/DPIP55G.
	BOTH	The command is displayed both on the options bar and on list items or form items. See Table 5-1 Positioning of Commands for Different Types of Screen on OpenStage/DPIP55G.
	NONE	The command is displayed nowhere. See F. Available with V3R3 and upwards.
Select (optional)	YES	<p>The command is pre-selected in an implicit list (see Section 5.8, "List"). If more than one commands are pre-selected, only the first one in document order will be used.</p> <p>Pressing  (OpenStage 60/80) or  (DPIP55G) when the options bar is highlighted returns the key/value pair for the pre-selected command.</p> <p>Pressing  (OpenStage 60/80) or  (DPIP55G) when an individual list item is highlighted returns the key/value pairs for both the pre-selected command and the highlighted list item.</p>
	NO	Default value. The command is not pre-selected in an implicit list.
Default (optional)	YES	The command is set as the default command in the context menu (OpenStage 60/80) or Softkey bar (DPIP55G). If more than one command is set as the default command, only the first one will be the default command.
	NO	Default value. The command is not set as the default command in the context menu.

Event (optional)	ONFOCUS	Defines event when the screen gained focus by user interaction or on Push request. If there are both 'Auto' and 'Event' attribute in the command the 'Auto' attribute is ignored. Valid only if Type= "UPDATE" or "SELECT" and DisplayOn= "NONE". Otherwise the parameter will be ignored.
	ONBLUR	Defines event when the screen lost focus. If there are both 'Auto' and 'Event' attribute in the command the 'Auto' attribute is ignored. Valid only if Type= "UPDATE" or "SELECT" and DisplayOn= "NONE". Otherwise the parameter will be ignored.

Syntax

```
<IppCommand Type="SELECT|BACK|UPDATE|SCREEN|CANCEL|EXIT"
Priority="[Number]" Auto="[Number]" Key="[Key]" Value="[Value]"
DisplayOn="OPTIONS|LISTITEM|BOTH|NONE" Select="YES|NO"
Default="YES|NO" Event="ONFOCUS|ONBLUR">
  <Label> </Label>
  <ScreenID> </ScreenID>
</IppCommand>
```



Multiple occurrences of a command type may appear on a screen. In such cases, the commands should have different labels in order to be distinguishable by the user.



If the **Type** attribute is missing or has an invalid value, the command is not displayed. If the child element **Label** is missing, the command type is displayed instead of a label.



If the event, specified in the attribute, occurs on the phone a HTTP/HTTPS request will be delivered to specified URL in 'Url' element of screen. The parameters in the request depend on type of command.



On OpenStage 60/80, the **Type** attributes BACK, UPDATE, and EXIT may be associated with the click wheel left-arrow key. On DPIP55G, the **Type** attributes BACK, UPDATE, and EXIT may be associated with the left-arrow navigation key. The XML Application running on the server is not aware of this association.

Child elements

- **Label**

Contains the label for the menu item that is generated for the Command.

• **ScreenID**

Indicates which screen should be accessed next on activating a **SCREEN** Command. The **ScreenID** is only appropriate if the Command type is **SCREEN**. If the **ScreenID** is missing or invalid, the current Screen will not be replaced, but continue to be displayed.

Type of Screen	DisplayOn			
	OPTIONS	LISTITEM	BOTH	NONE
Alert	Command added to and displays on the Alert			Command is hidden
Form	Command added to and displayed on "Options"	Command added to and displayed on individual items in the Form. Each item may display a different set of commands.	Commands added to and displayed on "Options" and individual items in the form. "Options" and each item may display a different set of commands. Commands added to and displayed on "Options" and individual items in the list.	Command is hidden
List	Command added to and displayed on "Options"	Command added to and displayed on individual items in the list. Each item displays the same set of commands.	Each item displays the same set of commands. A different set of commands may be displayed on "Options" to those on the individual items in the list.	Command is hidden

Table 5-1 Positioning of Commands for Different Types of Screen on OpenStage/
DPIP55G

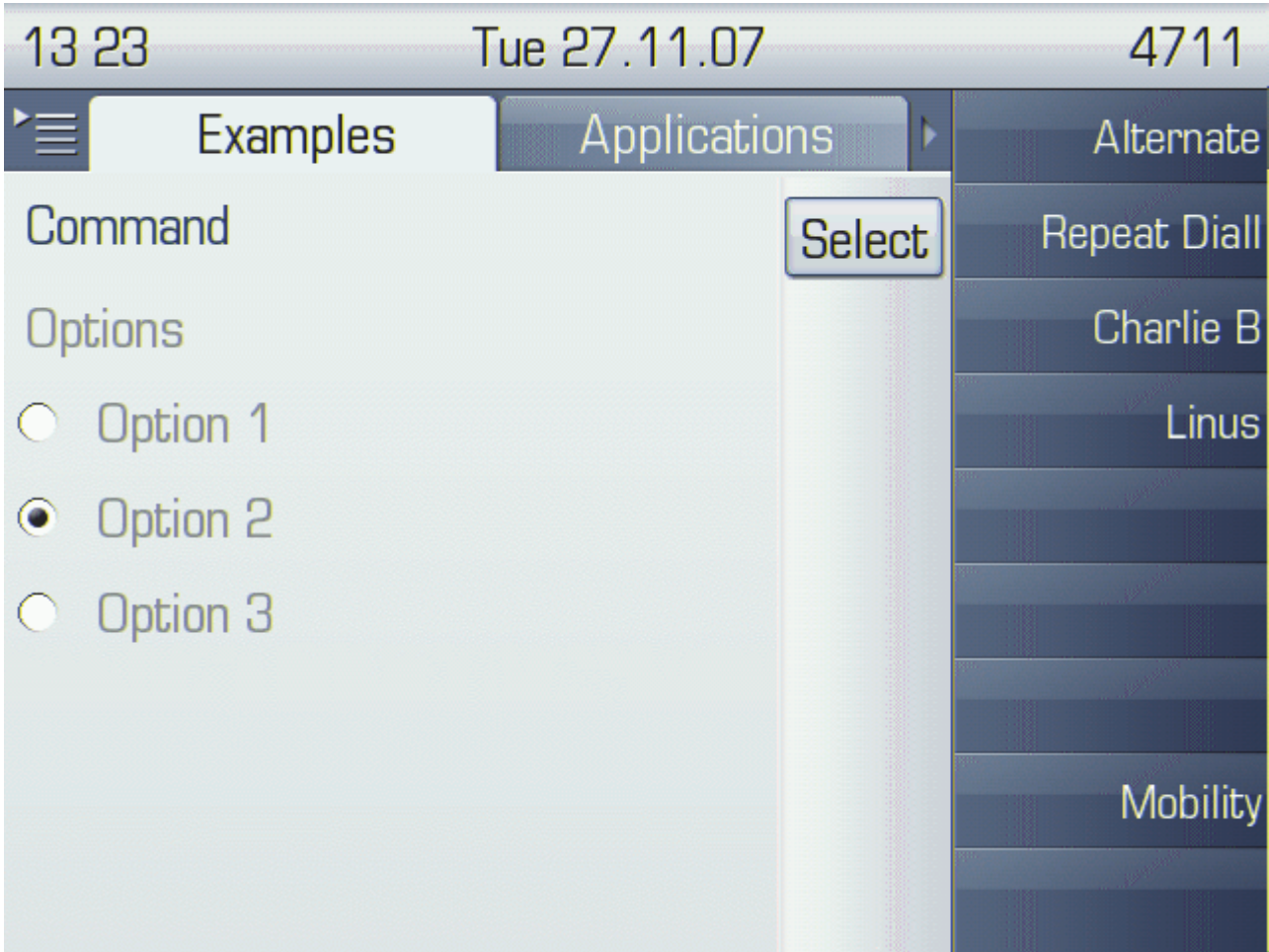
Type of Screen	DisplayOn			
	OPTIONS	LISTITEM	BOTH	NONE
Popup Player	Not appropriate - Commands can not be added to or displayed on Popup Player.			
Text Box	Command added to and displayed on "Options"			Command is hidden

Table 5-1 Positioning of Commands for Different Types of Screen on OpenStage/DPIP55G

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="2">
      <IppList Type="EXCLUSIVE" Count="3">
        <Title>Command</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <Option ID="1" Selected="FALSE" Key="key" Value="1">
          <OptionText>Option 1</OptionText>
        </Option>
        <Option ID="2" Selected="TRUE" Key="key" Value="2">
          <OptionText>Option 2</OptionText>
        </Option>
        <Option ID="3" Selected="FALSE" Key="key" Value="3">
          <OptionText>Option 3</OptionText>
        </Option>
      </IppList>
      <IppCommand Type="SELECT" DisplayOn="BOTH" Priority="1">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.6 Direct Keypad Input

5.6.1 Overview

In addition to regular user input by the means of input fields, it is possible to send keypad entries to the remote server in realtime, or, alternatively, in buffered mode. In unbuffered mode, the phone will immediately send an HTTP/HTTPS GET request to the server as soon as a keypad key has been pressed. After this, the phone will wait for a server response. The request contains a key/value pair wherein the key is predefined in the XML document, and the value represents the value of the keypad key.

The phone itself will not generate audible or visual feedback to the user when the data is sent; this must be handled by an appropriate server response.

The feature is available exclusively for lists (see Section 5.8, "List"); with alerts, forms, text boxes, or players, only regular user input is supported. To enable and configure direct key input, the `IppKey` element is used.

To add context information, hidden (Section 5.11, "Hidden") objects can be used. The key/value pairs contained in the hidden objects will be sent along with each keypad input. For example, the remote server may keep track of the entire digit sequence entered so far by including this digit sequence in an hidden object.



Long presses of the * and # keypad keys toggle the ringing state and invoke phone lock. As the keypad input feature does not distinguish between short and long press, these functions would occur in parallel with sending keypad input to the remote server. If the remote server updates an XML application whilst the phone is locked, the user does not see the updated screen until after the phone is unlocked.



Certain keypad key combinations may be invoked on the phone to enter the admin menu, invoke a factory reset, or restart the phone. When the first key of a combination is pressed, the corresponding value will be sent to the remote server. However, the subsequent key presses of the key combination will not be communicated.



If an alert (see Section 5.7, "Alert") is displayed over a list which had sending keypad input enabled, this function will be automatically disabled. Moreover, it will stay disabled when the alert is dismissed and the list has focus. To re-enable sending keypad input on the list, the XML document for the list must be sent again.

Buffering

As an alternative to immediate sending and interaction with the server, keypad input can be buffered and sent afterwards. This is controlled by the **BufferKeys** element. Depending on the settings of **BufferLength** and **TermKey**, the data is submitted either when the key sequence has reached the predefined buffer length, or when the predefined termination key is pressed.

If an application requires each keypad key press one at a time, the remote server should request subsequent buffering (see Section 5.6.3.4, "Buffer Subsequent Keypad Key Presses"). This ensures that no keypad key presses are thrown away when the user types keypad keys quicker than responses are received from the server.

Error Handling

If there is a failure in the communication protocol between the phone and the remote server when sending keypad key presses to the remote server, no error message is displayed to the user. However, if requested in the XML document, the key presses will be buffered on the phone. When the user presses the next keypad key, and the connection is re-established, that key press and all buffered key presses will be sent to the remote server.

5.6.2 Possible Uses

Potential example XML applications using sending keypad input are:

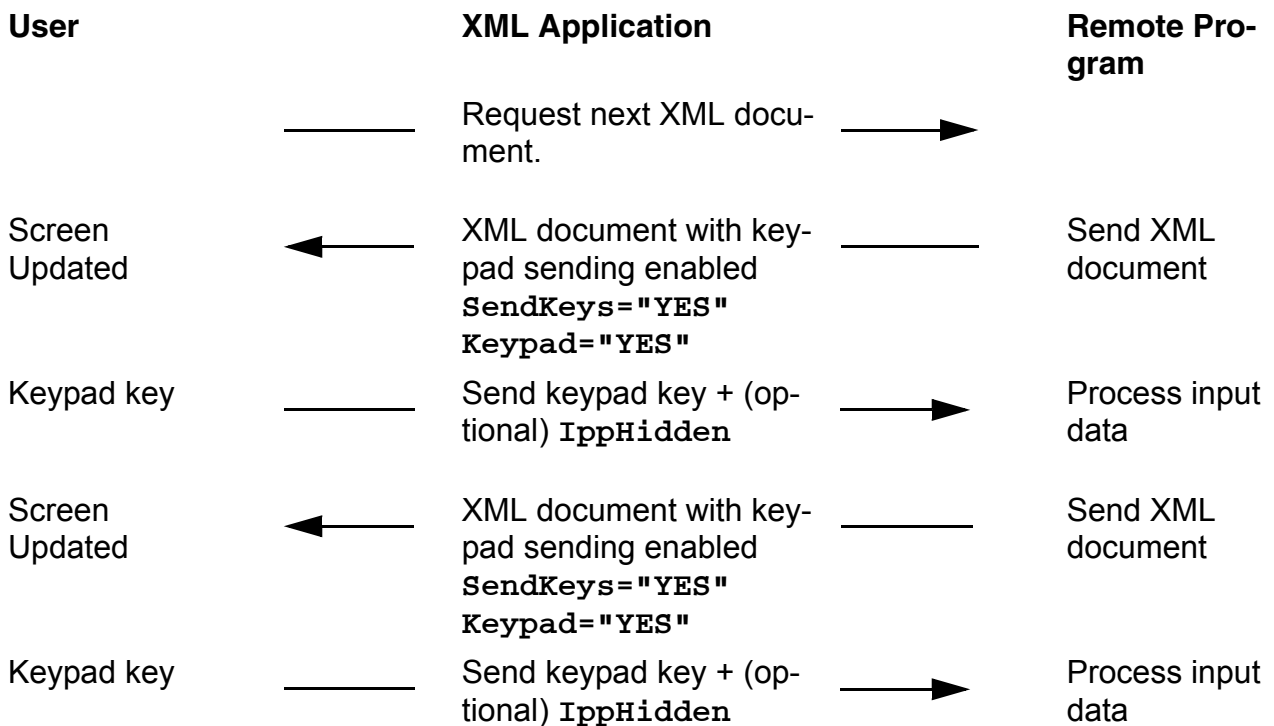
1. A phonebook application in which the user initiates a search for the appropriate entry using the keypad keys. The digits are sent to the remote program. The remote program uses the digits as search criteria and returns a list of matching entries. These entries are immediately displayed to the user. If the user presses subsequent keypad keys after the first keypad digit, and a response has not yet been received, the keypad digits are buffered, and sent en bloc to the remote program.
2. A menu application provides a sequence of numbered lists of options. The user navigates in a list using the keypad keys. The remote program requires single keypad digits to determine the next list. Therefore, multiple keypad digits or any subsequent keypad digits are ignored whilst the phone is waiting for server response.
3. An application requests the user to enter a PIN. The user presses a sequence of keypad digits terminated by #. The digits are buffered until the # is detected. After this, all of the digits including the # are sent en bloc to the remote program.

5.6.3 Typical Client-Server Interactions

This section describes typical interactions between the phone-side XML application and the server-side program with different settings for the keypad sending function.

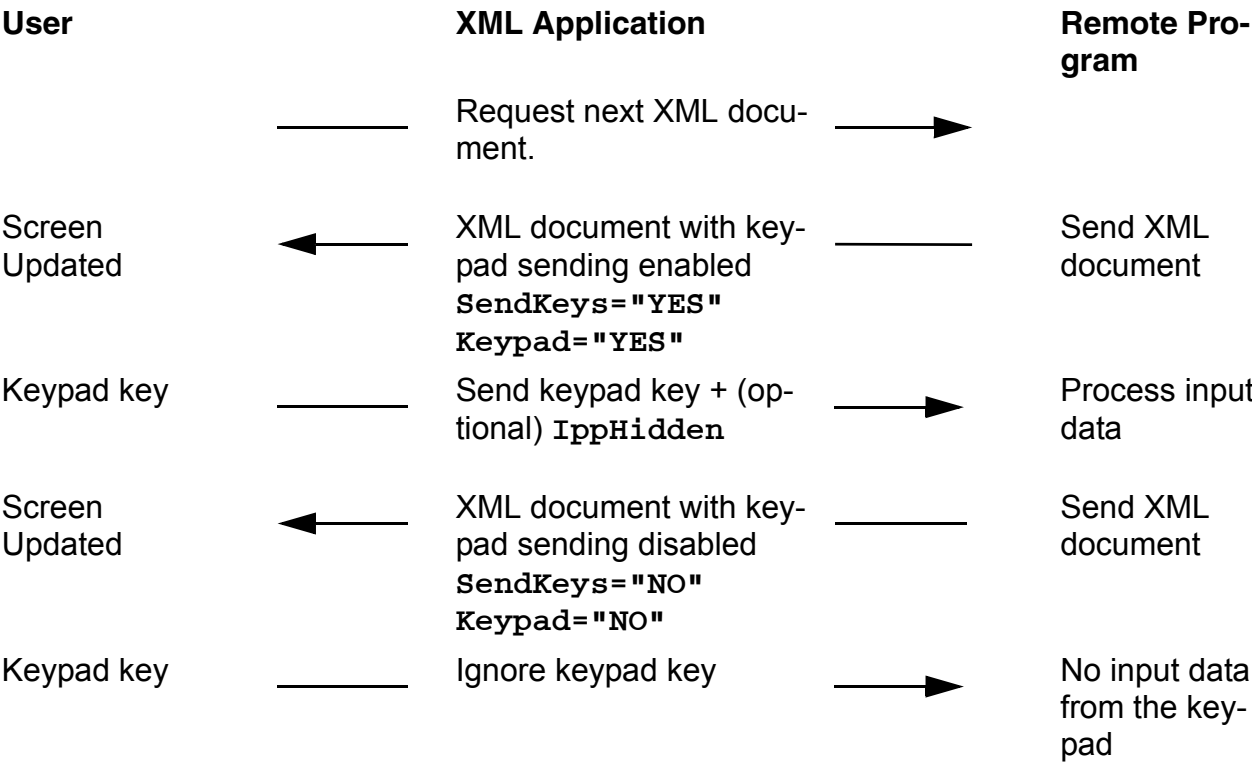
5.6.3.1 Sending Keypad Keys Enabled and Immediate Submission

In the following interaction, the remote program enables sending keypad input and disables buffering. As soon as the user presses a keypad key, the screen updates.



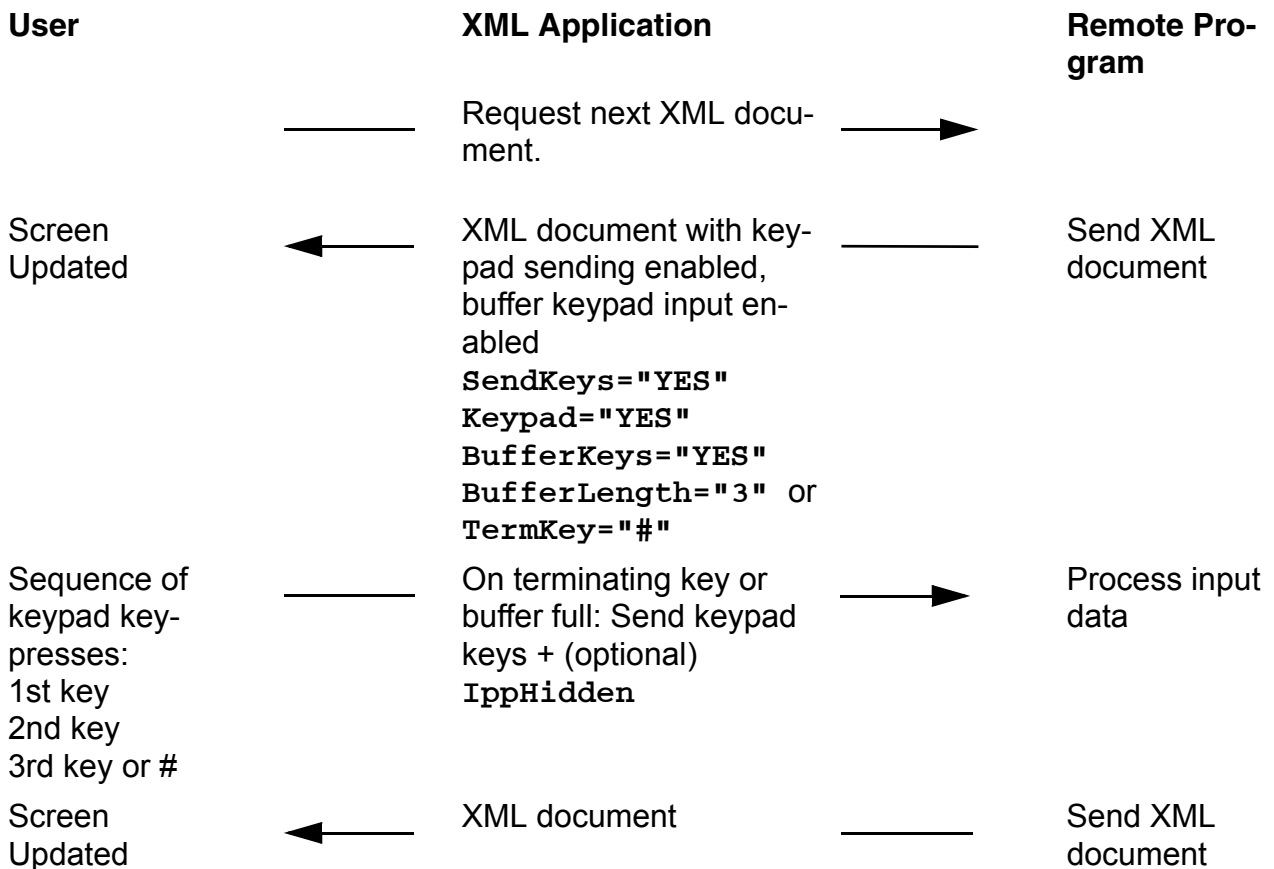
5.6.3.2 Disable Sending Keypad Keys

In the following interaction, the remote XML application initially enables sending keypad input. The user presses a keypad key which is sent to the remote program. With the following XML document, the XML application disables sends keypad input. All subsequent keypad key presses are ignored.



5.6.3.3 Buffer Initial Keypad Key Presses

In the following interaction, the remote program enables send keypad input and buffering with a buffer length greater than 1. When the user presses one or more keypad keys, the key presses are buffered until the buffer is full, i.e. the number of key presses equals the predefined buffer length. After this, the key data are sent en bloc to the remote XML application. Alternatively, a terminating keypad key is defined and the non-terminating keypad key presses are buffered until the terminating key is pressed. After this, the key data are sent en bloc, including the terminating keypad key.

