SMART MESSAGING IN TDMA

Caller Group Icons and Ringing Tones (Nokia Smart Messaging)
vCards and vCals (WAP1.1)

Contents

1. Purpose

This document shows how TDMA short messages are used to provide bearer for Nokia TDMA Smart Messaging (Caller Group Icons and Ringing Tones) and WAP data (vCards and vCals).

2. General

In TDMA network, a solution was needed in order to provide bearer for Client-to-Client Smart Messaging or WAP data. WAP Forum / defines how SMS can be used as generic header for text-based data transfer.

This document gives the information needed to utilize the Value Added Services of Nokia Mobile Phones' TDMA phones that support Nokia TDMA Smart Messaging. The needed information can be divided into two parts: Smart Message formats and sending Smart Messages over TDMA SMS. Smart Message formats are explained in /7/. Sending Smart Message formats over TDMA SMS is explained in this document and in /5/ and /6/.

2.1 Definitions/Glossary

ANSI	American National Standardisation Institute
EIA	Electronic Industries Association
ETSI	European Telecommunication Standardisation Institute
IE	Information Element
IP	Internet Protocol
LSB	Least significant bits
SMSC	Short Message Service Center
SMS	Short Message Service
MO	Mobile Originated
MSISDN	Mobile Subscriber ISDN (Telephone number or address of device)
MS	Mobile Station
MSB	Most significant bits
MT	Mobile Terminated
TCP/IP	Transmission Control Protocol/Internet Protocol
TIA	Telecommunication Industry Association
UDH	User-Data Header (see GSM 03.40)
UDP	User Datagram Protocol
WAE	Wireless Application Environment
WAP	Wireless Application Protocol
WDP	Wireless Datagram Protocol
WSP	Wireless Session Protocol
WTP	Wireless Transaction Protocol

Other WAP specific definitions can be found in WAP specifications ref. /5/

3. WDP Architectural Overview

Figure 1 shows a general model of the WAP protocol architecture and how WDP fits into that architecture.

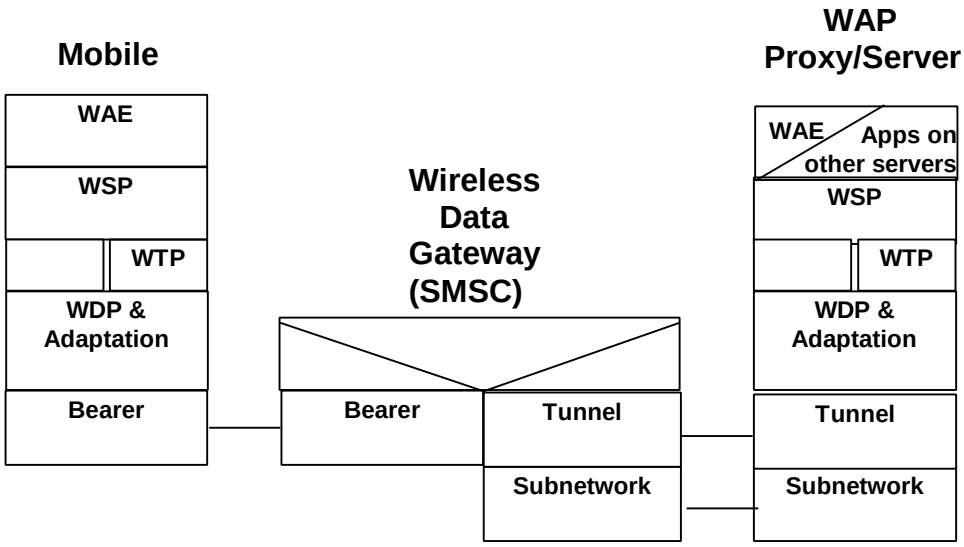

Figure 1 WDP in the WAP Architecture

The Transport layer protocol in the WAP architecture is the Wireless Datagram Protocol (WDP). The WDP protocol operates above the data capable bearer services supported by multiple network types. WDP offers a consistent but unreliable service to the upper level protocols of WAP and communicates transparently over one of the available bearer services. This document specifies the adaption for TDMA SMS bearer.

4. TDMA SMS Header Format

4.1 Mapping of WDP to TDMA SMS Text based headers

The text based headers are designed as an optional method for environments that support only reduced character sets, and for example not 8 bit binary headers. In /6/ a generic mechanism in similar environments is described and it can be used in TDMA SMS´s as well as in GSM. An exeption to that specification, only long address format is used.

No protocol indication at a higher level is needed to indicate the presence of protocol information in the data part of the message. The first characters "//SCKL" identify the WDP datagram addressing scheme to the receiving device. The header can be presented in various lengths, from 4 bytes (only destination port) to 15 bytes (containing full WDP information), in addition to the 6 bytes of "//SCKL".

<WDP -text-socket-header> ::=
<WDP-keyword> *<WDP-port-information>* [*<WDP-