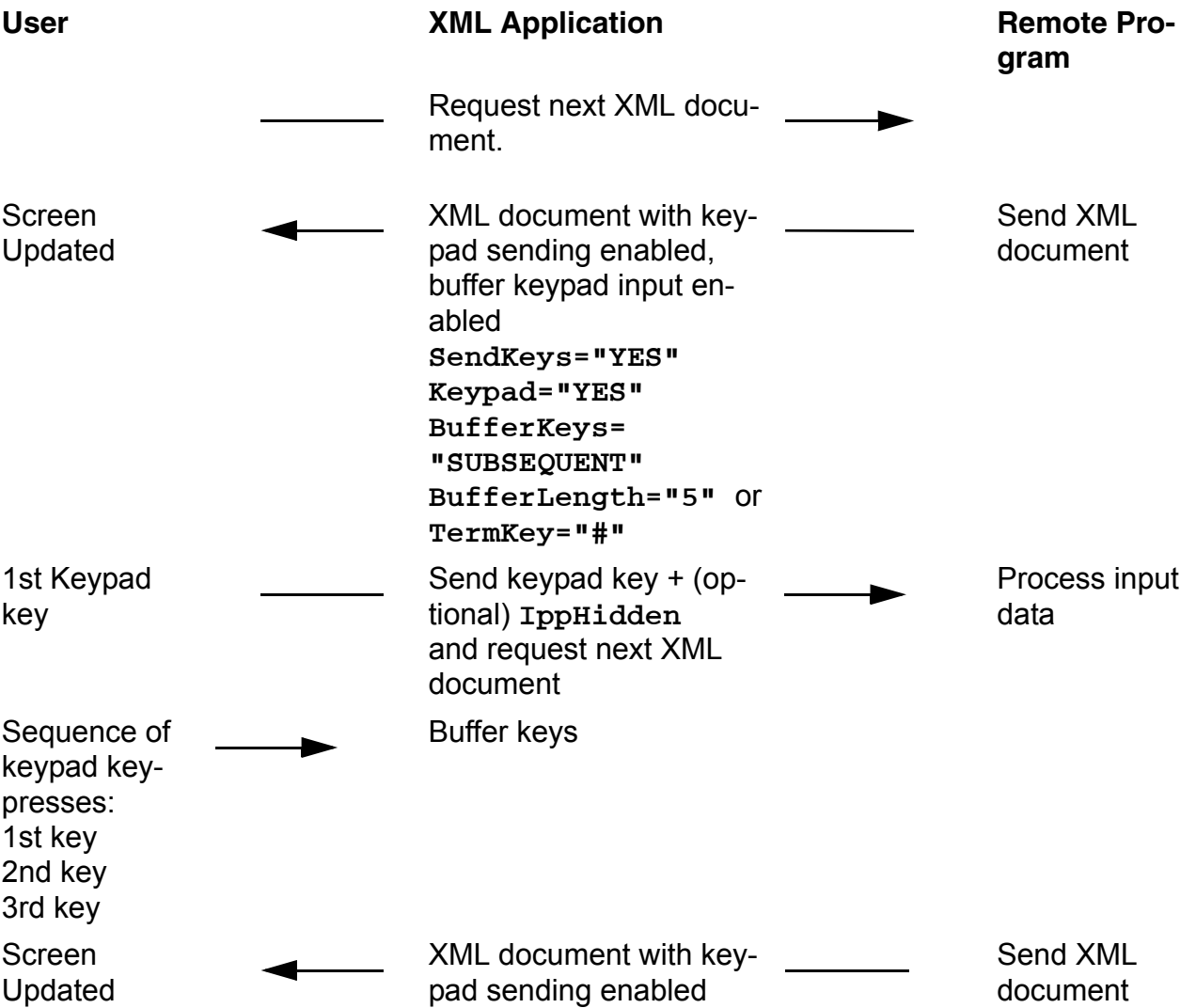


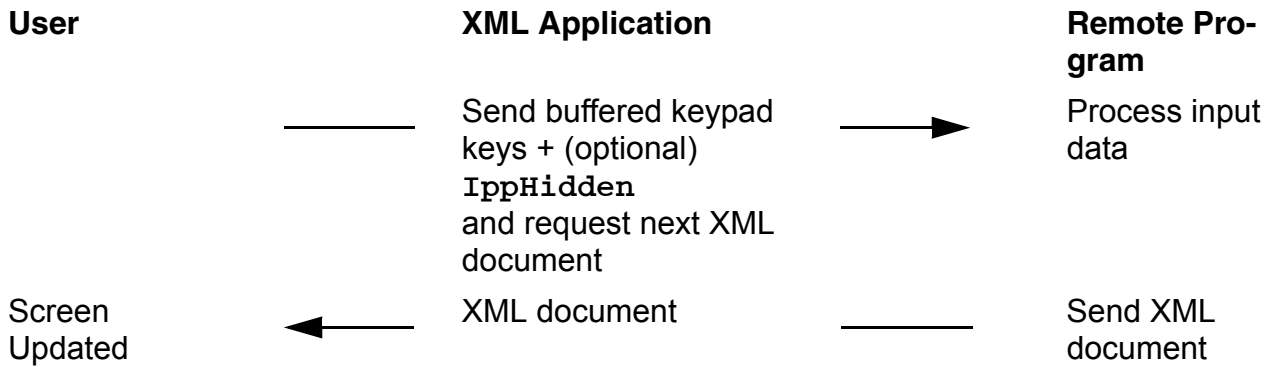
5.6.3.4 Buffer Subsequent Keypad Key Presses

In the following interaction, the remote program enables sending keypad input and buffering subsequent keypad keys. As soon as the user presses the first keypad key, e. g. to enter the first letter of a name to be searched in a phonebook, the key is sent to the server. Subsequently, the user types in some more letters or digits. These characters will be buffered until:

- the buffer length is reached, or
- the terminating key, if defined, has been pressed.

As soon as one of these criteria is met, and the response to the previous request issued with sending the first key has been received, the buffered keys are sent to the server. In the example interaction, the response from the server is received first, that is, before the buffer length is reached or the user has typed in the terminating key.





Attributes

The following attributes are available to the `IppKey` element:

Attribute	Value	Functionality/Remarks
Keypad (mandatory)	YES	Keypad key presses are handled.
	NO	Default value. Keypad key presses are ignored.
SendKeys (mandatory)	YES	Key digits are sent.
	NO	Default value. Key digits are not sent.
BufferKeys (optional)	YES	The key presses are buffered.
	NO	Default value. The key presses are not buffered, but immediately sent to the server.
	SUBSEQUENT	The key presses following the first key press are buffered.
BufferLength (optional)	Number of key presses to be buffered Default: 0	Defines the length of the buffer. When the buffer is full, the digits are sent en bloc.
TermKey (optional)	0 to 9, *, #, or left blank Default: blank	Defines the terminating keypad key, which triggers the submission of the buffered digits. Please note that the character # is URL encoded.
UrlKey (mandatory)	User defined string Default: <code>digit</code>	Defines the key part of the key-value pair sent in the URL string to the remote server.

XML Object Reference

Direct Keypad Input

Example

```
<?xml version="1.0" encoding="UTF-8"?>
  <IppDisplay InitialScreen="1">
    <IppScreen ID="1" HiddenCount="1" CommandCount="1">
      <IppKey Keypad="YES" SendKeys="YES" BufferKeys="YES" Buffer-
Length="3" UrlKey="mydigit"/>
      <IppList Type="IMPLICIT" Count="3">
        <Title>IppList</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <Option ID="1" Selected="FALSE" Key="1" Value="1">
          <OptionText>Item 1</OptionText>
          <Image/>
        </Option>
        <Option ID="2" Selected="TRUE" Key="2" Value="2">
          <OptionText>Item 2</OptionText>
          <Image/>
        </Option>
        <Option ID="3" Selected="FALSE" Key="3" Value="3">
          <OptionText>Item 3</OptionText>
          <Image/>
        </Option>
      </IppList>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Main Screen</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
      <IppHidden Type="VALUE" Key="xmlobject">
        <Value>_show</Value>
      </IppHidden>
    </IppScreen>
  </IppDisplay>
```

5.7 Alert

An Alert is a message window displayed on the bottom half of the current screen. Different types of alert can be defined using the **Type** attribute. Title, text, and an image for the alert can be specified in the child elements.






An alert implicates a special command to close the alert. This command has the label "Dismiss". If the screen containing the alert also includes a command, the "Dismiss" command is replaced by the command explicitly added to the screen. In this case the alert can only be cleared by the user.

The optional element **Url** enables explicitly added **SELECT**, **UPDATE**, and **EXIT** commands (see Section 5.5, "Command") to be returned to the server-side program. If the explicitly added commands are only **BACK**, **SCREEN**, or **CANCEL**, the **Url** element is not required .

Another optional element, **IppPhoneNumber**, provides a connection to the local phone book. If the **IppPhoneNumber** element contains a phone number that exists in the phone's local phone book, the name and number of the participant are displayed. Furthermore, if available, a picture clip or, else, an icon for the phone type in question (e.g. mobile number, home number, etc.) are shown. A picture clip from the phonebook will override an image object. The translation of phone number to name, number, and picture/icon is done on the phone. If the translation fails, alternative text may be displayed instead of the phone number. The alternative text is supplied in the XML document. The **IppPhoneNumber** element is defined in Section 5.25, "Phone Number".

Attributes

The following attributes are available to the `IppAlert` element:

Attribute	Value	Functionality/Remarks
Type (optional)	ALARM	 An alarm icon is displayed at the left side.
	CONFIRMATION	 A prompt for confirmation icon is displayed at the left side.
	ERROR	 Default value. An error icon is displayed at the left side.
	INFO	 An info icon is displayed at the left side.
	WARNING	 A warning icon is displayed at the left side.
Delay (optional)	Timeout in milliseconds	After the specified time elapses, the alert disappears and the previously displayed screen reappears
	FOREVER	Default value. The display of the alert can be deactivated only by the user.
	Missing, negative, or invalid	Will default to FOREVER .

Syntax

```
<IppAlert Type="ALARM|CONFIRMATION|ERROR|INFO|WARNING"
Delay="[Number]|FOREVER">
  <Title> </Title>
  <Url> </Url>
  <Text>
    <IppPhoneNumber> </IppPhoneNumber>
  </Text>
  <Image Cache="n"> </Image>
</IppAlert>
```

Child elements

- **Title**

The title of the alert is displayed in the title bar.

- **Url**

This URL is used by a **SELECT**, **UPDATE**, or **EXIT** command, if such a command is added to the alert.

- **Text**

Text in an alert. An **IppPhoneNumber** (see Section 5.25, "Phone Number") can be contained, which enables the automatic translation of a phone number stored in the local phone book into an icon, a picture clip or the name associated to the number.

- **Image**

If an image is provided, it will replace the standard symbol for the alert. For more information about the **Image** tag, see Section 5.23, "Image". Please note that, if the **Text** element contains an **IppPhoneNumber**, the picture clip or phone type icon from the phonebook will override the image object.

Commands

If one or more commands are added to an alert, i. e. to the screen containing the alert, these commands will replace the implicit "Dismiss" command.

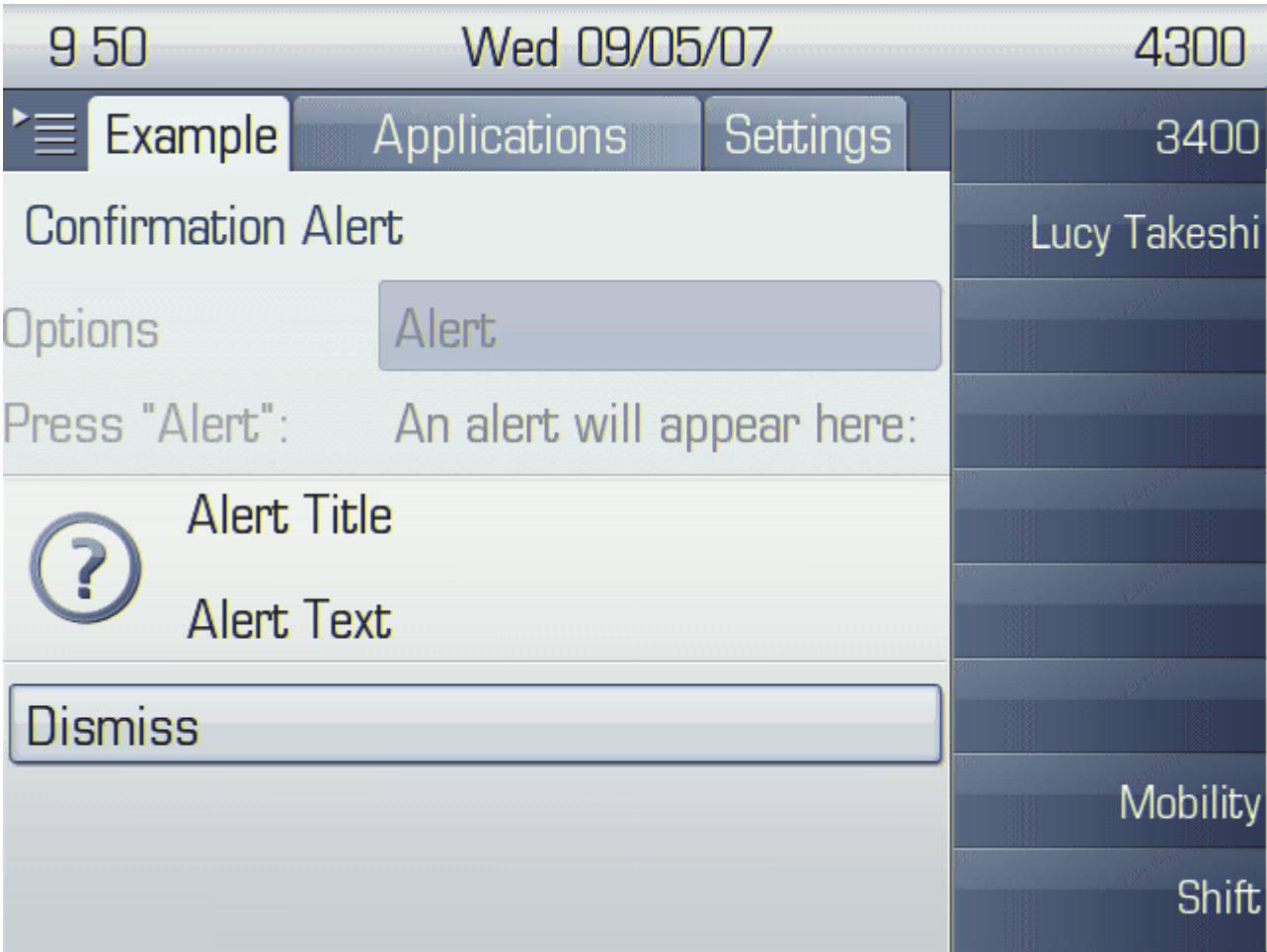
XML Object Reference

Alert

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="1">
        <Title>Confirmation Alert</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppStringItem>
          <Label>Press "Alert":</Label>
          <Text>An alert will appear here:</Text>
        </IppStringItem>
      </IppForm>
      <IppCommand Type="SCREEN" Priority="0">
        <Label>Alert</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
    <IppScreen ID="2" HiddenCount="0" CommandCount="0">
      <IppAlert Type="CONFIRMATION" Delay="FOREVER">
        <Title>Alert Title</Title>
        <Text>Alert Text</Text>
      </IppAlert>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.8 List

This object represents a selection list, comparable to the `<select>` and `<option>` elements in HTML or WML. A screen can only contain one list object.

There are three types of selection lists: **IMPLICIT**, **EXCLUSIVE**, and **MULTIPLE**. While the types **IMPLICIT** and **EXCLUSIVE** permit the selection of only one single option, the type **MULTIPLE** permits the selection of one or more options. Depending on the type of list, the list items are displayed as plain list (**IMPLICIT**), or with radio buttons (**EXCLUSIVE**), or checkboxes (**MULTIPLE**). Numbered lists are not supported. Additionally, images can be added to the list items (see Screenshot (1 column)).

On OpenStage 60/80, the same command (see Section 5.5, "Command") may appear in two different context menus; one displayed from "Options" and the other displayed from items in a List. On DPIP55G, the same command (see Section 5.5, "Command") may appear in two different Softkey bars; one displayed from "Options" and the other displayed from items in a List.

On OpenStage 60/80 and on DPIP55G, a command may be set as the select command for an implicit List.

Attributes

The following attributes are available to the element:

Attribute	Value	Function/Remarks
Type (mandatory)	IMPLICIT	Default value. As soon as an option has been selected, the data are sent immediately to the URL specified. Thus, exactly one option can be selected, and only the key/value pair that has been selected is sent to the server.
	EXCLUSIVE	Exactly one option can be selected, in radio button fashion. Only the key/value pair selected is sent to the server.
	MULTIPLE	One or more options can be selected. All key/value pairs present in the list are sent to the server. For selected options, the value of the <code>value</code> attribute is then sent; for non-selected options, this value is prefixed with <code>not_</code> .

Count (mandatory)	Number of options	Only as many options as indicated here are displayed. If the actual number of options exceeds this amount, all further options are ignored.
	0	No options are displayed.
Columns (optional)	Number of columns (1 or 3)	<p>A list may contain a single column or three columns of option text. The default value is 1, which results in a single column list, just like a list without this attribute. A single column list occupies 100% of the item width in a form. In a 3 column list, the width is distributed as follows:</p> <ul style="list-style-type: none"> • left column: 50% • middle column: 16% • right column: 34% <p>Each option container must have the same number of <code>OptionText</code> elements as the number of columns. The <code>OptionText</code> elements are displayed in order from the left to right column. If <code>Columns</code> is missing, negative, or invalid or there is a mismatch between the number of columns and <code>OptionText</code> elements, the list defaults to a single column list, using only the first <code>OptionText</code> element in each <code>Option</code> container.</p>

Syntax

```

<IppList Type="IMPLICIT|EXCLUSIVE|MULTIPLE" Count="[Number]" Columns
="[Number]">
  <Title> </Title>
  <Url> </Url>
  <Option Selected="FALSE|TRUE" Key="[Key]" Value="[Value]">
    <OptionText State="GRAY|NORMAL">
      <IppPhoneNumber> </IppPhoneNumber>
    </OptionText>
    <Image Cache="[Name]"> </Image>
  </Option>
</IppList>

```

Syntax (3 columns)

```
<IppList Type="IMPLICIT|EXCLUSIVE|MULTIPLE" Count="[Number]" Columns
="3">
  <Title> </Title>
  <Url> </Url>
  <Option Selected="FALSE|TRUE" Key="[Key]" Value="[Value]">
    <OptionText State="GRAY|NORMAL">
      <IppPhoneNumber> </IppPhoneNumber>
    </OptionText>
    <OptionText State="GRAY|NORMAL">
      <IppPhoneNumber> </IppPhoneNumber>
    </OptionText>
    <OptionText State="GRAY|NORMAL">
      <IppPhoneNumber> </IppPhoneNumber>
    </OptionText>
    <Image Cache="[Name]"> </Image>
  </Option>
</IppList>
```

Child elements

- **Title**
Title text for the selection list. The title is displayed in the title bar.
- **Url**
The URL to which the data of the selected option are sent.



If the URL is missing or is invalid, the current screen will continue to be displayed unchanged.

- **Option**

This contains the data that are sent to the server. It can also contain descriptive text (**OptionText**) and an image (**Image**).

The following attributes are available to the element:

Attribute	Value	Function
ID (optional)	ID of the option element (integer)	Enables referencing of the option object. If missing, negative, or invalid, it will set default to 0.
Selected (optional)	FALSE	Default value. The option is not preselected.
	TRUE	The option is preselected. When the IppList type is IMPLICIT , the option is highlighted.
Key (optional)	Key	The key for the key/value pair that is sent to the server as an HTTP/HTTPS POST request. For selection lists of type IMPLICIT and EXCLUSIVE , multiple options can have the same Key . If the type is MULTIPLE , all the values must be different.
Value (optional)	Value	The value for the key/value pair that is sent to the server as an HTTP/HTTPS POST request. If the selection list type is MULTIPLE , all the key/value pairs are sent. For selected options, the value of the value attribute is then sent; for non-selected options, this value is prefixed with not_ .

Table 5-2



If a key or value is missing or invalid, **null** is sent instead.



The uniqueness of keys and values is not checked in the telephone.

- **OptionText**

Descriptive text for the option. An **IppPhoneNumber** (see Section 5.25, "Phone Number") can be included, which enables the automatic translation of a phone number stored in the local phone book into the name associated to the number, and an icon or a picture clip.

XML Object Reference

List

The following attribute is available to the element. It only applies to the option text in Lists. It does not apply to option texts in Choice Groups.

Attribute	Value	Function
State (optional)	NORMAL	Default value. The text is displayed in regular color.
	GRAY	The text is displayed in gray color.

- **Image**

Illustrative image for the option. The image is displayed to the left of the text. For more information about the image element, see Section 5.23, "Image".

Commands

Unless the List type is **IMPLICIT**, a command is required to send data to a server and initiate server-side action. A command is added by inserting a command object in the screen (see Example (1 column)). The command can be displayed on the context menu of the options bar, or on the context menu of each individual item on the list, or both. For details, please see Section 5.5, "Command".

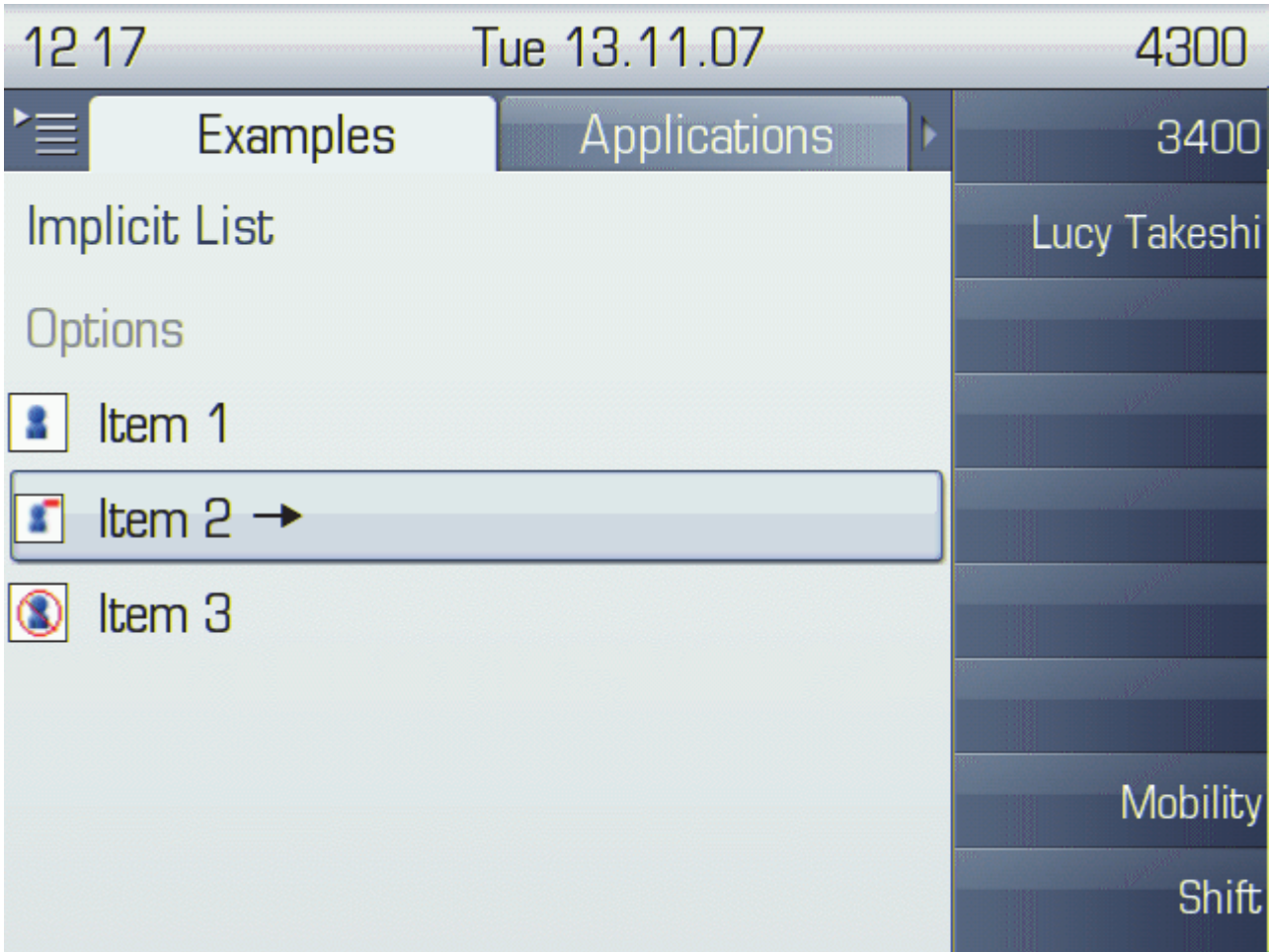
Example (1 column)

```

<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppList Type="IMPLICIT" Count="3">
        <Title>Implicit List</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <Option Selected="FALSE" Key="key1" Value="1">
          <OptionText>Item 1</OptionText>
          <Image>http://subdomain.domain/path/image1.png
          </Image>
        </Option>
        <Option Selected="TRUE" Key="key2" Value="2">
          <OptionText>Item 2</OptionText>
          <Image>http://subdomain.domain/path/image2.png
          </Image>
        </Option>
        <Option Selected="FALSE" Key="key3" Value="3">
          <OptionText>Item 3</OptionText>
          <Image>http://subdomain.domain/path/image3.png
          </Image>
        </Option>
      </IppList>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>

```

Screenshot (1 column)



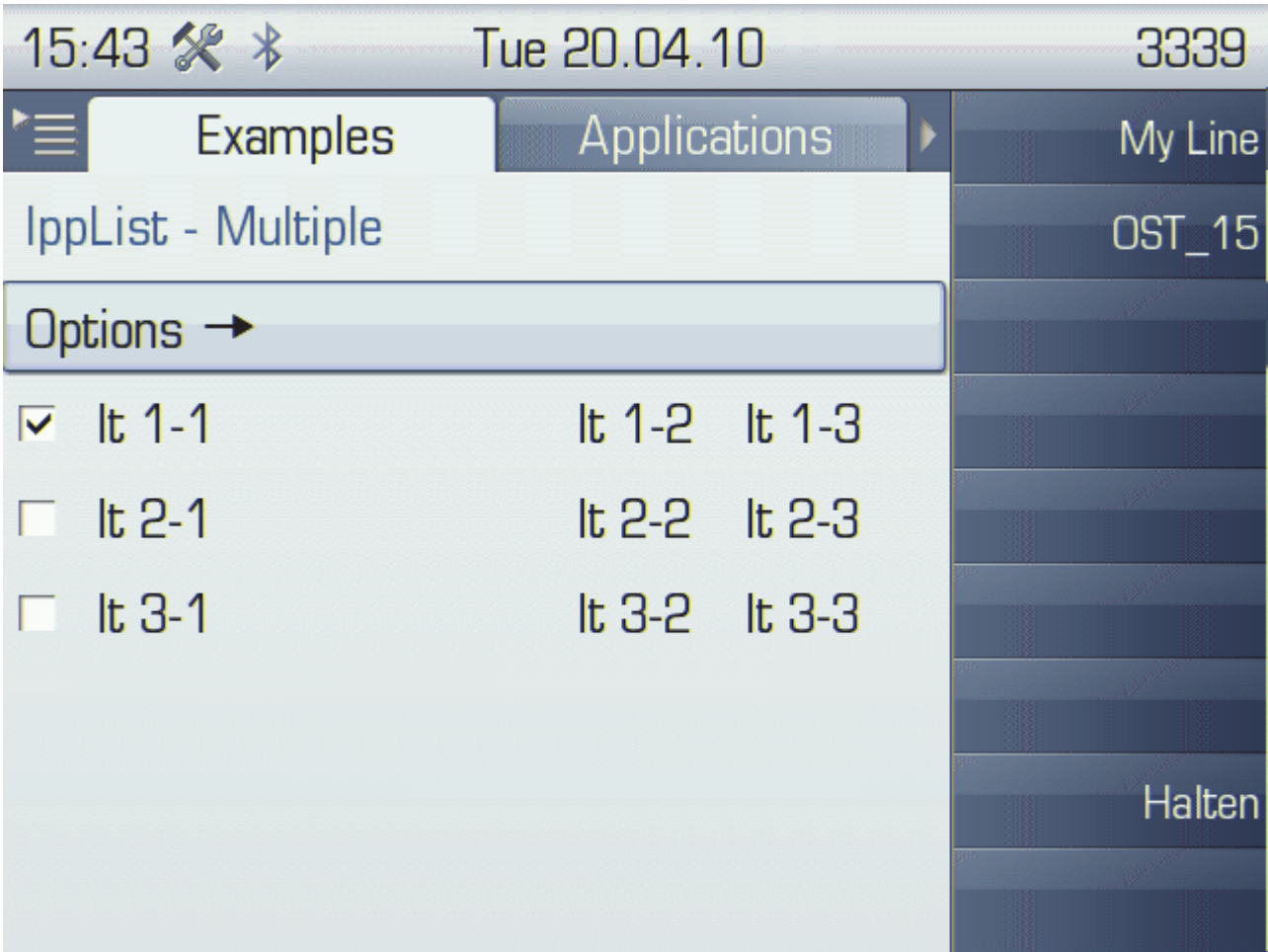
Example (3 columns)

```

<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="2" HiddenCount="0" CommandCount="2">
      <IppList Type="MULTIPLE" Count="3" Columns="3">
        <Title>IppList - Multiple</Title>
        <Url>http://${serverAddress}/testxml/servlet</Url>
        <Option ID="1" Selected="TRUE" Key="1" Value="1">
          <OptionText> It 1-1 </OptionText>
          <OptionText> It 1-2 </OptionText>
          <OptionText> It 1-3 </OptionText>
          <Image></Image>
        </Option>
        <Option ID="2" Selected="FALSE" Key="2" Value="2">
          <OptionText> It 2-1 </OptionText>
          <OptionText> It 2-2 </OptionText>
          <OptionText> It 2-3 </OptionText>
          <Image></Image>
        </Option>
        <Option ID="3" Selected="FALSE" Key="3" Value="3">
          <OptionText> It 3-1 </OptionText>
          <OptionText> It 3-2 </OptionText>
          <OptionText> It 3-3 </OptionText>
        </Option>
      </IppList>
      <IppCommand Type="SELECT" Priority="1" Key="xmlobject"
Value="_show">
        <Label>Select</Label>
        <ScreenID>1</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>

```

Screenshot (3 columns)



5.9 Text Box

This element generates a text area for user input. For inputting data, the user must first navigate to the text box using the ▼ key, and then open the display keyboard by pressing the Ⓞ key. The use of the display keyboard is explained in the OpenStage 60/80 or DPIP55G User Guide. When data input is completed, the user can confirm by pressing the ➡ key and the Ⓞ key, and afterwards press the ▲ key to go back to the options bar.

For a text box, predefined content, a title, the permitted data types, as well as a server URL for data transmission can be specified.

Attributes

The following attributes are available to the `IppTextBox` element:

Attribute	Value	Functionality/Remarks
MaxSize (optional)	Maximum number of characters	If missing, negative, or invalid, the maximum number of characters is limited only by the capacity of the display and the buffer of the phone.
Constraint (optional)	ANY	Default value. Any character string is permitted.
	NUMERIC	The data entered must be numeric. Other entries are ignored. The valid data range is +/- 2147483647.
	PASSWORD	The data entered are treated as a password. Asterisks (*) are displayed instead of the characters actually entered.
	PHONENUMBER	The data entered must be in a telephone number format.
	URL	The data entered must represent a valid URL.
	EMAILADDR	The data entered must represent a valid e-mail address.
Password (optional)	YES	The data entered in the Text Box is confidential and should be obscured whenever possible.
	NO	Default value.
Default (optional)	NULL	Default value. An empty text box is displayed; the content of the <code>Text</code> element is ignored.
	TEXT	The text box contains the content of the <code>Text</code> element.
	PHONENUMBER	The text box contains the call number of the phone.

XML Object Reference

Text Box

Attribute	Value	Functionality/Remarks
Key (optional)	Key	The value of this attribute is used as a key for submitting the data to the server-side program. The associated value is the content of the Text element. Please note that the key must be unique within a Screen.If the key is missing, the submitting is still invoked but there is no key-value pair sent within.
Uneditable (optional)	YES	The text box cannot be edited by the user.
	NO	Default value. The text box can be edited by the user.

Syntax

```
<IppTextBox MaxSize=" [Number] "  
Constraint="ANY|NUMERIC|PASSWORD|PHONENUMBER|URL|EMAILADDR"  
Password="YES|NO" Default="NULL|TEXT|PHONENUMBER" Key=" [Key] "  
Uneditable="YES|NO">  
  <Title> </Title>  
  <Text> </Text>  
  <Url> </Url>  
</IppTextBox>
```

Child elements

- **Title**
Title of the text box. The title is displayed in the title bar. If the title is missing, the textbox will be displayed with null value for title.
- **Text**
Predefined text contained in the text box. This is displayed if **Default** is set to **TEXT**. If the text is missing, the textbox will be displayed with null value for text.
- **Url**
URL of the server to which the data are sent.



If the URL is missing or is invalid, thereby allowing no data to be sent to the server, the current screen will continue to be displayed unchanged.

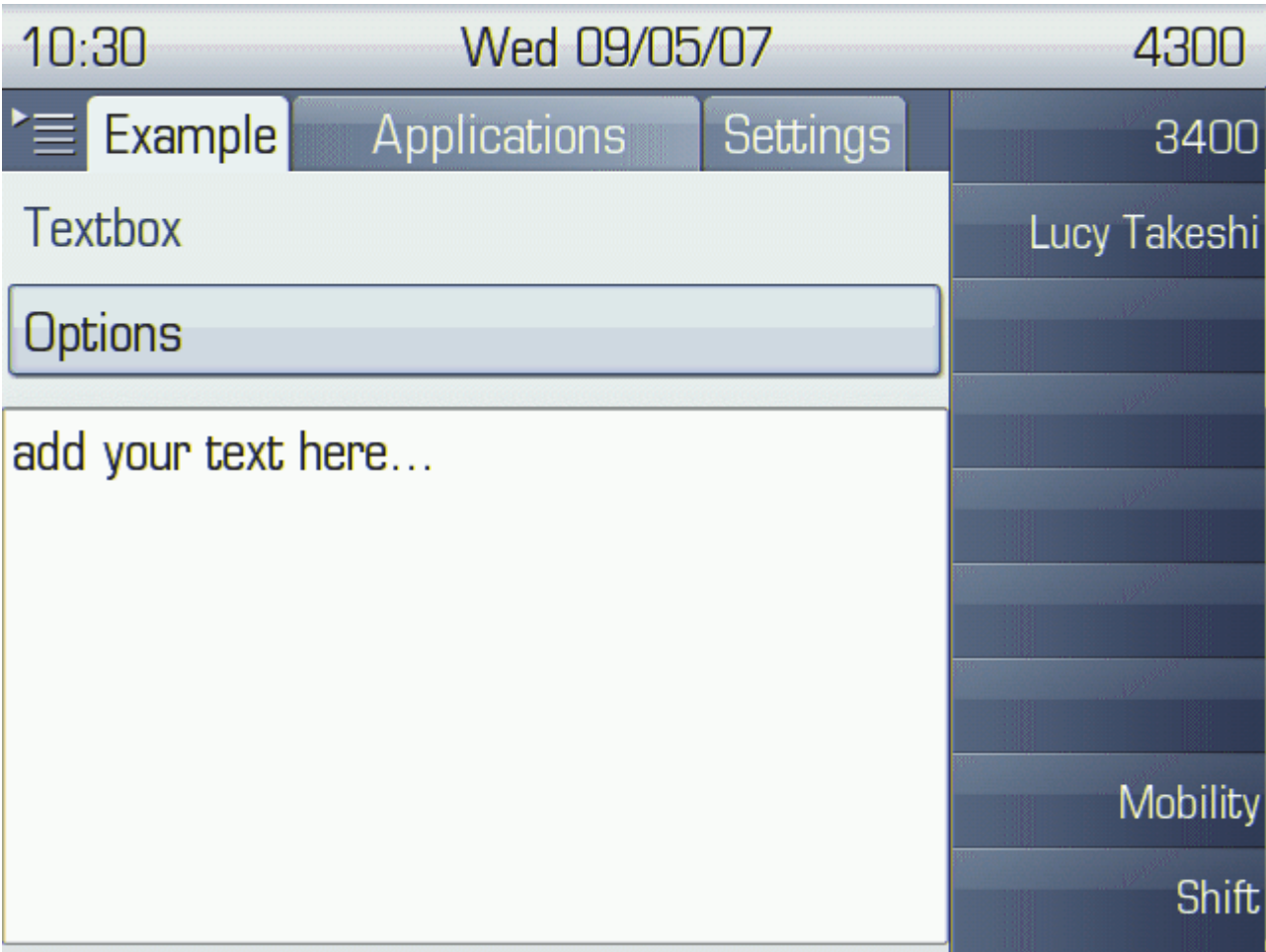
Commands

A command is required to send the text data to a server and initiate server-side action. The command is added by inserting a command object in the screen (see Example). It is displayed on the options menu, which is located underneath the screen title. For details about the command object, see Section 5.5, "Command".

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppTextBox MaxSize="30" Constraint="ANY" Default="TEXT"
Key="TB1">
        <Title>Textbox</Title>
        <Text>add your text here...</Text>
        <Url>http://subdomain.domain/path/program</Url>
      </IppTextBox>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.10 Ticker

Ticker text is displayed underneath the title bar and continually moves from right to left across the display.

Syntax

```
<IppTicker>
  <Text> </Text>
</IppTicker>
```

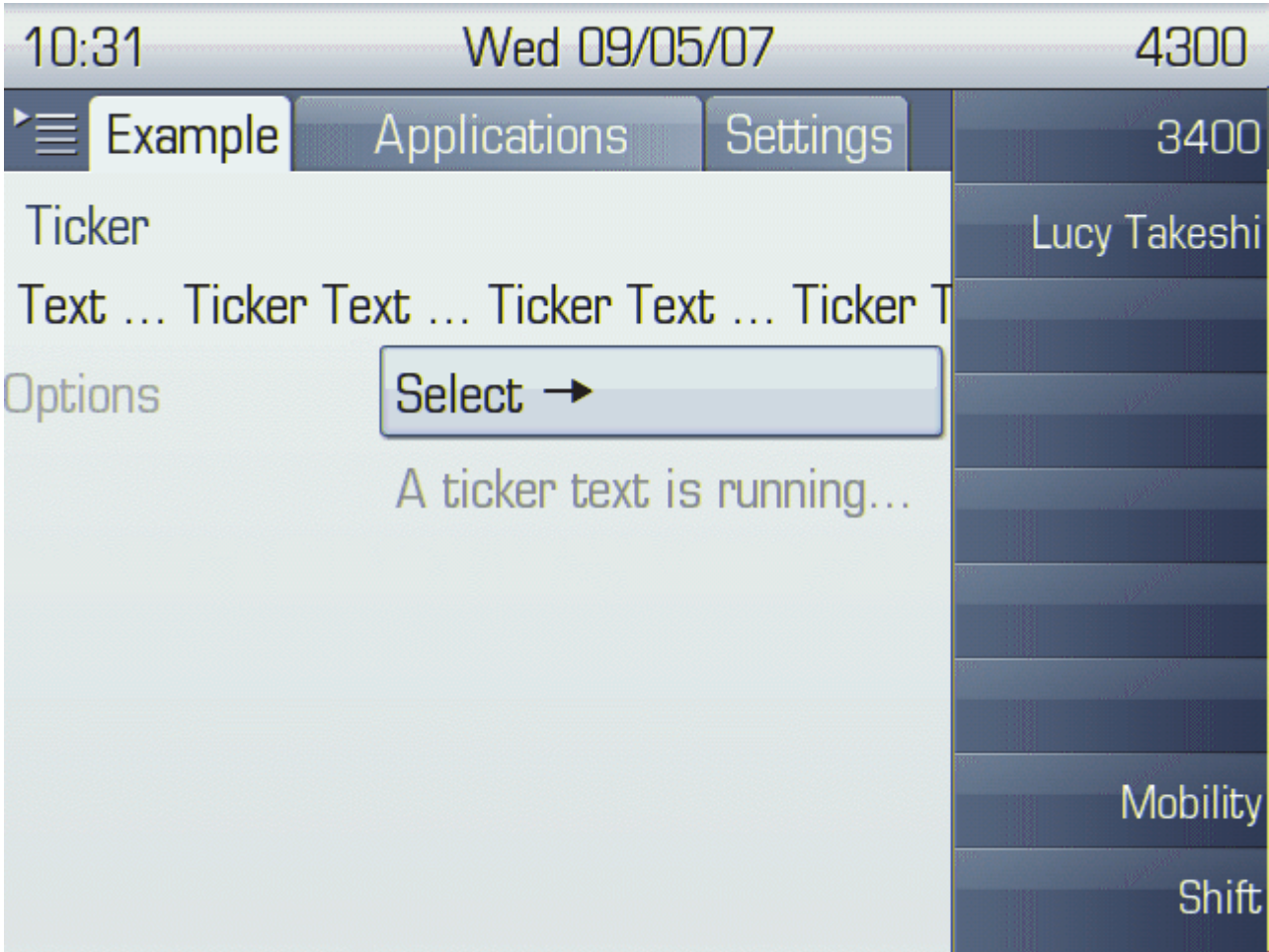


If the text is missing or is invalid, the ticker is not displayed at all. Phone number translation in ticker text is not supported.

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="1">
        <Title>Ticker</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppStringItem>
          <Label></Label>
          <Text>A ticker text is running...</Text>
        </IppStringItem>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>1</ScreenID>
      </IppCommand>
      <IppTicker>
        <Text>Ticker Text ... Ticker Text ...</Text>
      </IppTicker>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.11 Hidden

The function of this object is comparable to that of hidden entry fields in HTML. The object enables sending and receiving data from the server using key/value pairs, without this data being visible to the user.

Attributes

The following attributes are available to the `IppHidden` element:

Attribute	Value	Function
Type (mandatory)	VALUE	Default. The value of the key/value pair is the value saved in the <code>value</code> child element.
	PHONENUMBER	The value of the key/value pair is the phone's call number.
	IPADDRESS	The value of the key/value pair is the IP address of the phone connected.
Key (mandatory)	Key	Together with the content of the <code>value</code> child element, <code>Key</code> builds the key/value pair to be sent as an HTTP/HTTPS POST request. Please note that the key must be unique within a Screen.

Syntax

```
<IppHidden Type="VALUE | PHONENUMBER | IPADDRESS" Key=" [Key] ">
  <Value> </Value>
</IppHidden>
```



If the key is missing, no particular key-value pair is sent to the specified URL. If the value is missing, the key-value pair is sent to the specified URL with a null value.

Child elements

- `Value`

This contains the value that is sent to the server. Together with the `key` attribute of the `IppHidden` element, the content of `value` builds a key/value pair.

Commands

A command is required to the hidden data to a server and initiate server-side action. The command is added by inserting a command object in the screen (see Example). It can be displayed on the context menu of the options bar, or on the context menu of each individual item on a list (see Section 5.8, "List"), or both. For details about the command object, see Section 5.5, "Command".

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="1" CommandCount="1">
      <IppList Type="EXCLUSIVE" Count="3">
        <Title>Hidden</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <Option ID="1" Selected="FALSE" Key="key1" Value="1">
          <OptionText>Option 1</OptionText>
        </Option>
        <Option ID="2" Selected="FALSE" Key="key2" Value="2">
          <OptionText>Option 2</OptionText>
        </Option>
        <Option ID="3" Selected="FALSE" Key="key3" Value="3">
          <OptionText>Option 3</OptionText>
        </Option>
      </IppList>
      <IppCommand Type="SELECT" DisplayOn="LISTITEM" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
      <IppHidden Type="VALUE" Key="hidden key">
        <Value>hidden value</Value>
      </IppHidden>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```


5.12 Form

The form object is used to generate a frame that provides some layout options for a screen. In the XML document, it serves as a container for displayable objects. The form provides a `Title` element for labeling the screen content and a `Url` element for sending data to the server-side program.



If objects of different types shall be combined in a form, these objects must be wrapped in an item element (see Section 5.13, "Form/Item").

The following objects can be contained in a form:

- Item (see Section 5.13, "Form/Item")
- String item (see Section 5.14, "Form/String Item")
- Image item (see Section 5.15, "Form/Image Item")
- Spacer (see Section 5.16, "Form/Spacer")
- Text field (see Section 5.17, "Form/Text Field")
- Choice group (see Section 5.18, "Form/Choice Group")
- Date field (see Section 5.19, "Form/Date Field")
- Button (see Section 5.20, "Form/Button")
- Gauge (see Section 5.21, "Form/Gauge")

A form is divided into two columns. The left column contains the "Options" label automatically created for `Command` elements, as well as the labels for objects within the form. The proportions of the columns can be modified using the `Proportion` attribute.

Attributes

The following attributes and values are available to the `IppForm` element:

Attribute	Value	Function
ItemCount (mandatory)	Number of objects contained	Indicates the number of specific objects contained (<code>Title</code> and <code>Url</code> are not counted).
	Missing, negative, or invalid	Defaults to 0. Any objects in the form will be ignored.
Proportion (optional)	0_100	Left column: 0% - right column: 100%. The contents of the left hand column are not displayed. The right hand column occupies all of the available width.
	15_85	Left column: 15% - right column: 85%
	25_75	Left column: 25% - right column: 75%
	40_60	Left column: 40% - right column: 60%. Default value.
	50_50	Left column: 50% - right column: 50%
	60_40	Left column: 60% - right column: 40%
	75_25	Left column: 75% - right column: 25%

Syntax

```
<IppForm ItemCount="[Number]"
Proportion="0_100|15_85|25_75|40_60|50_50|60_40|75_25">
  <Title> </Title>
  <Url> </Url>
  <IppStringItem/>
  <IppImageItem/>
  <IppSpacer/>
  <IppTextField/>
  <IppChoiceGroup/>
  <IppDateField/>
  <IppButton/>
  <IppItem>
  <IppGauge>
</IppForm>
```



If `ItemCount` is set 0, any elements for items in the form will be ignored. If there are more elements for items in the form than indicated in the count, the additional elements will be ignored.

Child elements

- **Title**

Title for the form.



If the Title indicated in the `Title` element is missing, the form is displayed with a null title.

- **Url**

URL of the server to which the data is to be sent.



If the URL indicated in the `Url` element is missing or invalid, thereby allowing no data to be sent to a server, the screen will continue to be displayed unchanged.

5.13 Form/Item

By means of this element, commands can be associated with individual items in a form, as an alternative to displaying them in the options bar. When the user navigates to an item and presses the ➔ key on the TouchGuide (OpenStage 60/80) or according Softkey (DPIP55G), a context menu is opened which provides the commands.

The following objects can be contained in an Item:

- String Item (see Section 5.14, "Form/String Item")
- Image Item (see Section 5.15, "Form/Image Item")
- Spacer (see Section 5.16, "Form/Spacer")
- Text Field (see Section 5.17, "Form/Text Field")
- Choice Group (see Section 5.18, "Form/Choice Group")
- Date Field (see Section 5.19, "Form/Date Field")
- Button (see Section 5.20, "Form/Button")
- Gauge (see Section 5.21, "Form/Gauge")

Attributes

The following attribute/value combinations are available to the `IppItem` element:

Attribute	Value	Function/Remarks
<code>CommandCount</code> (mandatory)	Number of commands within the <code>IppItem</code>	The commands are rendered correctly.
	0	Any <code>IppCommand</code> elements will be ignored.
	Missing, negative or invalid	The value will default to 0.
	Less than the number of commands within the <code>IppItem</code>	Only those commands that fall within the given number are displayed.

Syntax

```
<IppItem CommandCount="[Number of Commands]">  
  <IppStringItem/>  
  <IppImageItem/>  
  <IppSpacer/>  
  <IppTextField/>  
  <IppDateField/>  
  <IppChoiceGroup/>  
  <IppGauge/>  
  <IppButton/>  
</IppItem>
```

Commands

To add a command to an item in a form, just include an `IppCommand` in the `IppItem`. The `DisplayOn` attribute of the command must be set to `LISTITEM` or to `BOTH` (see Section 5.5, "Command"). In the latter case, all commands assigned to the items are also available from the options bar.

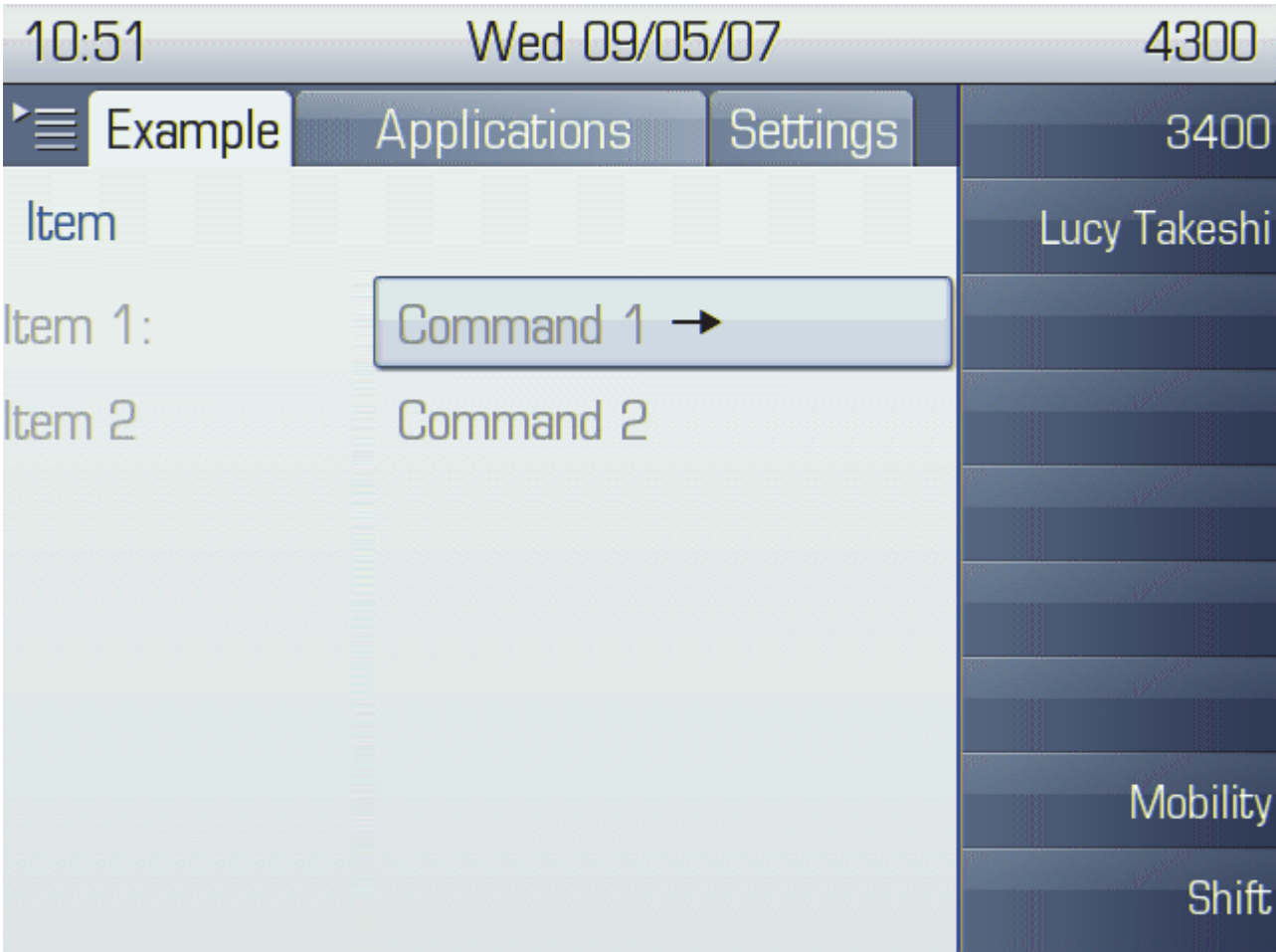
XML Object Reference

Form/Item

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="1" CommandCount="2">
      <IppForm ItemCount="2">
        <Title>Item</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppItem CommandCount="1">
          <IppStringItem>
            <Label>Item 1:</Label>
            <Text>Command 1</Text>
          </IppStringItem>
          <IppCommand Type="SELECT" DisplayOn="LISTITEM" Prior-
ity="0">
            <Label>Select</Label>
            <ScreenID>1</ScreenID>
          </IppCommand>
        </IppItem>
        <IppItem CommandCount="1">
          <IppStringItem>
            <Label>Item 2</Label>
            <Text>Command 2</Text>
          </IppStringItem>
          <IppCommand Type="SELECT" DisplayOn="LISTITEM" Prior-
ity="1">
            <Label>Select</Label>
            <ScreenID>1</ScreenID>
          </IppCommand>
        </IppItem>
      </IppForm>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.14 Form/String Item

This object provides a read-only text field. The text field consists of a `Label` and a `Text` element. The text string is displayed immediately after the label with a single space between them unless new lines are included in the label or text string.

The text string must be ASCII or UTF-8 encoded. The basic ASCII encoding is not able to express all characters of the document character set (for example, £ and €). They are included in UTF-8. If the character is not included in the encoding or has special meaning within XML documents, the character may be entered as a character reference. Character references are a character encoding-independent mechanism for entering any character from the document character set. They may appear in two forms:

- Numeric character references (either decimal or hexadecimal),
- Character entity references

Numeric character references specify the code position of a character in the document character set. Numeric character references may take two forms:

- The syntax "&#D;", where D is a decimal number, refers to the ISO 10646 decimal character number D,
- The syntax "&#xH;" or "&#XH;", where H is a hexadecimal number, refers to the ISO 10646 hexadecimal character number H. Hexadecimal numbers in numeric character references are case-insensitive.

Character entity references are a more intuitive way of referring to characters in the document character set, HTML offers a set of character entity references. Character entity references use symbolic names rather than code positions. HTML 4 does not define a character entity reference for every character in the document character set. Character entity references are case-sensitive.

Five character entity references that are frequently used to escape special characters:

- "<" represents the < sign and should be used whenever the < sign is required in the text to avoid confusion with the beginning of an XML tag (for example, start tag open delimiter in <IppStringItem>).
- ">" represents the > sign and should be used whenever the > sign is required in the text to avoid confusion with the end of an XML tag (for example, tag close delimiter in <IppStringItem>).
- "&" represents the & sign and should be used whenever the & sign is required in the text to avoid confusion with the beginning of a character reference (entity reference open delimiter).
- """ represents the " mark and should be used whenever the " mark is required in the text to avoid confusion with the double quote mark (") used to delimit attribute values.

- "'" represents the ' mark

The special symbols must include the leading '&' and the trailing ';'.

Some text editors add the leading sequence 0xEF 0xBB 0xBF to an UTF-8 file. This is a byte-order mark (BOM), which is conventionally used to indicate that the text is encoded as UTF-8. The XML parser on OpenStage 60/80 and on DPIP55G does not support UTF-8 files with BOM.

Syntax

```
<IppStringItem>  
  <Label> </Label>  
  <Text> </Text>  
</IppStringItem>
```



If any new lines are required in the label or text, the special symbol \NL must be used instead. New lines may be placed at the beginning, end, or anywhere else within the label or text. If there are two lines together, only one new line is actually displayed.

Phone number translation in string item text is not supported.

Child elements

- **Label**

Label that precedes the text.

- **Text**

Content in the text field.



If the label or text is missing, the string item will be displayed with null values for the missing elements.

Commands

A string item can be made interactive by adding a command to it. To achieve this, both the string item and the command must be placed inside a special form item, which is a container for adding commands to form objects. For details, please see Section 5.13, "Form/Item". For details about the command object, see Section 5.5, "Command".

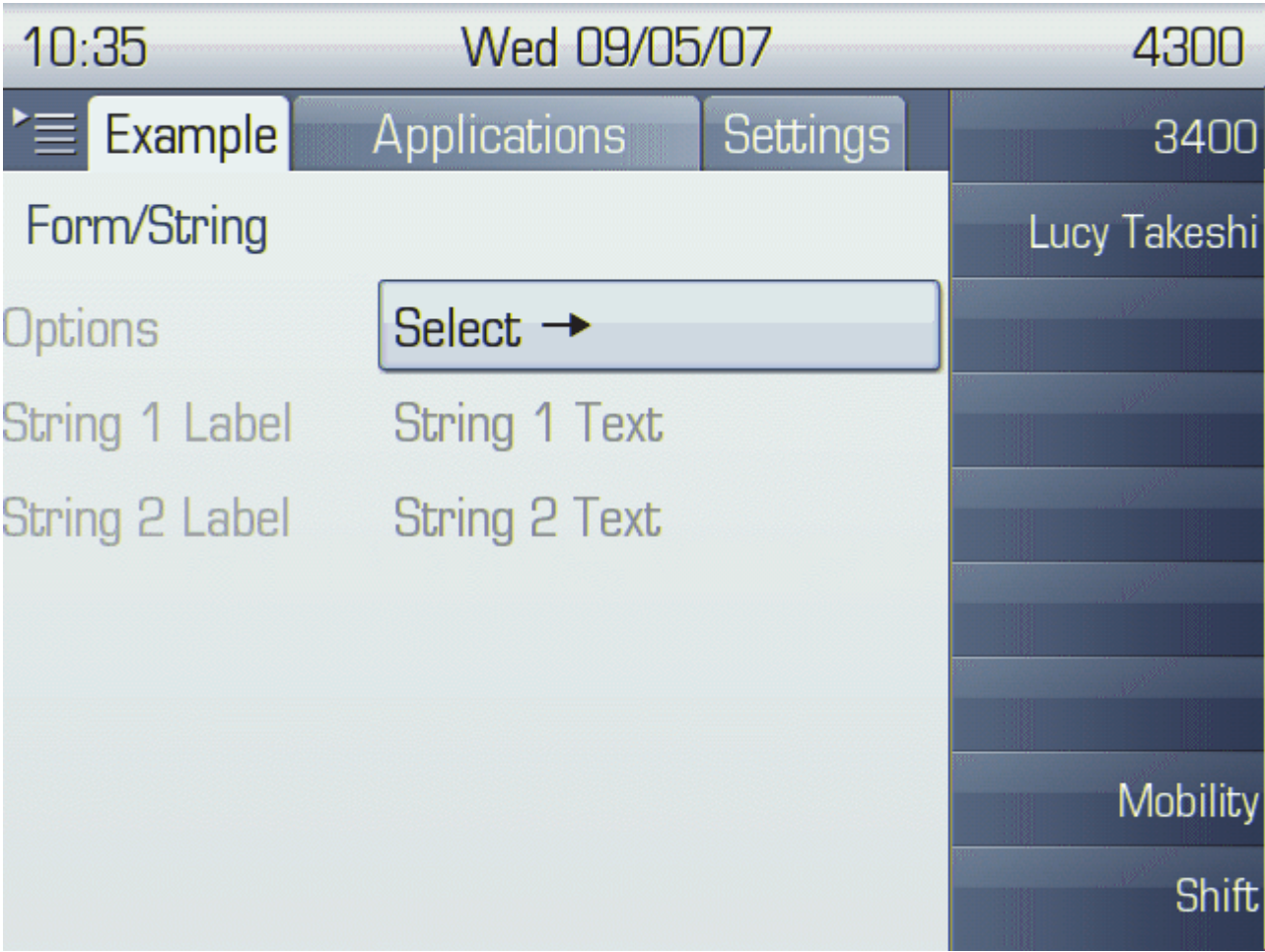
XML Object Reference

Form/String Item

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="2">
        <Title>Form/String</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppStringItem>
          <Label>String 1 Label</Label>
          <Text>String 1 Text</Text>
        </IppStringItem>
        <IppStringItem>
          <Label>String 2 Label</Label>
          <Text>String 2 Text</Text>
        </IppStringItem>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.15 Form/Image Item

This object functions as a frame for linking an image in the screen layout. In case the image cannot be displayed, an alternative text can be shown instead. Also, a label can be added, which is displayed in the left column.

Syntax

```
<IppImageItem>
  <Label> </Label>
  <Image Cache="[Name]"> </Image>
  <AltText> </AltText>
</IppImageItem>
```

Child elements

- **Label**
Label for the image; displayed in the left column.
- **Image**
Links the image file. For more information about the image object, see Section 5.23, "Image".
- **AltText**
Alternative text that is displayed if the image cannot be displayed.

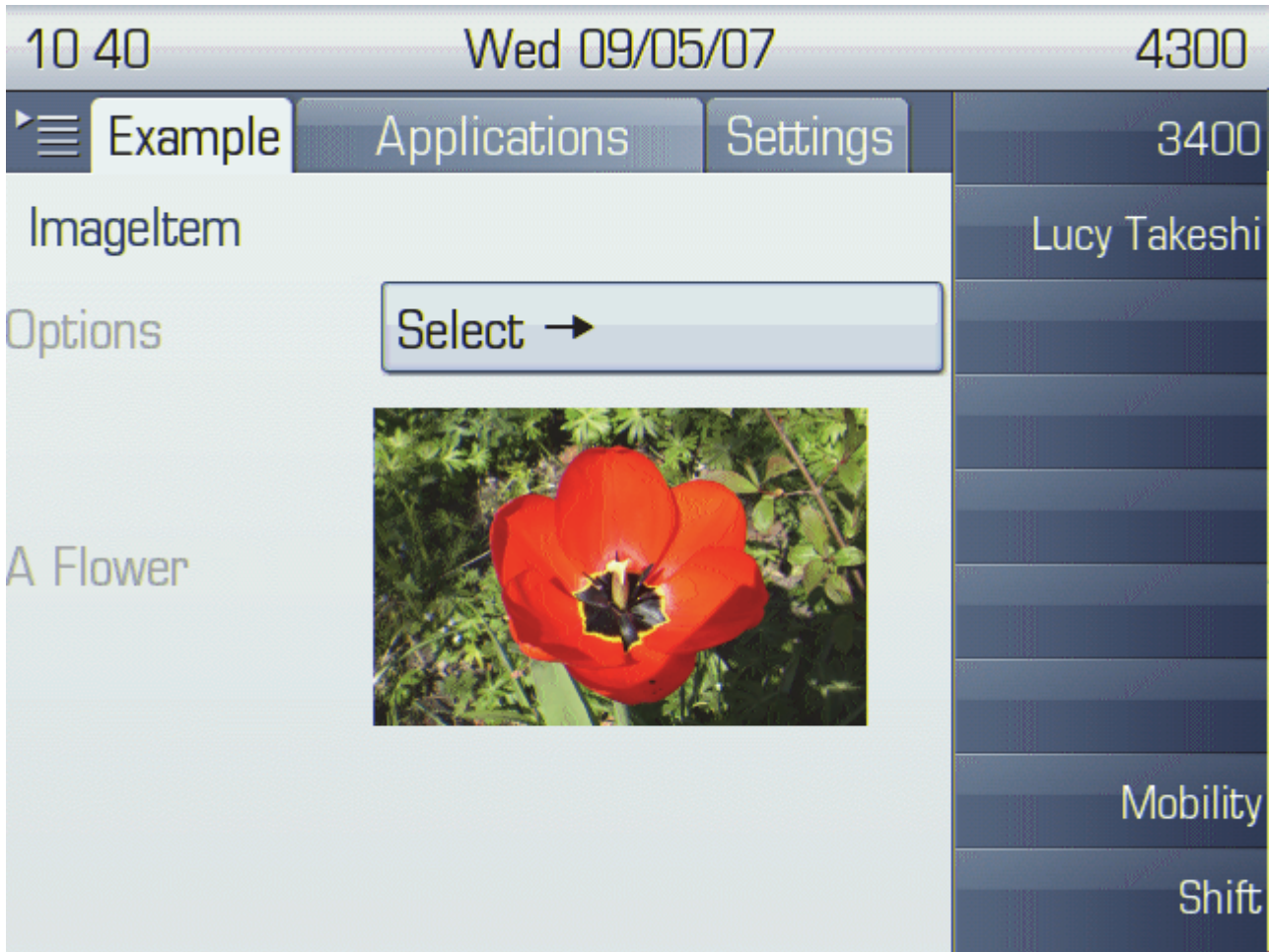
Commands

An image item can be made interactive by adding one or more commands. As a specific feature of image items, the context menu will contain an additional command for closing the context menu. This command is labeled "Exit menu". To add a command, both the image item and the command must be placed inside a form item (see Section 5.13, "Form/Item"). For details about the command object, see Section 5.5, "Command".

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="1">
        <Title>ImageItem</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppImageItem >
          <Label>A Flower</Label>
          <Image>http://subdomain.domain/path/image.png</Image>
          <AltText>The image cannot be displayed.</AltText>
        </IppImageItem>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.16 Form/Spacer

The spacer generates an extra vertical space the height of a line between two elements.



As inserting a spacer between two objects implies introducing a different type of object in the XML document, all form objects, including the spacer itself, must be wrapped in a form item element (see Section 5.13, "Form/Item").

Attributes

For the `IppSpacer` element, the `NewLine` attribute is required with the following values:

Attribute	Value	Functionality/Remarks
<code>NewLine</code> (mandatory)	<code>NEWLINE_AFTER</code>	Not implemented yet.
	<code>NEWLINE_BEFORE</code>	Not implemented yet.
	<code>NEWLINE_BEFO_AFT</code>	Not implemented yet.

Syntax

```
<IppSpacer NewLine="NEWLINE_AFTER|NEWLINE_BEFORE|NEWLINE_BEFO_AFT"/>
```

Commands

A command can be added to a spacer. To achieve this, both the spacer and the command must be placed inside a special form item, which is a container for adding commands to form objects. For details, please see Section 5.13, "Form/Item". For details about the command object, see Section 5.5, "Command".



When a command is associated with a spacer by means of a form item, the `DisplayOn` attribute of the form must be set to `OPTIONS`.

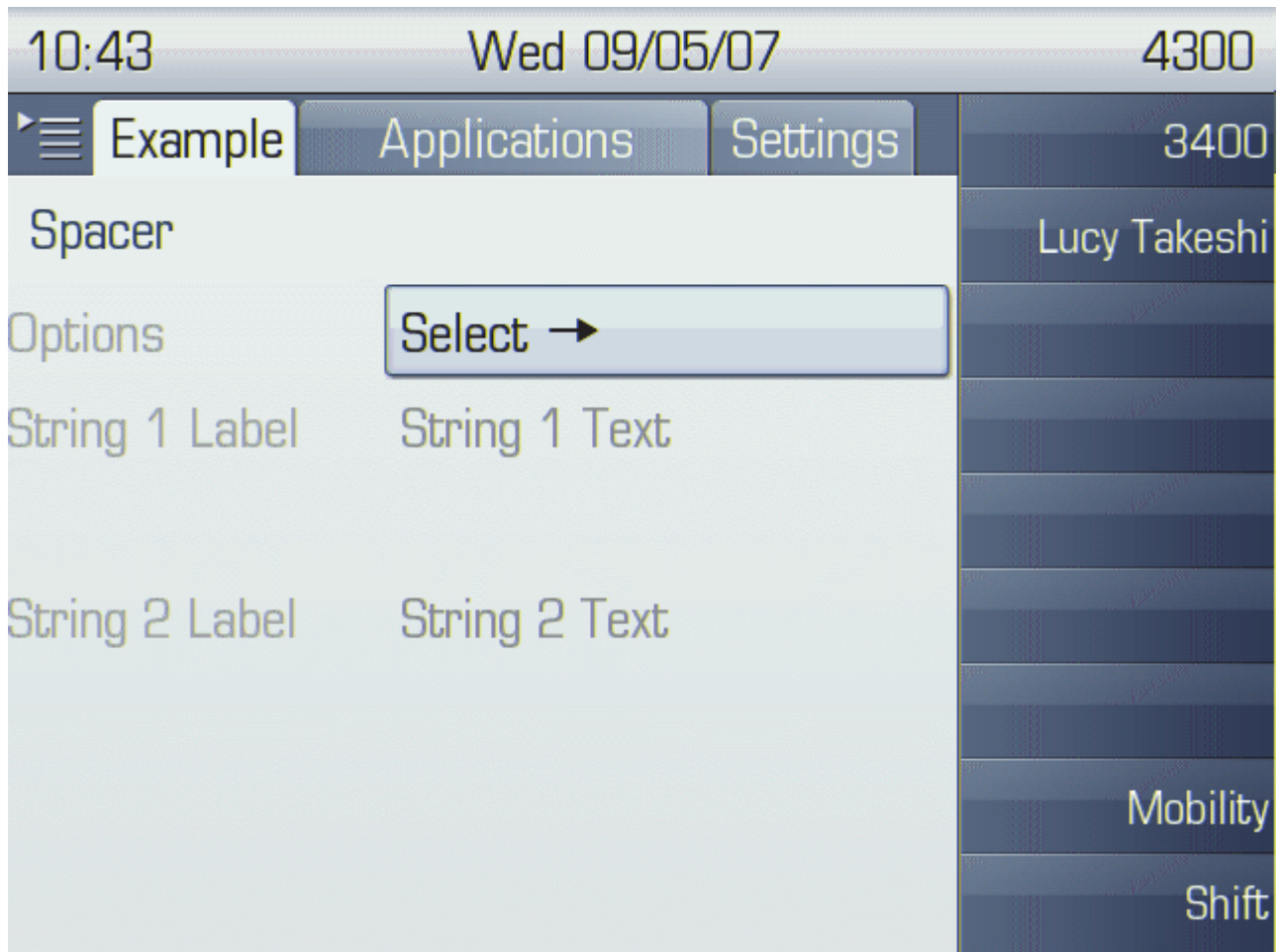
XML Object Reference

Form/Spacer

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="3">
        <Title>Spacer</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppItem>
          <IppStringItem>
            <Label>String 1 Label</Label>
            <Text>String 1 Text</Text>
          </IppStringItem>
        </IppItem>
        <IppItem>
          <IppSpacer/>
        </IppItem>
        <IppItem>
          <IppStringItem>
            <Label>String 2 Label</Label>
            <Text>String 2 Text</Text>
          </IppStringItem>
        </IppItem>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```


Screenshot



5.17 Form/Text Field

An entry field for user provided data is generated, similar to the `<input>` tag in HTML. The entry field contains a label. In addition, the data type of the entry can be defined using the `Constraint` attribute.

Attributes

The following attributes are available to the `TextField` element:

Attribute	Value	Function/Remarks
MaxSize (optional)	Maximum number of characters	Data input is accepted until this number is reached. Any further characters will be ignored.
	Missing, negative, or invalid	The maximum number of characters is limited only by the capacity of the display and the buffer of the phone
Constraint (optional)	ANY	Default value. Any character string is permitted.
	NUMERIC	The data entered must be numeric. Other keyboard entries are ignored.
	PASSWORD	The data entered are treated as a password. Asterisks (*) are displayed instead of the characters actually entered.
	PHONENUMBER	The data entered must be in a telephone number format.
	URL	The data entered must represent a valid URL.
	EMAILADDR	The data entered must represent a valid e-mail address.
Password (optional)	YES	The data entered in the text field are confidential and should be obscured whenever possible.
	NO	Default value. The data entered in the text field are not confidential.
Default (optional)	NULL	Default value. An empty entry field is displayed; the content of the <code>Text</code> element is ignored.
	TEXT	The entry field contains the content of the <code>Text</code> element.
	PHONENUMBER	The text field contains the phone's call number.

Table 5-3

Attribute	Value	Function/Remarks
Key (optional)	Key	The value of this attribute is used as a key for submitting the data as an HTTP/HTTPS request. The associated value is the content of the Text element. Please note that the key must be unique within a screen. If the key is missing, the specified URL is still invoked but there is no key-value pair sent with it for the particular text field.
Uneditable (optional)	YES	The text field cannot be edited by the user.
	NO	Default value. The text field can be edited by the user.

Table 5-3

Syntax

```
<IppTextField MaxSize="[Number]" Constraint="ANY|NUMERIC|
PASSWORD|PHONENUMBER|URL|EMAILADDR" Password="YES|NO"
Default="NULL|TEXT|PHONENUMBER" Key="[Key]" Uneditable="YES|NO">
  <Label > </Label >
  <Text> </Text>
</IppTextField >
```

Child elements

- **Label**

Label for identifying the entry field. It is displayed in a two-column layout; the label is placed in the left column, and the entry field is placed in the right column.

- **Text**

Preset text in the entry field.



Phone number translation in text field is not supported.

Commands

To send the data to a server and initiate server action, an appropriate command must be added to the screen (see Section 5.5, "Command"). The command will be displayed on the context menu of the options bar. Alternatively, the command can be associated with a text field. To achieve this, both the text field and the command must be placed inside a form item. For details, please see Section 5.13, "Form/Item".

XML Object Reference

Form/Text Field



If a command is associated with the text field, an arrow is shown as soon as the field has the focus. Additionally, the TouchGuide (OpenStage 60/80) buttons are mapped in a different way: the → key now opens the context menu, so that only the Ⓞ key opens the editor or the Softkeys on DPIP55G.

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="3">
        <Title>Form String</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppTextField MaxSize="30" Constraint="NUMERIC" De-
fault="TEXT" Key="TF1">
          <Label>Numeric Text</Label>
          <Text>123456</Text>
        </IppTextField>
        <IppTextField MaxSize="30" Constraint="ANY" De-
fault="TEXT" Key="TF2">
          <Label>Any Text</Label>
          <Text>abc123</Text>
        </IppTextField>
        <IppTextField MaxSize="30" Constraint="PASSWORD" De-
fault="TEXT" Key="TF3">
          <Label>Password</Label>
          <Text>999</Text>
        </IppTextField>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```


5.18 Form/Choice Group

This object generates a selection list within a form, comparable to the <select> and <option> elements in HTML and WML.

A form may contain none, one, or more choice groups.

Attributes

The following attributes are available to the `IppChoiceGroup` element:

Attribute	Value	Function
Type (mandatory)	EXCLUSIVE	Default value. Exactly one option can be selected (radio button function). Only the selected key/value pair is sent to the server.
	MULTIPLE	One or more options can be selected. All the key/value pairs are sent to the server. For selected options, the value of the <code>value</code> attribute is sent; for non-selected options, this value is sent with the prefix <code>not_</code> .
	POPUP	On startup, only the preselected option is shown. On pressing → on OpenStage60/80 or Ⓞ or Softkey EDIT on DPIP55G, a context menu containing all options opens up. A context menu option is selected by pressing Ⓞ when it has the focus. To submit the selection made in the context menu, the SELECT command must be issued from the options bar, just like with the other choice group types.
Count (mandatory)	Number of options	Only as many options as indicated here are displayed. If the actual number of options is greater, all further options that exceed this setting are ignored.
	0	No options are displayed.

Syntax

```
<IppChoiceGroup Type="EXCLUSIVE|MULTIPLE|POPUP" Count=" [Number] ">
  <Label> </Label >
  <Option Selected="FALSE|TRUE" Key=" [Key] " Value=" [Value] ">
    <OptionText> </OptionText>
    <IppPhoneNumber> </IppPhoneNumber>
    <Image Cache=" [Name] "> </Image>
  </Option>
</ IppChoiceGroup >
```

Child elements

- **Option**

Stores the data to be sent to the server in attributes. It can also contain descriptive text (**OptionText**) and an image (**Image**).

Attribute	Value	Function
Selected (optional)	FALSE	Default value. The option is not preselected
	TRUE	The option is preselected.
Key (optional)	Key	The key for the key/value pair that is sent to the server. For selection lists of type POPUP and EXCLUSIVE , multiple options can have the same Key . If the type is MULTIPLE , all the values must be different.
Value (optional)	Value	The value for the key/value pair that is sent to the server. If the selection list type is MULTIPLE , all the key/value pairs are sent. For selected options, the value of the value attribute is then sent; for non-selected options, this value is sent with the prefix not_..

Table 5-4



If a key or value is missing or invalid, **null** is sent instead.



The uniqueness of keys and values is not checked in the telephone

- **OptionText**

Descriptive text for the option. An **IppPhoneNumber** (see Section 5.25, "Phone Number") can be contained here. In this case, the corresponding call number or the associated name can be displayed here, if the call number is stored in the local phone book.

- **Image**

Illustrative image for the option. The image is displayed in the left column. For more information about the **Image** object, see Section 5.23, "Image".

Commands

To send the data to a server and initiate server action, an appropriate command must be added to the screen (see Section 5.5, "Command"). The command will be displayed on the context menu of the options bar. Alternatively, a command can be associated with the choice group by means of a form item (see Section 5.13, "Form/Item").

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="2">
        <Title>ChoiceGroup</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppChoiceGroup Type="MULTIPLE" Count="3">
          <Label>Choice1</Label>
          <Option Selected="TRUE" Key="key1-1" Value="1">
            <OptionText>Option 1-1</OptionText>
            <Image></Image>
          </Option>
          <Option Selected="FALSE" Key="key1-2" Value="2">
            <OptionText>Option 1-2</OptionText>
            <Image></Image>
          </Option>
          <Option Selected="FALSE" Key="key1-3" Value="3">
            <OptionText>Option 1-3</OptionText>
            <Image></Image>
          </Option>
        </IppChoiceGroup>
        <IppChoiceGroup Type="EXCLUSIVE" Count="2">
          <Label>Choice2</Label>
          <Option Selected="FALSE" Key="key2-1" Value="4">
            <OptionText>Option 2-1</OptionText>
            <Image></Image>
          </Option>
          <Option Selected="TRUE" Key="key2-2" Value="5">
            <OptionText>Option 2-2</OptionText>
            <Image></Image>
          </Option>
        </IppChoiceGroup>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

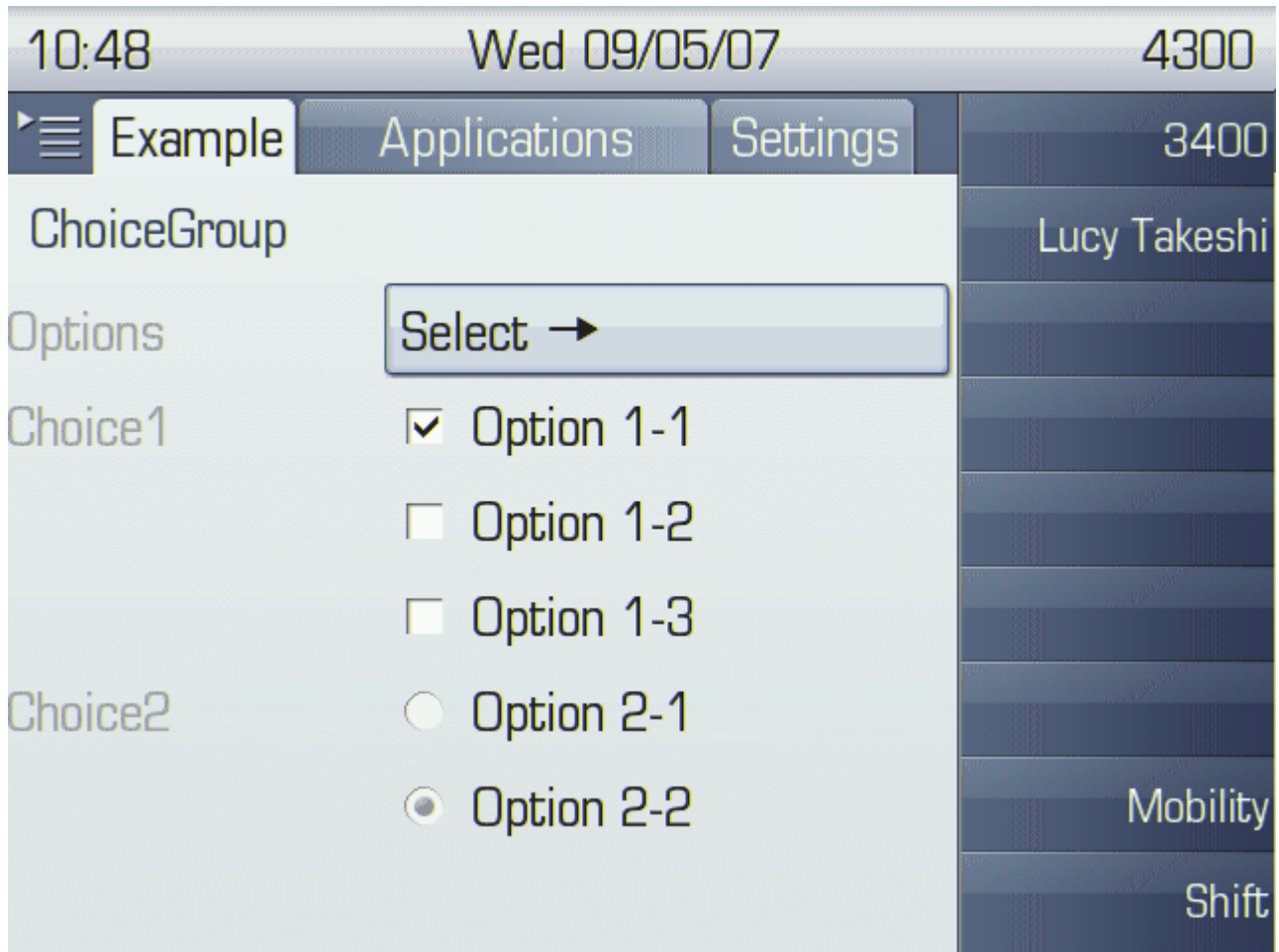


```

        <ScreenID>2</ScreenID>
    </IppCommand>
</IppScreen>
</IppDisplay>
</IppPhone>

```


Screenshot



5.19 Form/Date Field

This object generates a field in which date and time information can be preset or entered by the user. The data to be displayed (date, time, or date and time), the time zone, and a label can be specified.

The date is shown as three separate fields: day, month, and year. The time is shown as two separate fields: hours and minutes. The user cannot enter seconds; however, seconds are returned with a default value of 00.000

 If the key in a date field is invalid or not present, the URL indicated in the form is opened, but the data contained in the date field are not sent.

Attributes

The following attributes are available to the `IppDateField` element:

Attribute	Value	Function
Mode (optional)	DATE	Only the content of the <code>Date</code> field is submitted to the server.
	TIME	Only the content of the <code>Time</code> field is submitted to the server.
	DATETIME	Default value. The contents of the <code>Date</code> field and of the <code>Time</code> field are submitted to the server.
Default (optional)	NULL	Default value. The field is empty when the XML document is loaded.
	MODE	The contents of <code>Date</code> or <code>Time</code> are displayed when the XML document is loaded.
DateKey (optional)	Key for the date field	Together with the content of the <code>Date</code> field, this constitutes the key/value pair to be sent to the server.
TimeKey (optional)	Key for the time field	Together with the content of the <code>Time</code> field, this constitutes the key/value pair to be sent to the server.

Syntax

```
<IppDateField Mode="DATE|TIME|DATETIME" Default="NULL|MODE"  
DateKey=" [Key] " TimeKey=" [Key] ">  
  <Label> </Label>  
  <TimeZone> </TimeZone>  
  <Date> </Date>  
  <Time> </Time>  
</IppDateField>
```

Child elements

- **Label**

Generates a label for identifying the date and time fields. The label is displayed in the left hand column.

- **TimeZone**

Determines the time zone corresponding to the date and time fields. This affects the displayed time when the **Time** element is not provided in the XML document, so that the phone's local or GMT time is displayed. Any time zone definition accepted by Java can be used here. If the content is missing or invalid, it will default to **GMT**.

Example: If the time on the phone is 13:00:00.000, and the time zone is set to **GMT+2**, the phone's display will read 15:00.

- **Date**

Entry field for the date. The format for entry and display is set in the user menu, under **Locality > Date format**.



For predefining the date in the XML document, the YYYY-MM-DD format is used.

Example: 2007-11-20.

- **Time**

Time data is entered in the order of hours - minutes.



For predefining the time in the XML document, the HH-MM-SS format is used, followed by a period and the milliseconds.

Example: 13:00:00.000.

Commands

To send the data to a server and initiate server action, an appropriate command must be added to the screen (see Section 5.5, "Command"). The command will be displayed on the context menu of the options bar.



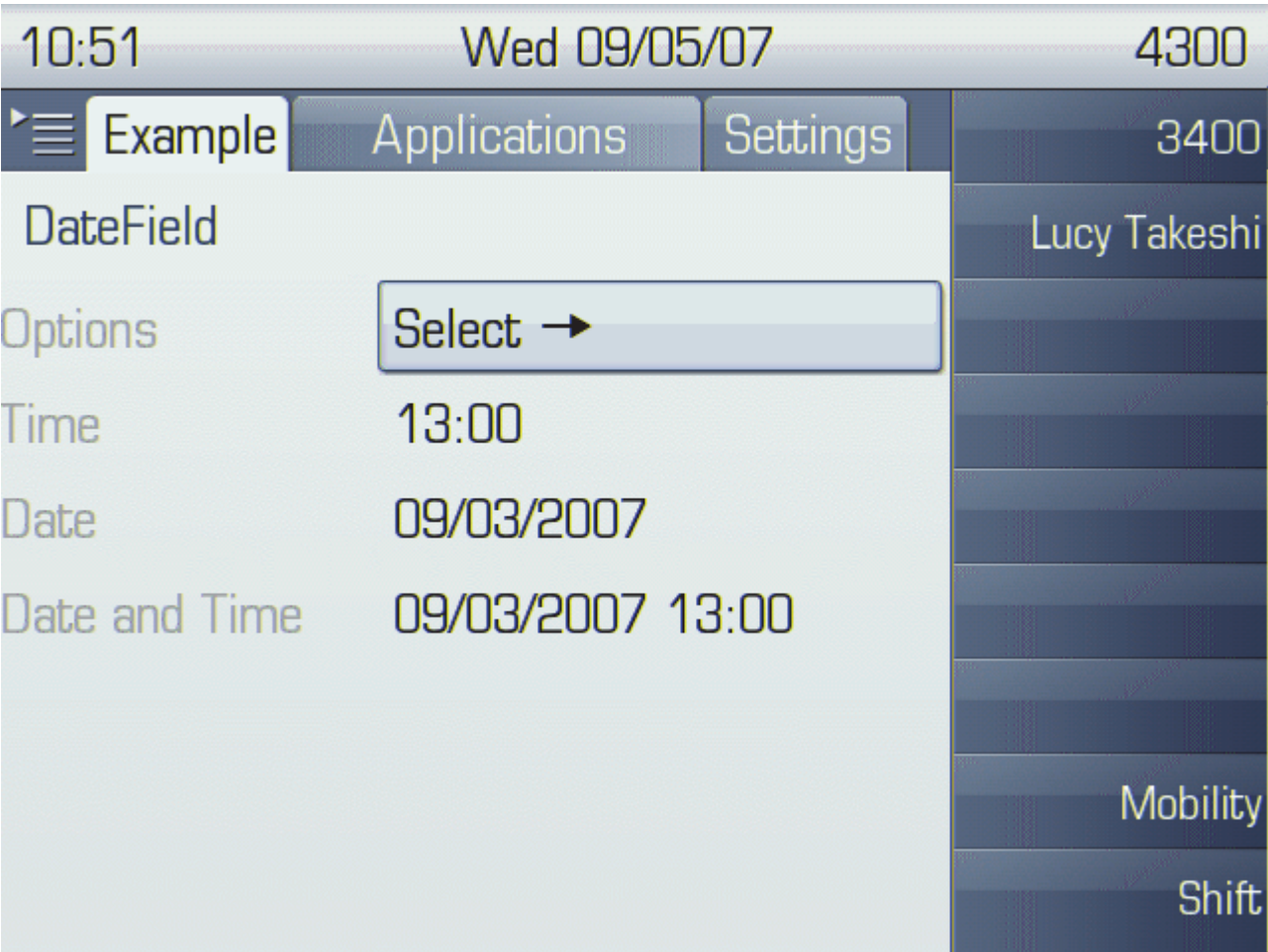
The `DisplayItem` attribute of the command must be set to `LISTITEM` or `BOTH`; otherwise, the command will not be accessible to the user. However, it is possible to have a command displayed in the context menu of the date field by means of a form item (see Section 5.13, "Form/Item").

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="3">
        <Title>DateField</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppDateField Mode="TIME" Default="MODE" DateKey="DK1"
TimeKey="TK1">
          <Label>Time</Label>
          <TimeZone>GMT+1</TimeZone>
          <Time>13:00:00.000</Time>
        </IppDateField>
        <IppDateField Mode="DATE" Default="MODE" DateKey="DK2"
TimeKey="TK2">
          <Label>Date</Label>
          <TimeZone>GMT + 1</TimeZone>
          <Date>2007-09-03</Date>
        </IppDateField>
        <IppDateField Mode="DATETIME" Default="MODE"
DateKey="DK3" TimeKey="TK3">
          <Label>Date and Time</Label>
          <TimeZone>GMT + 1</TimeZone>
          <Date>2007-09-03</Date>
          <Time>13:00:00.000</Time>
        </IppDateField>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

```
</IppScreen>  
</IppDisplay>  
</IppPhone>
```

Screenshot



5.20 Form/Button

This object generates a clickable area with a label that can be specified. When clicked, the key/value pair contained in the attributes of the `IppButton` element as well as the key/value pairs of any hidden objects in the XML document (see Section 5.11, "Hidden") are immediately sent to the server. The URL of the server-side program is indicated in the form (see Section 5.12, "Form").

Adjacent buttons are placed vertically.

Attributes

The following attributes are available to the `IppButton` element:

Attribute	Value	Function
Type (optional)	IMAGE	Default value. In the current versions, this is the only possible value. The button is represented by an image.
Layout (optional)	CENTER	This is the only available setting in the current versions. Available with V3R3 and upwards.
	DEFAULT	Default value. Position according to the default setting. Available with V3R3 and upwards.
	LEFT	Not implemented.
	NEWLINE_AFTER	Not implemented.
	NEWLINE_BEFORE	Not implemented.
	RIGHT	Not implemented.
Key (mandatory)	Key	The key for the key/value pair that is sent to the server. Please note that the key must be unique within a screen.
Value (mandatory)	Value	The value for the key/value pair that is sent to the server.

Table 5-5

Syntax

```
<IppButton Type="IMAGE" Layout=" [CENTER|DEFAULT|LEFT|NEWLINE_AFTER|
NEWLINE_BEFORE|RIGHT] " Key=" [Key] " Value=" [Value] ">
  <Label> </Label>
  <Image Cache="n"> </Image>
</IppButton>
```

Child elements

- **Label**

Generates a label for identifying the button.

- **Image**

Links an image file (see Section 5.23, "Image"). The image is rendered as a clickable area.

Commands

If an additional command is added to a button using a form item (see Section 5.13, "Form/Item"), it will displayed in the context menu of the options bar.

Example

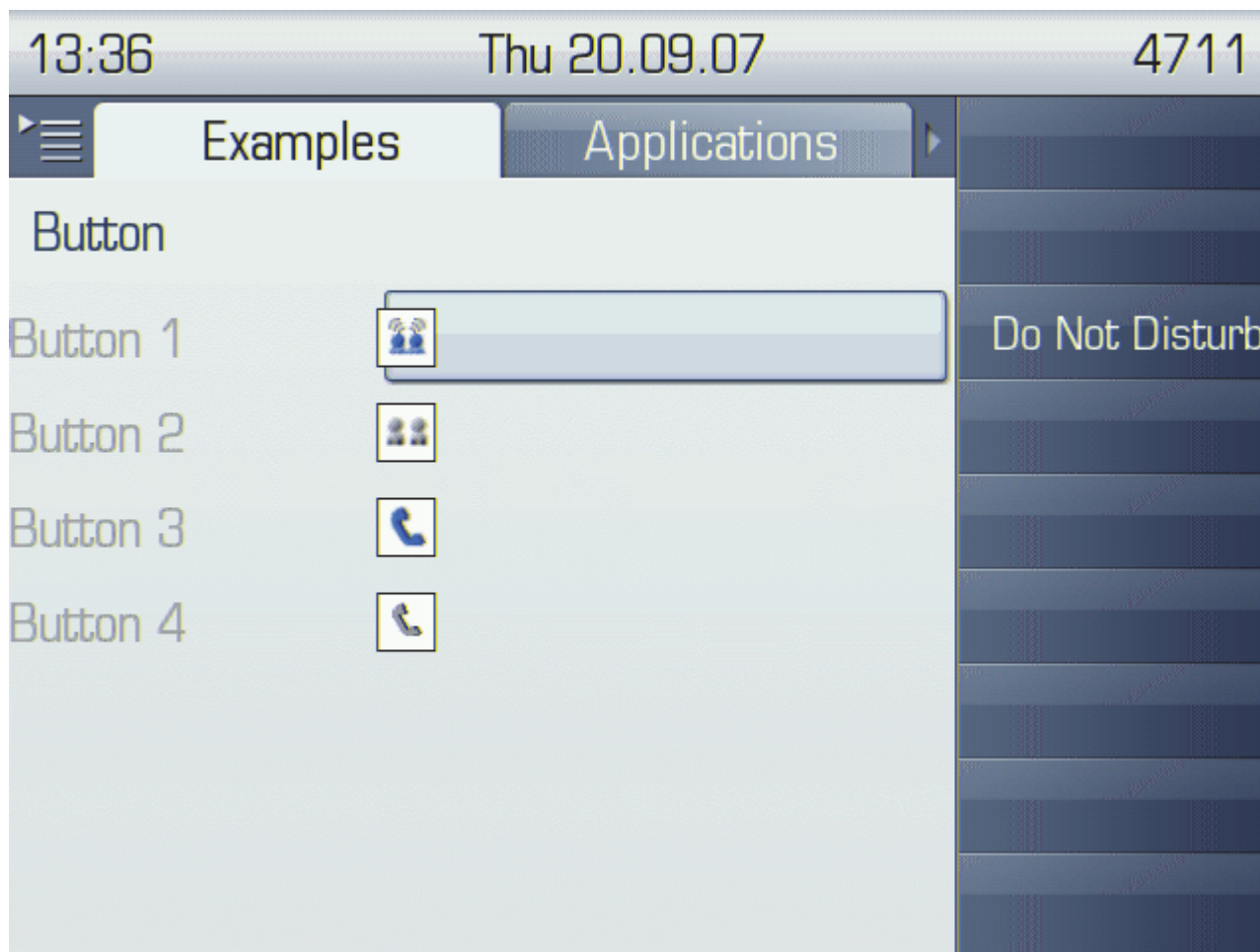
```
<?xml version="1.0" encoding="UTF-8"?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="0">
      <IppForm ItemCount="4">
        <Title>Button</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppButton Type="IMAGE" Layout="CENTER" Key="key1"
Value="1">
          <Label>Button 1</Label>
          <Image>http://subdomain.domain/path/image1.png</Im-
age>
        </IppButton>
        <IppButton Type="IMAGE" Layout="CENTER" Key="key2"
Value="2">
          <Label>Button 2</Label>
          <Image>http://subdomain.domain/path/image2.png</Im-
age>
        </IppButton>
        <IppButton Type="IMAGE" Layout="CENTER" Key="key3"
Value="3">
          <Label>Button 3</Label>
          <Image>http://subdomain.domain/path/image3.png</Im-
age>
        </IppButton>
        <IppButton Type="IMAGE" Layout="CENTER" Key="key4"
Value="4">
          <Label>Button 4</Label>
          <Image>http://subdomain.domain/path/image4.png</Im-
age>
```

XML Object Reference

Form/Button

```
</IppButton>  
</IppForm>  
</IppScreen>  
</IppDisplay>  
</IppPhone>
```

Screenshot



5.21 Form/Gauge

This object creates a horizontal graphical bar which represents a value or time interval. The associated label can be used for providing information on the specific function of the gauge.

Depending on what is specified, the gauge can function as slider or as progress bar. With the slider, the user can adjust a value via the TouchGuide and send it to the server-side program. The progress bar is a horizontal bar which grows from the left to the right; the speed is specified in the XML document.

For setting a value, the user must first navigate to the gauge and then activate it by pressing the **OK** or the **➔** key. The slider is moved by pressing the **➔** or **➞** key, or by rotating the finger over the TouchGuide. To confirm the setting, the user must press the **OK** key and afterwards press the **▲** key to go back to the options bar.

Attributes

The following attributes are available to the `IppGauge` element:

Attribute	Value	Function
Interactive (optional)	USER	Default value. The user can change the value using the TouchGuide; the changes are graphically represented by the bar. The interactive gauge has a value range between 0 and 100 which is pre-defined by the Maximum and the Minimum element.
	AUTO	The user has no influence on the graphical bar. The gauge increments every second. The range, and, consequently, the time interval, is specified by the content of the Maximum element and by the content of the Initial element.
Key (optional)	Key for the current value	Only effective if the value of the Interactive attribute is USER . Together with the value currently set (value range 1-100), it forms a key/value pair that can be sent to the server-side program. If the key is invalid or not present, the specified URL is opened, but no data are sent to the server. For sending data to the server, the screen must contain a SELECT command. Please note that the key must be unique within a screen.

Syntax

```
<IppGauge Interactive="USER|AUTO" Key="k">  
  <Label> </Label>  
  <Maximum> </Maximum>  
  <Initial> </Initial>  
</IppGauge>
```

Child elements

- **Label**

Provides information on what is displayed by the gauge.

- **Initial**

Data format and function are differentiated depending on the value of the **Interactive** attribute:

- If **INTERACTIVE="USER"**: The number indicated here determines the initial value and, therefore, the starting position of the slider bar. The range is 0-100. If the value is 20, for instance, the progress bar is displayed at 20% of its total width. If the value is 0, the bar is on the leftmost position.
- If **INTERACTIVE="AUTO"**: The number indicated here determines the starting position of the progress bar. The value is given in mm:ss or in ss format.



If the initial value is missing, negative, or invalid, it will default to 0.

- **Maximum**

Data format and function are differentiated depending on the value of the **Interactive** attribute:

- If **INTERACTIVE="USER"**: The number entered here indicates the maximum value that can be sent to the server. The range is 0-100.



If the maximum value is set at under 100, the slider bar will still reach to the right end of the scale. If, for instance, **Maximum** is set to 80, and the user sets the slider to rightmost position, the value 80 will be sent to the server.



If the maximum value is missing, negative, invalid, or greater than 100, it will default to 100. If the initial value is greater than the maximum value, it will be set to the maximum value.

- If **INTERACTIVE="AUTO"**: If the type is non-interactive, the time duration is indicated until the progress bar has reached the right end. The value is given in mm:ss or in ss format, like, for instance, 01:20 for one minute and 20 seconds. The range is not limited.





If the maximum value is missing, negative, or invalid, it will default to 100 seconds. If the initial value is greater than the maximum value, it will be set to the maximum value and there will be no automatic updates to the gauge.

Commands

If **INTERACTIVE** is set to **USER**, data can be sent to a server and initiate server action. For this purpose, an appropriate command must be added to the screen (see Section 5.5, "Command") or, alternatively, associated with the Gauge by means of a form item (see Section 5.13, "Form/Item"). If the command is added to the screen, it will be displayed on the context menu of the options bar. If it is placed in a form item, the command will be displayed on the context menu of the Gauge.

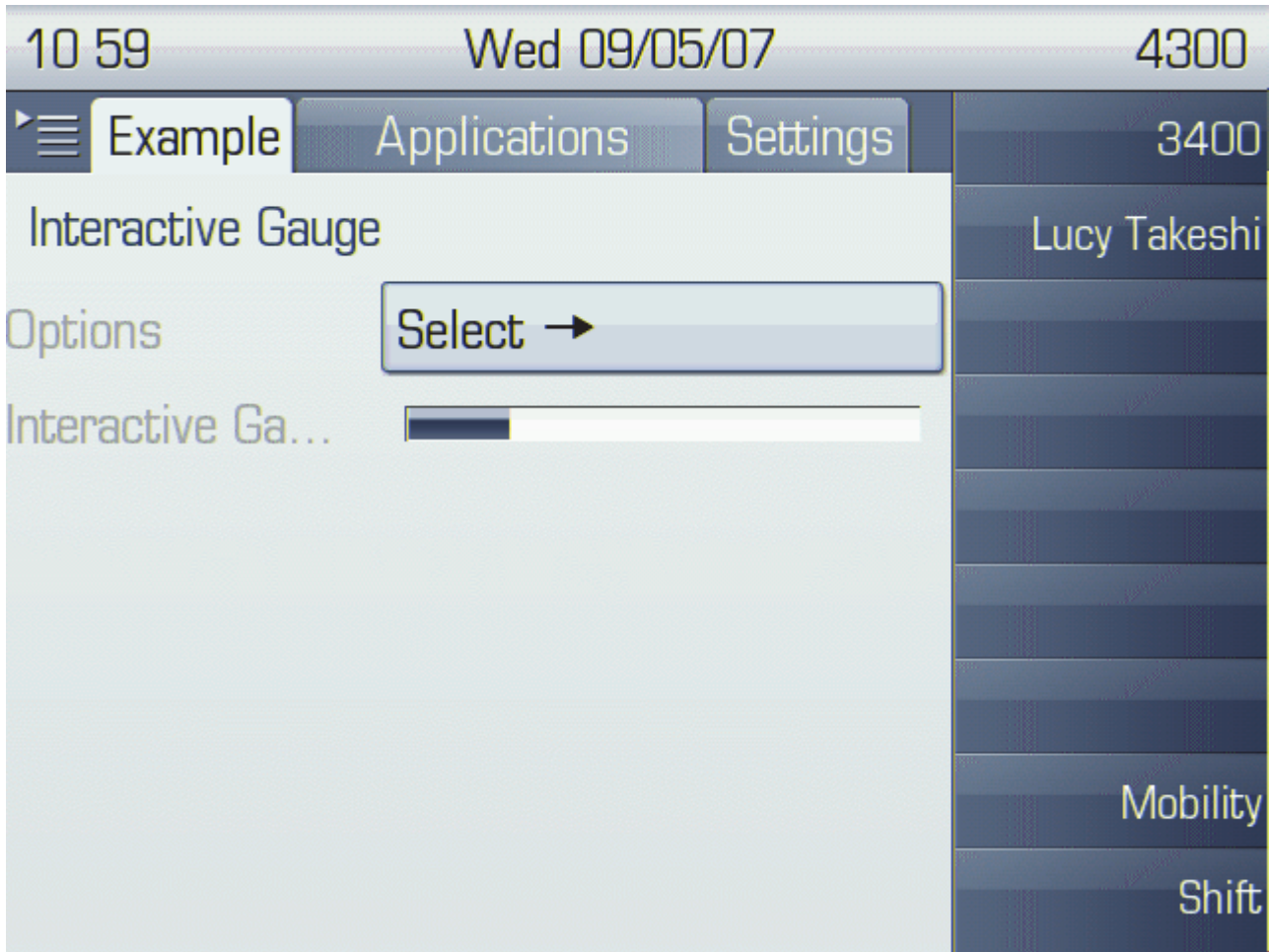


If a Command is displayed on the Gauge, the TouchGuide buttons are mapped in a different way: First, the user must press the  key in order to change the value; after this, the  key opens the context menu.

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppForm ItemCount="1">
        <Title>Interactive Gauge</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppGauge Interactive="USER" Key="G1">
          <Label>Interactive Gauge</Label>
          <Maximum>100</Maximum>
          <Initial>20</Initial>
        </IppGauge>
      </IppForm>
      <IppCommand Type="SELECT" Priority="0">
        <Label>Select</Label>
        <ScreenID>2</ScreenID>
      </IppCommand>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.22 Table

The table is a set of header and rows. Each table must consist of at least one row or table header. The table header can appear in the table just once as the first element. The table row and header consist of one or more cells. The cell consists of 1 or 2 cell lines. Each cell line consists of combination of text and images. The header cannot get focus.

The row can have one or more commands. The number of commands is specified by the attribute 'CommandCount'. If 'CommandCount' is missing, negative, or invalid, it will default to 0. If 'CommandCount' is 0, any lppCommand elements will be ignored. If there are more lppCommand elements than indicated in the count, the additional elements will be ignored.

The row has required attributes 'Key' and 'Value'. If the confirming action is a 'SELECT' command, the key-value pair of the selected item is sent to the specified URL.

Attributes

The following attributes are available to the `Table` element:

Attribute	Value	Function
ColumnCount (mandatory)	Number of Columns	Specifies number of columns. Each row should have the same number of cells. If there are more Cell elements, the additional elements will be ignored. If there are less, then empty columns will be added at the end of the row.
Selectable (mandatory)	ROW	Whole row is selected when using UP and DOWN arrow key for navigation through the table.

Syntax

```
<IppTable ColumnCount="[Number]" Selectable="ROW">
  <Url> </Url>
  <Header LineCount="[Number]" ColumnCount="[Number]">
    <Cell Width="[Number]">
      <CellLine>
        <CellText></CellText>
      </CellLine>
      <CellLine State="NORMAL|GRAY">
        <Image> </Image>
        <CellText> </CellText>
      </CellLine>
    </Cell>
  </Header>
  <Row LineCount="[Number]" CommandCount="[Number]" Key="[Key]"
Value="[Value]" >
```

XML Object Reference

Table

```
<Cell>
  <CellLine>
    <CellText></CellText>
  </CellLine>
  <CellLine State="NORMAL|GRAY">
    <Image> </Image>
    <CellText> </CellText>
  </CellLine>
</Cell>
<IppCommand></IppCommand>
</Row>
</IppTable>
```

Child elements

- **Url**

The URL to which the data of the selected option are sent.



If the URL is missing or is invalid, the current screen will continue to be displayed unchanged.

- **Header**

Each table must consist of at least one row or table header. The table header can appear in the table just once as the first element. The table header consist of one or more cells. The cell consists of 1 or 2 cell lines. Each cell line consists of combination of text and images. The header cannot get focus.

Attribute	Value	Function
LineCount (optional)	1 2	Specifies how many lines are in one table row.
	Missing, negative, 0, or invalid	The value will default to 1.
ColumnCount (optional)	Number of columns	Specifies the number of column for table header. If there are defined more Cell elements, the additional elements will be ignored. If there are less, then empty columns will be added at the end of the row.

- **Cell**

Each 'Cell' has to have one or two 'CellLine' elements. If the number of 'CellLine' elements is greater than indicated in the 'LineCount' attribute, the additional elements will be ignored.

Attribute	Value	Function
width (optional)	Number	Specifies width of cell in percentage of screen width. If the attribute is missing the width of cell is computed according to rules defined in Table 5-6 Rules for cell width. The Width attribute is used just from the header, if presented, or from the first row. If there are Width attributes in other rows they are ignored. If the Width is 0, negative, or greater than 100%, the attribute is ignored.

- **CellLine**

The CellLine element consists of CellText and Image and has an additional attribute.

Attribute	Value	Function
State (optional)	NORMAL	The text is displayed in regular color. Default value
	GRAY	The text is displayed in gray color.

- **CellText**

The number of text elements in one cell line is restricted to 1. All text elements except the first one are ignored.

- **Image**


The number of images in one cell line is not limited but all images must be placed before any text. All images which are in one cell line beyond text are ignored. For more information about the image element, see Section 5.23, "Image".


XML Object Reference

Table

- Row

Attribute	Value	Function
CommandCount (mandatory)	Number of commands within the IppTable	The commands are rendered correctly.
	0	Any IppTable elements will be ignored.
	Missing, negative or invalid	The value will default to 0.
	Less than the number of commands within the IppTable	Only those commands that fall within the given number are displayed.
Key (mandatory)	Key	The key for the key/value pair that is sent to the specified URL when confirming action is set to 'SELECT'.
Value (mandatory)	Value	The value for the key/value pair that is sent to the server.
LineCount (optional)	1 2	Specifies how many lines are in one table row.
	Missing, negative, or invalid	The value will default to 1.


 If a key or value is missing or invalid, null is sent instead.


 The uniqueness of keys and values is not checked in the telephone

- **IppCommand**

To send the data to a server and initiate server action, an appropriate command must be added to the screen (see Section 5.5, "Command"). The command will be displayed on the context menu of the options bar.

Condition	All cells in header/row have Width attribute	No cell in header/row have Width attribute	Some cells in header/row have Width attribute
Rule	Each cell has the width specified in the attribute. The sum of all Width attributes must be 100%. If the sum is less or more 100% the width of each cell will be normalized.	Each cell has equal width. The width allocated to each cell depends on number of cells in the row.	Each cell with the attribute has width defined by the attribute. Cells without the Width attribute will get same width computing by the formula: (100 - sum of all specified width)/ number of cells without the attribute If sum of all specified width is greater than 100, it is consider as error and no Width attribute in the row will be used.

Table 5-6 Rules for cell width

XML Object Reference

Table

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
<IppPhone>
  <IppDisplay>
    <IppScreen ID="1" HiddenCount="0" CommandCount="1">
      <IppTable ColumnCount="3" Selectable="ROW">
        <Url>http://subdomain.domain/path/program</Url>
        <Header>LineCount="1" ColumnCount="3">
          <Cell Width="20">
            <CellLine>
              <CellText>add the header text here</CellText>
            </CellLine>
          </Cell>
        </Header>
        <Row> CommandCount="1"
          <Cell Width="20">
            <CellLine>
              <Image>http://subdomain.domain/path/image1.png
            </Image>
              <CellText>add the your text here</CellText>
            </CellLine>
          </Cell>
          <IppCommand Type="SELECT" Priority="0">
            <Label>Select</Label>
            <ScreenID>2</ScreenID>
          </IppCommand>
        </Row>
      </IppTable>
    </IppScreen>
  </IppDisplay>
</IppPhone>
```

Screenshot



5.23 Image

This object is used to link an image. The XML document specifies whether the image should be cached or not. The XML application can use images

- stored in the application as resources
- previously downloaded and cached in memory
- downloaded on demand.

The image is downloaded from the server via HTTP/HTTPS, analogous to images in HTML pages.



Saving images in cache is explicitly indicated in the XML document. For this purpose, the cache name must be defined. This is necessary because specific areas in the cache are overwritten when new images are loaded while memory is on the decline. When this occurs, the previously cached images that have been overwritten will have to be reloaded if needed again. When the application is exited, all cached and active images are deleted.



With images, there are following limits:

V2R2 and earlier versions

- size of an individual image: 200 KB
- size of the cache: 750 KB

V3R0 and upwards

- size of an individual image: 1 MB
- size of the cache: 1 MB

The application will not download an individual image if it exceeds the maximum size for individual images.

Attributes

The following attributes are available to the **Image** element:

Attribute	Value	Function
Cache (optional)	Name	The image can be accessed from the cache under the name indicated here. If the attribute is invalid or not present, it is not cached.

Syntax

```
<Image Cache=" [Name] ">[source]</Image>
```

The content of the image element indicates the source path and filename of the image to be displayed. **A predefined image that is already available in the telephone software:**

- Filename, e. g., `inCall.png`
- Filename with preceding slash, e. g., `/inCall.png`



Images predefined in the telephone software cannot be cached.

The source path of an image may take one of the following formats:

- URL for the image file: `http://<IP address>:<Port>/<filename>`
- URL of a program on the server that sends the desired image file; the key/value pair identifies the image:
`http://<IP address>:<Port>/<filename of the program>?<key/value pair>`

If the image has been stored in cache already, it is sufficient to provide the file name, as in this example:

```
<Image Cache="Flower">flower.png</Image>
```

- The name of the image file and its directory path on the phone:
`file:/<directory path on phone>/<filename>`



If the source of the image file is missing, but the cache attribute exists and the image is cached, the image in cache is displayed.
If the source of the image is missing and the "Cache" attribute is missing or invalid, the corresponding alert, list, image item, or choice group will be displayed without the image.

XML Object Reference

Image

Images as Icons

If an image is to be used as an icon for an interactive element, it is recommended to choose an appropriate size. The images should be in PNG format. The built-in icons for OpenStage 60/80 are sized as follows, see also Section 9.4, "Image Files stored on the Phone":

- Icons for mode keys, call states, phone number identification, presence, media widget, speller, idle screen, info bar, and others: 36px x 36px.
- Icons in popups and prompts: 60px x 60px.
- Dial phone number icon: 12px x 36px.



Generally, images should be optimized for OpenStage 80 phones. On OpenStage 60, they will be resized correctly.

5.24 Player

The player is designed for applications that involve audio streaming. All player commands issued by the user are sent to the server, enabling the server to control the streaming accordingly.

The player is a transient screen, replacing the current screen on the display. However, those parts of the current screen which are not covered by the player are still visible in the background. The player displays the current progress through a media stream, and offers the functions:

- play,
- pause,
- stop,
- rewind,
- skip rewind,
- forward,
- skip forward,
- call,
- delete,

similar to common audio players.

The user interface consists of a gauge and a number of buttons. The gauge may be interactive or non-interactive. The non-interactive gauge value is automatically updated on the phone, provided a time-based maximum value is supplied. For further information, please refer to Section 5.21, "Form/Gauge".

The player has eight modes of operation, which determine the state, behaviour, and appearance of the player:

- playing,
- edit,
- stopped playing,
- recording,
- stopped recording,
- playback recording,
- edit playback,
- disabled.

The disabled mode is controlled locally on the phone, whereas the other seven modes are controlled by the remote program.

Three states are defined for the player:

- **PLAYING**
- **RECORDING**
- **STOPPED**

Additionally, two modes are defined by the **Mode** attribute:

- **CALL**
- **RECORD**

The player buttons and the TouchGuide allow user interaction with the server-side program. Whenever the user presses a TouchGuide or player button, a specific key/value pair, consisting of the player's **Key** attribute and the function type, is immediately sent to the specified URL. If, for instance, the value of the **Key** attribute is **MyPlayer**, and the user presses the forward button, the key/value pair is **MyPlayer=forward**. Also the key/value pairs of the gauge (see Section 5.21, "Form/Gauge") and of any hiddens (see Section 5.11, "Hidden") are sent to the URL.

The following table shows the buttons and the related function types, i. e. the value of the key/value pair whose key is the value of **Key**:

Player Button	Function
	delete
	rewind
	skip_rewind
	play
	pause

Table 5-7



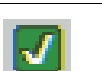






Player Button	Function
	stop
	skip_forward
	forward
	call
	confirm
	record

Table 5-7

XML Object Reference

Player

The following table shows the TouchGuide (OS60/80 only) buttons and the related function types, i. e. the value of the key/value pair whose key is the value of **Key**:

TouchGuide Button (OS60/80)	Navigation Key (DPI55G)	Function
		forward next
		rewind
		delete

The following attributes are available to the **IppPlayer** element:

Attribute	Value	Function/Remarks
Mode (mandatory)	CALL	With this value, the phone can be in playing, edit, and stopped mode.
	RECORD	With this value, the phone can be in recording, stopped record, edit playback, and playback recording mode.
State (mandatory)	PLAYING	All buttons are displayed except for the play button, and the gauge is automatically updating.
	STOPPED	All buttons are displayed except for the stop button, and the gauge is not automatically updating.
	RECORDING	Only the stop and the delete button are displayed, and the gauge is automatically updating.
Key (mandatory)	Key for the Player	Together with the function type of the player button that has been pressed, the key forms a key/value pair. Please note that the key must be unique within a screen.

The following table shows the possible player modes and their corresponding interactive, state, and mode values:

Player Mode	Attributes		
	Gauge - Interactive	State	Mode
Playing	AUTO	PLAYING	CALL
Edit	USER	STOPPED	CALL
Stopped	AUTO	STOPPED	CALL
Recording	AUTO	RECORDING	RECORD
Stopped Record	AUTO	STOPPED	RECORD
Edit Playback	USER	STOPPED	RECORD
Playback Re-cording	AUTO	PLAYING	RECORD

Table 5-8

Syntax

```
<IppPlayer State="PLAYING|STOPPED|RECORDING" Mode="CALL|RECORD"
Key=" [Key] ">
  <Url> </Url>
  <IppGauge> </IppGauge>
</IppPlayer>
```

Child Elements

- **Url**

The URL invoked when a button is pressed.

- **IppGauge**

The **Interactive** attribute must be set to **USER** or **AUTO**, according to the current state and mode of the Player. For details, please refer to Table 5-7 .

Example

```

<IppPhone>
  <IppDisplay InitialScreen="1">
    <IppScreen ID="1" HiddenCount="0" CommandCount="2">
      <IppForm ItemCount="2">
        <Title>Play / Record</Title>
        <Url>http://subdomain.domain/path/program</Url>
        <IppItem CommandCount="1">
          <IppStringItem>
            <Label></Label>
            <Text>Play</Text>
          </IppStringItem>
          <IppCommand Type="SCREEN" DisplayOn="LISTITEM"
Priority="0">
            <Label>Select</Label>
            <ScreenID>2</ScreenID>
          </IppCommand>
        </IppItem>
        <IppItem CommandCount="1">
          <IppStringItem>
            <Label></Label>
            <Text>Record</Text>
          </IppStringItem>
          <IppCommand Type="SCREEN" DisplayOn="LISTITEM" Pri-
ority="0">
            <Label>Select</Label>
            <ScreenID>3</ScreenID>
          </IppCommand>
        </IppItem>
      </IppForm>
    </IppScreen>
    <IppScreen ID="2" HiddenCount="1" CommandCount="2">
      <IppPlayer State="PLAYING" Mode="CALL" Key="Myplayer">
        <Url>http://subdomain.domain/path/program</Url>
        <IppGauge Interactive="AUTO" Key="G1">
          <Label></Label>
          <Maximum>100</Maximum>
          <Initial>0</Initial>
        </IppGauge>
      </IppPlayer>
    </IppScreen>
  </IppDisplay>
</IppPhone>

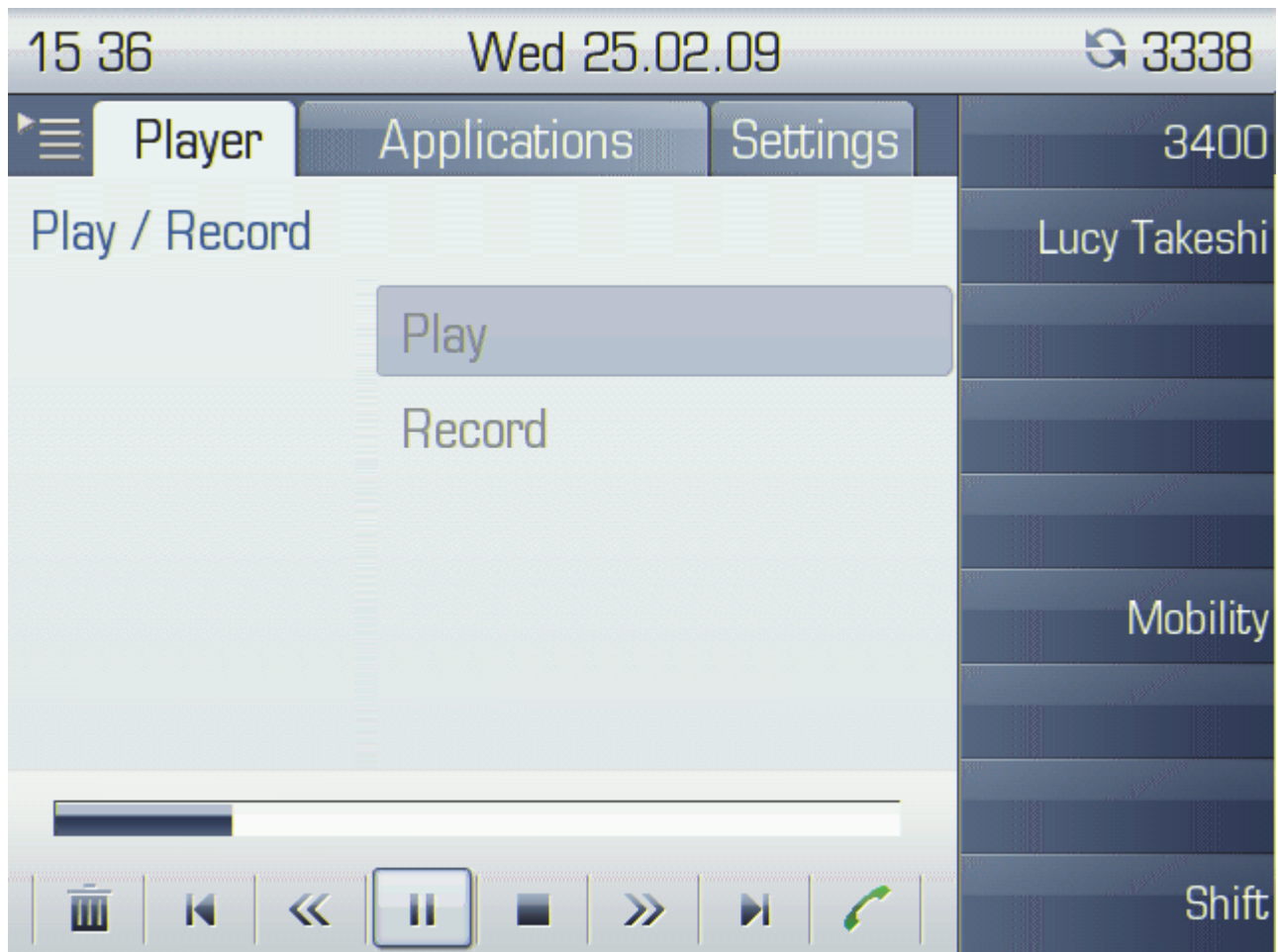
```

```

<IppScreen ID="3" HiddenCount="1" CommandCount="2">
  <IppPlayer State="RECORDING" Mode="RECORD" Key="Myplayer">
    <Url>http://subdomain.domain/path/program</Url>
    <IppGauge Interactive="AUTO" Key="G1">
      <Label>Interactive Gauge</Label>
      <Maximum>100</Maximum>
      <Initial>0</Initial>
    </IppGauge>
  </IppPlayer>
</IppScreen>
</IppDisplay>
</IppPhone>

```

Screenshot



5.25 Phone Number

This element enables the translation of a given phone number which is stored in the local phone book. The phone number can be translated to:

- the name of the participant,
- the picture clip associated to the participant, if available,
- or, alternatively, an icon of the phone type (e.g. mobile number, home number, etc.).

If the translation fails, alternative text can be displayed instead of the phone number.

Depending on the GUI element wherein the phone number is placed, some or all of the information listed above may be displayed instead of or in addition to the phone number.

Examples:

- An alert can display the name, number, and picture clip of the participant (if available), or a phone type icon (see Section 5.7, "Alert").



If the name and number are both displayed, the name is placed on the top line, and the number is placed immediately below it.

- A single column list or the left hand column in a multiple column list can display a picture or an icon followed by the name or number (see Section 5.8, "List").
- Any other column in a multiple column list can only display the name or number (see Section 5.8, "List").

Attributes

The following attributes are available to the `IppPhoneNumber` element:

Attribute	Value	Function/Remarks
ImageType (optional)	PHONETYPE	The icon of the phone type according to the given phone number is displayed.
	PICTURECLIP	The picture clip associated to the participant is displayed, if available.
NumberType (optional)	NUMBER	Only the number is displayed.
	NAME	Only the corresponding name in the phone book is displayed.
	BOTH	Both the number and the corresponding name in the phone book are displayed



For consistency with the style for presentations of call identities on OpenStage, `ImageType` should equal `PICTURECLIP` and `NumberType` should equal `NAME`.

Syntax

```
<IppPhoneNumber ImageType=" [PHONETYPE|PICTURECLIP] "  
NumberType=" [NUMBER|NAME|BOTH] ">  
  <AltText> </AltText>  
</IppPhoneNumber>
```

Child elements

- `AltText`

In case the number does not exist in the phone book, the alternative text is displayed instead of the number, name or picture clip.

5.26 Tone

The "IppTone" defines a tone that can be played when the action is invoked either when the screen or the command which contains the action is rendered .

The attribute **Length** defines the amount of time the tone will be played. If the attribute **Length** is missing or it has different value than defined in this document the IppTone element is ignored.

The tone is played into active audio output device and the volume of tone is set according to the volume of the device. While the phone plays tone the Alert bar LED is not changed due to the tone being played. The tone is also played into active call but it doesn't interrupt the ringing tone or melody.

Attributes

The following attributes are available to the **IppTone** element:

Attribute	Value	Function/Remarks
Length (required)	SHORT	The short period is half of standard value.
	STANDARD	The standard period is 250 ms.
	LONG	The long period is double of standard value.

Syntax

```
<IppTone Length="SHORT | STANDARD | LONG">  
</IppTone>
```


6 Push Capability (All Phone Types)

An XML application can be started or updated by a remote program, without any user action. For this purpose, the server-side program sends a specific HTTP or HTTPS message to the corresponding web service on the phone. For detailed information on the composition of a push request, see Section 6.2, "The Push Request".

6.1 Push Types

There are four different types of push requests. The type determines under which circumstances the information is displayed to the user.

The four different push types and their characteristics are:

1. **Active:** If the required XML application is not running, nothing changes; the application is not started by the push request. The information is displayed in a non-intrusive manner; the application will not gain the focus on push.

This type is appropriate for non-essential information which should only be displayed if the required XML application is already running.

2. **Queue:** If the required XML application is not running, it is started by the push request. However, the application will not gain the focus on push. Alert popups (see Section 5.7, "Alert") and players (see Section 5.24, "Player") are not opened on push.

This type is appropriate for information that does not have to be presented immediately to the user (e.g. offers, restaurant menu, message of the day).

3. **Indicate:** If the required XML application is not running, it is started by the push request. However, the application will not gain the focus on push. The information is displayed to the user in a non-intrusive manner.

This type is appropriate for non-essential information (e.g. new E-mail received, message playback progress).

4. **Force:** If the required XML application is not running, it is started by the push request. Additionally, the application will gain the focus on push.

This type is appropriate for urgent information that must be immediately displayed to the user.

The following table shows which actions are performed by which push type, considering the possible sub-conditions:

Push Capability (All Phone Types)

Push Types

Action	sub-condition		'Push' Type		
		Active	Queue	Indicate	Force
XML application started on push	Application is configured and not running	No	Yes	Yes	Yes
	Application is not configured	Error case - the push request is ignored.			
XML document loaded from the nominated URL on the server		Yes, if program is already running.	Yes	Yes	Yes

Table 6-1

Action	sub-condition	'Push' Type			
		Active	Queue	Indicate	Force
XML document rendered	XML document contains list (see Chapter 5.8), text box (see Chapter 5.9), or form (see Chapter 5.12)	Yes, application tab updated if application is already running.	Yes, application tab updated.	Yes, application tab updated.	Yes, application tab updated.
	XML document contains alert (see Chapter 5.7)	Popup is only created if program is already running. Displayed only if no other popup or prompt is showing.	No popup is created. The previously displayed screen is shown, if applicable.	Popup is created. Displayed only if no other popup or prompt is showing.	Popup is created. Displayed only if no other popup or prompt is showing.
	XML document contains player (see Chapter 5.24)	Player is created if program is already running. Displayed only if no other popup or prompt is showing.	No player is displayed. The previously displayed screen is shown.	Player is created. Displayed only if no other popup or prompt is showing.	Player is created. Displayed only if no other popup or prompt is showing.
XML application gains screen focus		No	No	No	Yes, XML tab is displayed

Table 6-1

Push Capability (All Phone Types)

Push Types

Action	sub-condition	'Push' Type			
		Active	Queue	Indicate	Force
Screensaver is running		Stopped for alert popup or player if the application is already running, with the following constraint: When the push request starts a player, the screensaver will only stop if the XML application has had the focus before the screensaver had started.	Stopped if the push request has started the application. Neither alert nor popup player are started by push requests.	Stopped if the push request has started the application, and for alert popup or player, with the following constraint: When the push request starts a player, the screensaver will only stop if the XML application has had the focus before the screensaver had started.	Stopped for alert popup or player, or if this push request has started the application.
Phone locked		No change	No change	No change	No change

Table 6-1

6.2 The Push Request

The push request is an HTTP or HTTPS POST request sent to the following phone-side URL:

`http://<ip-address>:<port-number>/server_push.html/ServerPush`

Example:

`http://137.223.234.11:8085/server_push.html/ServerPush`

The Push request must contain the following Information:

Key	Value	Function
ServerAddr	IP address	IP address of the server where the remote program is located.
ServerPort	Port number	Port number of the server where the remote program is located.
ProgramName	Resource name	Entity part of the URI pointing to the server-side program. For instance, this can be an XML file name, or the name of a servlet. Additional parameters can be added like this: <code>servlet?id=117&param1=hi</code> If a tab on demand is to be started, this parameter must contain the appropriate application name (Tab 1...3 Application name , see Section 3.1, "Configuring an Application on the Phone" and Section 3.4, "Application Suite Using Tabs On Demand").

Table 6-2

Push Capability (All Phone Types)

The Push Request

Key	Value	Function
RequestType	active	The XML document is loaded, if the program is already started. If the document contains a popup (IppAlert) or a player (IppPlayer), and no other popup or player is shown already, the player or popup is displayed. For detailed information, see the table in Section 6.1, "Active".
	queue	The program is started in the background and the XML document is loaded. For detailed information, see the table in Section 6.1, "Queue".
	indicate	The program is started and the XML document is loaded. If the document contains a popup (IppAlert) or a player (IppPlayer), and no other popup or player is shown already, the player or popup is displayed. For detailed information, see the table in Section 6.1, "Indicate".
	force	The program is started and the XML document is loaded. It is displayed to the user with input focus, unless a prompt (e.g. incoming call Alert or Dialer) is showing. For detailed information, see the table in Section 6.1, "Force".
MidletName	Name of the generic XML application	Name of the application that is to be controlled by the Push request. Depending on the type of Push request, and the current state of the application, the application may be started by the Push request. This parameter is equivalent to the Application name entered when the application was configured on the telephone (see Section 3.1, "Configuring an Application on the Phone").
ServerProtocol	Communication protocol	Indicates the protocol used by the server for communicating to the phone. Examples: http , https .
ServerContextKey	Key	The key for the key/value pair that the phone will send to the server-side program. The program can use this key/value pair to detect whether the XML document request goes back to this push request.
ServerContextValue	Value	The value for the key/value pair that the phone will send to the server-side program.

Table 6-2

Push Request Example:

```
POST /server_push.html/ServerPush HTTP/1.1
User-Agent: Java/1.6.0_20
Host: 192.168.1.244:8085
Accept: text/html, image/gif, image/jpeg, *; q=.2, */*; q=.2
Connection: keep-alive
Content-type: application/x-www-form-urlencoded
Content-Length: 204
MidletName=testxml&ServerProtocol=http&
ServerAddr=192.168.1.151&ServerPort=8080&
ProgramName=testxml/servlet&RequestType=force&
ServerContextKey=usr;key&
ServerContextValue=RFT;0002hagdtefsjuhsjdtfgrhywhdbzu
```

7 HTTP Protocol

The communication between the phone and the application server is based on HTTP protocol defined in HTTP 1.1 RFC - <http://tools.ietf.org/html/rfc2616>. The phone supports just a subset of functionality described in the RFC. This chapter discusses what the phone supports.

7.1 Transport protocol

The phone supports TCP transport protocol and also secure TCP. The secure TCP connection uses TLS 1.0 .

7.2 URI scheme

The phone supports http scheme and https scheme.

7.3 HTTP messages

The phone supports only GET message for sending request to the server. For proxy secure connection the message CONNECT is supported.

7.4 HTTP responses

The following response codes are supported by the phone. Other response codes are treated as 400 response.

Response Code	Function	Action
200	OK	The icon of the phone type according to the given phone number is displayed.
204	No Content	The picture clip associated to the participant is displayed, if available.
301	Moved Permanently	The request is send to URL defined in the Location header
302	Found	
307	TemporaryRedirect	

Response Code	Function	Action
400	BadRequest	Receiving such responses stops the application on the phone
401	Unauthorized	
403	Forbidden	
404	NotFound	
408	TimedOut	
500	Internal Server	Receiving such response stops the application on the phone
		All other response are handled as 400.

7.5 Authentication

The phone doesn't support any authentication scheme on HTTP level (RFC 2617).

7.6 Request headers

The phone sends following headers in the HTTP request. See also Section 3.4, "Starting the Application".

1. **Host:** Specifies the Internet host and port number of the resource being requested, as obtained from the original HTTP URL.
2. **Connection:** The phone sends Keep-Alive in the header and supports persistent connection.
3. **Accept-Language:** The Accept-Language request-header field will be used to return the current language of the phone back to the server. The associated quality value which represents an estimate of the user's preference for the languages specified by a range and the language quality factor are not used.
4. **Accept-Charset:** The phone propagates support of "UTF-8" charset.

7.7 Response headers

The server can use the headers defined in this chapter for communication with the phone. Other headers not defined in this chapter will be ignored by the phone.

1. **Content-Length:** Indicates the size of body in the bytes
2. **Content-Type:** Indicates media type of the body. Currently the phone supports "text/xml" type. As encoding charset are supported "UTF-8" and "ISO-8859-1".

HTTP Protocol

Response headers

3. **Cache-Control**: Specifies directives to handle caching of resources. Detailed discussed in the Section 2.5, "Cache".
4. **Expires**: Gives date/time after that the response is considered stale. Detailed discussed in the Section 2.5, "Cache".

8 Using Additional Phone Keys (All Phone Types)




8.1 Overview

In addition to the input and navigation elements accessible to OpenStage XML applications, the free programmable function keys (FPK) and, with firmware V2R1 onwards, the fixed function keys (FFK) can be utilized for communication with a server-side program. For this purpose, a function that sends a configurable HTTP or HTTPS request to a remote server is assigned to the key.

To enable feedback from the server, the LED associated with the key can be controlled remotely. This can be done via SIP notify messages, or HTTP header parameter Set-Cookie: LEDState=[ON, OFF, Flash], or, with firmware version V2R2 or higher, via a combination of HTTP/HTTPS push requests (see Section 8.4, "Creating the Push Request for LED Control (V2R2)") and XML documents (see Section 8.5, "XML Document for LED Control").

8.2 Configuring the Phone

To assign this function to a free programmable key, open the web based management (see Section 3.1.3, "Using the Web Based Management (WBM)", step 1-3) and navigate to **System > Features > Program keys**. In the menu for the desired key (normal or shifted level, as appropriate), select the function **Send URL**.

To assign the function to a fixed function key, navigate to **System > Features > Fixed Keys**. The forwarding key , the release key , and the voice recognition key  can be configured here, as well as the DPIPSPG keys forwarding key, conference key, transfer key, and hold key. In the menu for the desired key, select the function **Send URL**.

The following parameters are configurable for the **Send URL** function:

- In **Key label <n>**, the label for this key is defined.
- **Protocol** defines whether HTTP or HTTPS will be used for sending the URL to the server.
- The **Web server address** is the IP address or DNS name of the remote server to which the URL is to be sent.
- The **Port** is the target port at the server to which the URL is to be sent.
- The **Path** is the server-side path to the desired function, i. e. the part of the URL that follows the IP address or DNS name. Example: `webpage/checkin`
With firmware version V2R2, this is the path that returns the XML document containing the LED status information.

Using Additional Phone Keys (All Phone Types)

Configuring the Phone


- In the **Parameters** field, one or more key/value pairs in the format `<key>=<value>` can be added to the request, separated by an ampersand (&).
Example: `mode=remote&action=start`



The question mark will be automatically added between the path and the parameters. If a question mark has been entered at the start of the parameters, it will be stripped off automatically.

- **Method** determines the HTTP/HTTPS method to be used, which can either be GET or POST. If GET is selected, the additional parameters (**Parameters**) and the user id/password (**Web server user ID/Web server password**) are part of the URL. If POST is selected, these data form the body of the message.
- In case the web server requires user authentication, the parameters **Web server user ID** and **Web server password** can be used. If not null, the values are appended between the server-side path (**Path**) and the additional parameters (**Parameter**).
- If the **LED controller URI** is given, the LED associated with this key indicates the state of the call number or SIP URI specified here, provided the SIP server sends a notification (SIP NOTIFY, based on RFC 4235):
 - Busy notification (state=confirmed): LED is glowing.
 - Ringing notification (state=early): LED is blinking.
 - Idle notification (state=terminated): LED is dark.



When assigning the function described here to the release key , please consider that this key has no LED.

- With firmware version V2R2, the **Push support** parameter is available. If activated, the LED is controllable by a combination of an HTTP/HTTPS push request and an XML document (for details, see Section 8.4, "Creating the Push Request for LED Control (V2R2)" and Section 8.5, "XML Document for LED Control").



If you want to use the HTTP/HTTPS push solution, please ensure that the **LED controller URI** field is empty. Otherwise, the phone will only use the SIP mechanism for LED control, and ignore the push request.

- The **Symbolic name**, which is available with firmware version V2R2, is used to assign a push request from the application server to the appropriate free programmable key resp. fixed function key. This value must be unique for all keys involved.

8.3 Phone Request

OpenStage phones can send GET or POST requests, depending on the configuration. The specific request string is sent in the query string when GET is chosen, and in the message body when POST is chosen. The **Content-type** of the POST request is **text/xml**.

With firmware version V2R1, the phone sends an HTTP/HTTPS request when the user presses the key to which the **Send URL** function is assigned. The request string contains the parameters **Web server user ID**, **Web server password**, and **Parameters**; for example:

```
userid=jdoe&password=00secret&mode=remote&action=start
```

With firmware version V2R2 onwards, the phone sends an HTTP/HTTPS request in any of the following cases:

- The user presses the key to which the **Send URL** function is assigned. The request string contains the **Web server user ID**, the **Web server password**, the **Parameters**, the phone's IP address, the phone's call number, and the **Symbolic Name**; for example:

```
userid=jdoe&password=00secret&mode=remote&action=start&  
ipaddress=192.168.1.244&phonenumber=3338&symbn=key4
```
- The server-side program has sent a push request to the phone. The request string is the same as in the case of key press.
- The LED state must be updated or restored due to a configuration change or restart. The phone indicates this to the server by adding **updt** to the request string. Thus, the request string contains the **Web server user ID**, the **Web server password**, the **Parameters**, the phone's IP address, the phone's call number, the **Symbolic Name**, and the **updt** flag; for example:

```
userid=jdoe&password=00secret&mode=remote&action=start&  
ipaddress=192.168.1.244&phonenumber=3338&symbn=key4&updt
```

Using Additional Phone Keys (All Phone Types)

Creating the Push Request for LED Control (V2R2)

8.4 Creating the Push Request for LED Control (V2R2)

The state of the LED is stored and controlled by a remote XML document. The phone will request this document if the user presses a **Send URL** key, or if it has received an appropriate push request. This is a special HTTP/HTTPS POST message, similar to the push request for XML applications. It must contain the following key/value pairs:

- **ServerAddr**: The IP address or DNS name of the server that provides the XML document for LED control. At the phone's web interface, this parameter is configured in **Program keys > Send URL > Web server address**.
- **ServerPort**: The port at which the server program is listening. At the phone's web interface, this parameter is configured in **Program keys > Send URL > Port**.
- **ProgramName**: A symbolic name used to assign a push request from the application server to the appropriate key. At the phone's web interface, this parameter is configured in **Program keys > Send URL > Symbolic name**.
- **MidletName**: A symbolic name used to assign a push request from the application server to the appropriate key; the value is identical with that of **ProgramName**. At the phone's web interface, this parameter is configured in **Program keys > Send URL > Symbolic name**.
- **RequestType**: Must be set to **sendURL**.

Example:

```
MidletName=key4&ServerProtocol=http&ServerAddr=192.168.1.151&  
ServerPort=80&ProgramName=key4&RequestType=sendURL
```

8.5 XML Document for LED Control

The desired state for the LED assigned to the key is stored in a XML document which is to be delivered from the server to the phone when it has sent an appropriate HTTP/HTTPS request. The design of this XML structure is due to the possibility of future enhancements.

Syntax Example

```
<Batch>
  <Capabilities_Req TYPE="ANY_OF">
    <Capability NAME="PHONE_TYPE_OS80" />
    <Capability NAME="PHONE_TYPE_OS60" />
    <Capability NAME="PHONE_TYPE_DPIP55" />
  </Capabilities_Req>
  <Capabilities_Req TYPE="ALL_OF">
    <Capability NAME="XML_LED_STATE_CONTROL" />
  </Capabilities_Req>
  <Remote_Control>
    <Turnled ID="led04" STATE="ON" />
  </Remote_Control>
</Batch>
```

"Batch" Element

Serves as root element.

"Capabilities_Req" Element

Optional element which contains a list of capabilities required by the web application. If omitted, the web application assumes that all phones can handle the tasks in this document. The element has a **Type** attribute which specifies in what way the capabilities are required.

Attribute	Value	Function/Remarks
Type	ANY_OF	The phone must have at least one capability or feature from the list.
	ALL_OF	The phone must have all capabilities or features from the list.

Using Additional Phone Keys (All Phone Types)

XML Document for LED Control

"Capability" Element

This object describes one particular capability. Each capability must have the **NAME** attribute, which specifies a capability or the phone type. The following attributes are possible:

Attribute	Value	Function/Remarks
NAME	PHONE_TYPE_OS80	The phone is an OpenStage 80.
	PHONE_TYPE_OS60	The phone is an OpenStage 60.
	PHONE_TYPE_OS40	The phone is an OpenStage 40.
	PHONE_TYPE_OS20	The phone is an OpenStage 20.
	PHONE_TYPE_OS15	The phone is an OpenStage 15.
	PHONE_TYPE_OS10	The phone is an OpenStage 10.
	PHONE_TYPE_DPIP55	The phone is a Desk Phone IP 55G.
	PHONE_TYPE_DPIP35	The phone is a Desk Phone IP 35G or 35G Eco.
	XML_LED_STATE_CONTROL	The phone has the capability to change the state of LEDs associated with FPKs or FFKs.

"Remote_Control" Element

Contains a list of tasks which are destined to change the state of the phone. Currently, only **Turnled** is supported.

"Turnled" Element

This element controls the LED status. The following attributes are possible:

Attribute	Value	Function/Remarks
ID	String	An ID can be assigned to the LED. Currently, this attribute is not used; however, it is required by the XML schema (see Section 9.3, "XML Schema for the Send URL Feature").
STATE	ON	LED is glowing.
	OFF	LED is dark.
	FLASH	LED is blinking.

9 Appendix

9.1 Glossary

Term/Abbreviation	Definition/Description
DPIP55	OpenScape Desk Phone IP 55G
FFK	Fixed Function Key
FPK	Free Programmable Function Key
HFA	HiPath Feature Access
jad	Java Application Descriptor
Jar	Java Archive File
OS 60/80	OpenStage 60/80 phone
SIP	Session Initiation Protocol
Web Based Management	Built-in configuration and administration facility which is accessible by a web browser.

9.2 XML Schema for XML Applications

This appendix contains the entire XML schema supported by the HFA and SIP variants of the OpenStage 60/80.

The XML schema is available for download. For downloading,

1. register with the Community Portal under
<http://www.unify.com/us/partners/developer-program.aspx>

2. and navigate to
<https://app-enterprise.unify.com/gdmsproxy/retrieve?id=40766600>

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">

  <xs:annotation>
    <xs:documentation xml:lang="en">
      XML Schema for Unify IP Phone Generic MIDlet. Version 7.0
      Copyright 2014 Unify.
      All rights reserved.
    </xs:documentation>
  </xs:annotation>

  <xs:element name="IppPhone">
    <xs:complexType>
      <xs:sequence>
        <xs:choice>
          <xs:element ref="IppDisplay"/>
        </xs:choice>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:element name="IppDisplay">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="IppScreen" minOccurs="1" maxOccurs="5"/>
      </xs:sequence>
      <xs:attribute name="InitialScreen" type="xs:nonNegativeInteger" use="optional"/>
      <xs:attribute name="UpdateScreen" type="xs:nonNegativeInteger" use="optional"/>
    </xs:complexType>
  </xs:element>


```

```

<xs:element name="IppScreen">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="IppKey" minOccurs="0" maxOccurs="1"/>
      <xs:choice>
        <xs:element ref="IppAlert" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppList" minOccurs="0" maxOccurs="1"/
>
        <xs:element ref="IppTextBox" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppForm" minOccurs="0" maxOccurs="1"/
>
        <xs:element ref="IppPlayer" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppTable" minOccurs="0" maxOc-
curs="1"/>
      </xs:choice>
      <xs:element ref="IppAction" minOccurs="0" maxOccurs="3"/>
      <xs:element ref="IppCommand" minOccurs="0" maxOc-
curs="unbounded"/>
      <xs:element ref="IppHidden" minOccurs="0" maxOccurs="un-
bounded"/>
      <xs:element ref="IppTicker" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="HiddenCount" type="xs:nonNegativeInte-
ger" use="required"/> <!-- default="0"/> -->
    <xs:attribute name="CommandCount" type="xs:nonNegativeInte-
ger" use="required"/> <!-- default="0"/> -->
    <xs:attribute name="ID" type="xs:nonNegativeInteger"
use="optional" default="0"/>
    <xs:attribute name="History" use="optional" de-
fault="YES">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO"/>
          <xs:enumeration value="YES"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
  <xs:unique name="SingleIppActionOnScreenOfEveryType">
    <xs:selector xpath="IppAction" />
    <xs:field xpath="@Type" />
  </xs:unique>

```

Appendix

XML Schema for XML Applications

```
</xs:unique>
</xs:element>
<xs:element name="IppAction">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Number" minOccurs="0" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:pattern value="\d*" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element ref="IppTone" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
    <xs:attribute name="Type" use="required">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="MAKECALL" />
          <xs:enumeration value="ENDCALL" />
          <xs:enumeration value="TURNLEDON" />
          <xs:enumeration value="TURNLEDOFF" />
          <xs:enumeration value="HIDEPOPUP" />
          <xs:enumeration value="PLAYTONE" />
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Focus" use="optional" default="YES">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO" />
          <xs:enumeration value="YES" />
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```

```
<xs:element name="IppAlert">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Title" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Text" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Image" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Type" use="optional" default="ERROR">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="ALARM"/>
          <xs:enumeration value="CONFIRMATION"/>
          <xs:enumeration value="ERROR"/>
          <xs:enumeration value="INFO"/>
          <xs:enumeration value="WARNING"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Delay" use="optional" default="FOREVER">
      <xs:simpleType>
        <xs:union memberTypes="xs:positiveInteger">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="FOREVER"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:union>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppButton">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Image" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Layout" use="optional" default="DE-
FAULT">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="CENTER"/>
          <xs:enumeration value="DEFAULT"/>
          <xs:enumeration value="LEFT"/>
          <xs:enumeration value="NEWLINE_AFTER"/>
          <xs:enumeration value="NEWLINE_BEFORE"/>
          <xs:enumeration value="RIGHT"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Type" use="optional" default="IMAGE">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="IMAGE"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Key" use="required"/>
    <xs:attribute ref="Value" use="required"/>
  </xs:complexType>
</xs:element>
```

```
<xs:element name="IppChoiceGroup">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Option" minOccurs="0" maxOccurs="un-
bounded"/>
    </xs:sequence>
    <xs:attribute name="Numbered" default="NO">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO"/>
          <xs:enumeration value="YES"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Type" use="required">
      <!-- default="EXCLUSIVE" -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="EXCLUSIVE"/>
          <xs:enumeration value="MULTIPLE"/>
          <xs:enumeration value="POPUP"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Count" type="xs:nonNegativeInteger"
use="required"/>
      <!-- default="0"/> -->
    </xs:complexType>
  </xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppCommand">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Label" type="xs:string" minOccurs="0"
maxOccurs="1"/>
      <xs:element name="ScreenID" type="xs:nonNegativeInteger"
minOccurs="0" maxOccurs="1"/>
      <xs:element ref="IppAction" minOccurs="0" maxOccurs="3"/>
    </xs:sequence>
    <xs:attribute name="Type" use="required">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="SELECT"/>
          <xs:enumeration value="BACK"/>
          <xs:enumeration value="UPDATE"/>
          <xs:enumeration value="SCREEN"/>
          <xs:enumeration value="CANCEL"/>
          <xs:enumeration value="EXIT"/>
          <xs:enumeration value="ACTION"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Priority" use="optional" default="0">
      <xs:simpleType>
        <xs:restriction base="xs:nonNegativeInteger">
          <xs:maxInclusive value="9"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Auto" use="optional" default="0">
      <xs:simpleType>
        <xs:restriction base="xs:nonNegativeInteger"/>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="DisplayOn" use="optional" default="OP-
TIONS">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="OPTIONS"/>
          <xs:enumeration value="LISTITEM"/>
          <xs:enumeration value="BOTH"/>
          <xs:enumeration value="NONE"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```



```
</xs:attribute>
<xs:attribute name="Select" use="optional" default="NO">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="YES"/>
      <xs:enumeration value="NO"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="Default" use="optional" default="NO">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="YES"/>
      <xs:enumeration value="NO"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute ref="Key" use="optional"/>
<xs:attribute ref="Value" use="optional"/>
<xs:attribute name="Event" use="optional" >
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="ONFOCUS"/>
      <xs:enumeration value="ONBLUR"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
</xs:complexType>
<xs:unique name="SingleIppActionOnCommandOfEveryType">
  <xs:selector xpath="IppAction" />
  <xs:field xpath="@Type" />
</xs:unique>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppDateField">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Timezone" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Date" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Time" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Mode" use="optional" default="DATETIME">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="DATE"/>
          <xs:enumeration value="TIME"/>
          <xs:enumeration value="DATETIME"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Default" use="optional" default="NULL">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NULL"/>
          <xs:enumeration value="MODE"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="DateKey" use="optional"/>
    <xs:attribute ref="TimeKey" use="optional"/>
  </xs:complexType>
</xs:element>
```

```

<xs:element name="IppForm">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Title" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
      <!-- IppForm may contain any combination of none, one, or
      more IppButton, IppChoiceGroup, IppDateField, IppGauge,
      IppImageItem, IppItem, IppSpacer, IppStringItem, and
      Ipp TextField in any order. The correct XML syntax should
      surround each one by "<IppItem></IppItem>". However, this
      increases the size of the XML document and has an impact
      on performance.
      When validating a simple IppForm with only one type of
      element, each element does not have to be surrounded by
      <IppItem></IppItem>. When validating a complex IppForm
      with many different types of elements, each elements must
      be surrounded by <IppItem></IppItem>. When the XML
      document for a complex IppForm has been validated, the
      "IppItem" tags can be removed from the XML document. If
      they remain in the XML document, they will be correctly
      parsed.-->
      <xs:choice>
        <xs:element ref="IppButton" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppChoiceGroup" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppDateField" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppGauge" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppImageItem" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppItem" minOccurs="0" maxOccurs="un-
bounded"/>
        <xs:element ref="IppSpacer" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppStringItem" minOccurs="0" maxOc-
curs="unbounded"/>
        <xs:element ref="IppTextField" minOccurs="0" maxOc-
curs="unbounded"/>
      </xs:choice>
    </xs:sequence>
    <xs:attribute name="ItemCount" type="xs:nonNegativeInteger"
use="required"/> <!-- default="0"/> -->

```

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XML Schema for XML Applications

```
<xs:attribute name="Proportion" use="optional" default="40_60">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="40_60"/>
      <xs:enumeration value="50_50"/>
      <xs:enumeration value="60_40"/>
      <xs:enumeration value="75_25"/>
      <xs:enumeration value="25_75"/>
      <xs:enumeration value="15_85"/>
      <xs:enumeration value="0_100"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
</xs:complexType>
</xs:element>

<xs:element name="IppGauge">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Maximum" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Initial" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Interactive" use="optional" default="USER">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="USER"/>
          <xs:enumeration value="AUTO"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Key" use="optional"/>
  </xs:complexType>
</xs:element>
```

```
<xs:element name="IppHidden">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Value" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Type" use="required">
      <!-- default="VALUE" -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="VALUE"/>
          <xs:enumeration value="PHONENUMBER"/>
          <xs:enumeration value="IPADDRESS"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Key" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="IppImageItem">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Image" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="AltText" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="Layout" use="optional" default="CENTER">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="CENTER"/>
          <xs:enumeration value="DEFAULT"/>
          <xs:enumeration value="LEFT"/>
          <xs:enumeration value="NEWLINE_AFTER"/>
          <xs:enumeration value="NEWLINE_BEFORE"/>
          <xs:enumeration value="RIGHT"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppItem">
  <xs:complexType>
    <xs:sequence>
      <xs:choice>
        <xs:element ref="IppButton" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppChoiceGroup" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppDateField" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppGauge" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppImageItem" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppSpacer" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppStringItem" minOccurs="0" maxOc-
curs="1"/>
        <xs:element ref="IppTextField" minOccurs="0" maxOc-
curs="1"/>
      </xs:choice>
      <xs:element ref="IppCommand" minOccurs="0" maxOccurs="un-
bounded"/>
    </xs:sequence>
    <xs:attribute name="CommandCount" type="xs:nonNegativeInte-
ger" use="required"/>
    <!-- default="0"/> -->
  </xs:complexType>
</xs:element>
```

```

<xs:element name="IppKey">
  <xs:complexType>
    <xs:attribute name="Keypad" use="required">
      <!--default="NO"> -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO"/>
          <xs:enumeration value="YES"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="SendKeys" use="required">
      <!--default="NO"> -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO"/>
          <xs:enumeration value="YES"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="BufferKeys" use="optional" default="NO">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NO"/>
          <xs:enumeration value="YES"/>
          <xs:enumeration value="SUBSEQUENT"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="BufferLength" use="optional" de-
fault="0">
      <xs:simpleType>
        <xs:restriction base="xs:nonNegativeInteger"/>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="TermKey" use="optional" default=" ">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:pattern value="[ *#0-9]{1}"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>

```

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XML Schema for XML Applications

```
        <xs:attribute ref="UrlKey" use="required"/>
    </xs:complexType>
</xs:element>

<xs:element name="IppList">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="Title" minOccurs="0" maxOccurs="1"/>
            <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
            <xs:element ref="Option" minOccurs="0" maxOccurs="un-
bounded"/>
        </xs:sequence>
        <xs:attribute name="Numbered" use="optional" default="NO">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="NO"/>
                    <xs:enumeration value="YES"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="Type" use="required">
            <!-- default="IMPLICIT"> -->
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="IMPLICIT"/>
                    <xs:enumeration value="EXCLUSIVE"/>
                    <xs:enumeration value="MULTIPLE"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="Count" type="xs:nonNegativeInteger"
use="required"/>
        <xs:attribute name="Columns" use="optional" default="1">
            <xs:simpleType>
                <xs:restriction base="xs:nonNegativeInteger">
                    <xs:enumeration value="1"/>
                    <xs:enumeration value="3"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute ref="FColor"/>
        <xs:attribute ref="TColor"/>
        <xs:attribute ref="SFCColor"/>
    </xs:complexType>
</xs:element>
```



```
        <xs:attribute ref="STColor"/>
    </xs:complexType>
</xs:element>

<xs:element name="IppPhoneNumber">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="AltText" minOccurs="0" maxOccurs="1"/>
        </xs:sequence>
        <xs:attribute name="ImageType" use="optional" default="NOIM-
AGE">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="NOIMAGE"/>
                    <xs:enumeration value="PHONETYPE"/>
                    <xs:enumeration value="PICTURECLIP"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="NumberType" use="optional" default="NUM-
BER">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="NUMBER"/>
                    <xs:enumeration value="NAME"/>
                    <xs:enumeration value="BOTH"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
    </xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppPlayer">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="IppGauge" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="State" use="required">
      <!-- default="STOPPED"> -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="PLAYING"/>
          <xs:enumeration value="RECORDING"/>
          <xs:enumeration value="STOPPED"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Mode" use="required">
      <!-- default="CALL"> -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="CALL"/>
          <xs:enumeration value="RECORD"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Key" use="required"/>
  </xs:complexType>
</xs:element>
```

```
<xs:element name="IppSpacer">
  <xs:complexType>
    <xs:attribute name="NewLine" use="required">
      <!-- default="NEWLINE_BEF_AFT" -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="NEWLINE_AFTER"/>
          <xs:enumeration value="NEWLINE_BEFORE"/>
          <xs:enumeration value="NEWLINE_BEF_AFT"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Height" use="optional" default="0">
      <xs:simpleType>
        <xs:restriction base="xs:nonNegativeInteger"/>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Width" use="optional" default="0">
      <xs:simpleType>
        <xs:restriction base="xs:nonNegativeInteger"/>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppStringItem">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Text" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="IppTable">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Header" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Row" minOccurs="0" maxOccurs="unbound-
ed"/>
    </xs:sequence>
    <xs:attribute ref="ColumnCount" use="required" />
    <xs:attribute name="Selectable" use="optional" de-
fault="ROW">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="ROW"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>

<xs:element name="IppTextBox">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Title" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Text" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Url" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="MaxSize" type="xs:nonNegativeInteger"
use="optional"/>
    <xs:attribute name="Constraint" use="optional" de-
fault="ANY">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="ANY"/>
          <xs:enumeration value="NUMERIC"/>
          <xs:enumeration value="PASSWORD"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>
```

```
        <xs:enumeration value="PHONENUMBER"/>
        <xs:enumeration value="URL"/>
        <xs:enumeration value="EMAILADDR"/>
    </xs:restriction>
</xs:simpleType>
</xs:attribute>
<xs:attribute name="Password" use="optional" default="NO">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="YES"/>
            <xs:enumeration value="NO"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="Uneditable" use="optional" default="NO">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="YES"/>
            <xs:enumeration value="NO"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute ref="Default" use="optional" default="NULL"/>
<xs:attribute ref="Key" use="optional"/>
</xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="IppTextField">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Label" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="Text" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="MaxSize" type="xs:nonNegativeInteger"
use="optional"/>
    <xs:attribute name="Constraint" use="optional" de-
fault="ANY">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="ANY"/>
          <xs:enumeration value="NUMERIC"/>
          <xs:enumeration value="PASSWORD"/>
          <xs:enumeration value="PHONENUMBER"/>
          <xs:enumeration value="URL"/>
          <xs:enumeration value="EMAILADDR"/>
          <xs:enumeration value="VALIDATE"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Password" use="optional" default="NO">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="YES"/>
          <xs:enumeration value="NO"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="Uneditable" use="optional" default="NO">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="YES"/>
          <xs:enumeration value="NO"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Default" use="optional" default="NULL"/>
    <xs:attribute ref="Key" use="optional"/>
  </xs:complexType>
</xs:element>
```

```

<xs:element name="IppTicker">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Text" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="IppTone">
  <xs:complexType>
    <xs:attribute name="Length" use="required">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="SHORT"/>
          <xs:enumeration value="STANDARD"/>
          <xs:enumeration value="LONG"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>

<xs:element name="AltText" type="xs:string"/>

<xs:element name="Cell">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="CellLine" minOccurs="1" maxOccurs="2"/>
    </xs:sequence>
    <xs:attribute name="Width" use="optional">
      <xs:simpleType>
        <xs:restriction base="xs:positiveInteger">
          <xs:maxInclusive value="100"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
  </xs:complexType>
</xs:element>

<xs:element name="CellLine">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Image" minOccurs="0" maxOccurs="unbound-
ed"/>
      <xs:element ref="CellText" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

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XML Schema for XML Applications

```
        <xs:attribute ref="State"/>
    </xs:complexType>
</xs:element>

<xs:element name="CellText" type="xs:string"/>

<xs:element name="Date">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:pattern value="\d{4}-\d{2}-\d{2}"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>

<xs:element name="Header">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="Cell" minOccurs="0" maxOccurs="unbound-
ed"/>
        </xs:sequence>
        <xs:attribute ref="LineCount" use="optional"/>
        <xs:attribute ref="ColumnCount" use="required"/>
    </xs:complexType>
</xs:element>

<xs:element name="Image">
    <xs:complexType>
        <xs:simpleContent>
            <xs:extension base="imagePath">
                <xs:attribute name="Cache" type="xs:string"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
</xs:element>

<xs:element name="Initial" type="gaugeTimeType"/>

<xs:element name="Label" type="xs:string"/>

<xs:element name="Maximum" type="gaugeTimeType"/>
```



```
<xs:element name="Option">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="OptionText" minOccurs="1" maxOccurs="3"/
>
      <xs:element ref="Image" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="ID" type="xs:nonNegativeInteger"
use="optional"/>
    <xs:attribute name="Selected" use="required">
      <!-- default="FALSE" -->
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="TRUE"/>
          <xs:enumeration value="FALSE"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute ref="Key" use="required"/>
    <xs:attribute ref="Value" use="required"/>
    <xs:attribute ref="FColor"/>
    <xs:attribute ref="TColor"/>
    <xs:attribute ref="SFCColor"/>
    <xs:attribute ref="STColor"/>
  </xs:complexType>
</xs:element>
```

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XML Schema for XML Applications

```
<xs:element name="OptionText">
  <xs:complexType mixed="true">
    <xs:sequence>
      <xs:element ref="IppPhoneNumber" minOccurs="0" maxOc-
curs="1"/>
    </xs:sequence>
    <xs:attribute name="State"/>
  </xs:complexType>
</xs:element>

<xs:element name="Row">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Cell" minOccurs="0" maxOccurs="unbound-
ed"/>
      <xs:element ref="IppCommand" minOccurs="0" maxOccurs="un-
bounded"/>
    </xs:sequence>
    <xs:attribute name="CommandCount" use="required"
type="xs:nonNegativeInteger"/>
    <xs:attribute ref="Key" use="required"/>
    <xs:attribute ref="Value" use="required"/>
    <xs:attribute ref="LineCount" use="optional"/>
  </xs:complexType>
</xs:element>

<xs:element name="Text">
  <xs:complexType mixed="true">
    <xs:sequence>
      <xs:element ref="IppPhoneNumber" minOccurs="0" maxOc-
curs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="Time">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:pattern value="\d{2}:\d{2}:\d{2}.\d{3}"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<xs:element name="Timezone" type="timeZoneType"/>

<xs:element name="Title" type="xs:string"/>
```

```
<xs:element name="Url" type="xs:anyURI"/>
<xs:element name="Value" type="xs:string"/>
<xs:attribute name="DateKey" type="xs:string"/>
<xs:attribute name="Default">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="NULL"/>
      <xs:enumeration value="TEXT"/>
      <xs:enumeration value="PHONENUMBER"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="FColor" type="colourType"/>
<xs:attribute name="Key" type="xs:string"/>
<xs:attribute name="ColumnCount" type="xs:nonNegativeInteger"/>
<xs:attribute name="LineCount">
  <xs:simpleType>
    <xs:restriction base="xs:positiveInteger">
      <xs:maxInclusive value="2"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="SFColor" type="colourType"/>
<xs:attribute name="STColor" type="colourType"/>
<xs:attribute name="State" default="NORMAL">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="NORMAL"/>
      <xs:enumeration value="GRAY"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="TColor" type="colourType"/>
<xs:attribute name="TimeKey" type="xs:string"/>
<xs:attribute name="Value" type="xs:string"/>
<xs:attribute name="UrlKey" type="xs:string"/>
```

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XML Schema for XML Applications

```
<xs:simpleType name="colourType">
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="#[0-9ABCDEF]{6}" />
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="BLACK" />
        <xs:enumeration value="RED" />
        <xs:enumeration value="GREEN" />
        <xs:enumeration value="BROWN" />
        <xs:enumeration value="BLUE" />
        <xs:enumeration value="MAGENTA" />
        <xs:enumeration value="CYAN" />
        <xs:enumeration value="LIGHTGRAY" />
        <xs:enumeration value="DARKGRAY" />
        <xs:enumeration value="LIGHTRED" />
        <xs:enumeration value="LIGHTGREEN" />
        <xs:enumeration value="YELLOW" />
        <xs:enumeration value="LIGHTBLUE" />
        <xs:enumeration value="LIGHTMAGENTA" />
        <xs:enumeration value="LIGHTCYAN" />
        <xs:enumeration value="WHITE" />
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>

<xs:simpleType name="gaugeTimeType">
  <xs:union memberTypes="xs:nonNegativeInteger">
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="\d{2}:\d{2}" />
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

```
<xs:simpleType name="imagePath">
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value=".+"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="file:."/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="http:."/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="map:."/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>

<xs:simpleType name="timeZoneType">
  <xs:union memberTypes="xs:string">
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="GMT[\\+|\\-]\\d*"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
</xs:schema>
```

9.3 XML Schema for the Send URL Feature

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" targetNam-
espace="http://xml.netbeans.org/schema/os" xmlns:tns="http://xml.net-
beans.org/schema/os" elementFormDefault="qualified">

  <xsd:element name="Batch">
    <xsd:complexType>
      <xsd:sequence>

        <xsd:element name="Capabilities_Req" minOccurs="0"
maxOccurs="unbounded">
          <xsd:complexType>
            <xsd:sequence>

              <xsd:element name="Capability" minOccurs="0"
maxOccurs="unbounded">
                <xsd:complexType>
                  <xsd:attribute name="NAME" use="required">
                    <xsd:simpleType>
                      <xsd:restriction base="xsd:string">
                        <xsd:enumeration
value="XML_LED_STATE_CONTROL"/>
                        <xsd:enumeration
value="XML_LOGGING"/>
                        <xsd:enumeration
value="XML_SETTINGS"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS80"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS60"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS40"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS20"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS15"/>
                        <xsd:enumeration
value="PHONE_TYPE_OS10"/>
                        <xsd:enumeration
value="PHONE_TYPE_DPIP55"/>
                        <xsd:enumeration
value="PHONE_TYPE_DPIP35"/>
                      </xsd:restriction>
                    </xsd:simpleType>
                  </xsd:attribute>
                </xsd:complexType>
              </xsd:element>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

```

        </xsd:attribute>
      </xsd:complexType>
    </xsd:element>

    </xsd:sequence>
    <xsd:attribute name="TYPE" default="ALL_OF"
use="optional">
      <xsd:simpleType>
        <xsd:restriction base="xsd:string">
          <xsd:enumeration value="ANY_OF"/>
          <xsd:enumeration value="ALL_OF"/>
        </xsd:restriction>
      </xsd:simpleType>
    </xsd:attribute>
  </xsd:complexType>
</xsd:element>

  <xsd:element name="Remote_Control" minOccurs="0"
maxOccurs="unbounded">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="Turnled" minOccurs="0"
maxOccurs="unbounded">
          <xsd:complexType>
            <xsd:attribute name="ID" type="xsd:string"
use="required">
              </xsd:attribute>
            <xsd:attribute name="STATE"
use="required">
              <xsd:simpleType>
                <xsd:restriction base="xsd:string">
                  <xsd:enumeration value="ON"/>
                  <xsd:enumeration value="OFF"/>
                  <xsd:enumeration value="FLASH"/>
                </xsd:restriction>
              </xsd:simpleType>
            </xsd:attribute>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

```

Appendix

XML Schema for the Send URL Feature

```
        <xsd:element name="Settings" minOccurs="0"
maxOccurs="unbounded">
            <xsd:complexType>
                <xsd:sequence>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:schema>
```


9.4 Image Files stored on the Phone

Example: <Image>map:05_icon_send_ok.png</Image>

PNG File Name	Icon	Description
map:05_icon_edit.png		Edit icon
map:05_icon_flag_fra.png		French flag icon
map:05_icon_flag_ger.png		German flag icon
map:05_icon_flag_uk.png		UK flag icon
map:05_icon_flag_usa.png		USA flag icon
map:05_icon_group.png		Group of people icon
map:05_icon_message_email.png		Unread email icon
map:05_icon_message_email_read.png		Read email icon
map:05_icon_message_fax.png		Unread fax icon
map:05_icon_message_fax_read.png		Read fax icon

Table 9-1 Image Files stored on the Phone

Appendix

Image Files stored on the Phone












PNG File Name	Icon	Description
map:05_icon_message_sent.png		Sent message icon
map:05_icon_message_sms.png		Unread SMS icon
map:05_icon_message_sms_read.png		Read SMS icon
map:05_icon_message_voice.png		Unread voice message icon
map:05_icon_message_voice_read.png		Read voice message icon
map:05_icon_phonenumber_business1.png		Active business 1 phone number icon
map:05_icon_phonenumber_business1_pas.png		Passive business 1 phone number icon
map:05_icon_phonenumber_business2.png		Active business 2 phone number icon
map:05_icon_phonenumber_business2_pas.png		Passive business 2 phone number icon
map:05_icon_phonenumber_mobile.png		Active mobile phone number icon
map:05_icon_phonenumber_mobile_pas.png		Passive mobile phone number icon

Table 9-1 Image Files stored on the Phone









PNG File Name	Icon	Description
map:05_icon_phonenumber_private.png		Active private phone number icon
map:05_icon_phonenumber_private_pas.png		Passive private phone number icon
map:05_icon_send_failure.png		Send failure icon
map:05_icon_send_ok.png		Send OK icon
map:05_icon_send_repeat.png		Send repeat icon
map:05_icon_user		Single user icon
map:05_icon_call_default.png		Call default icon
map:04_line_structure_end.png		Line end icon

Table 9-1 Image Files stored on the Phone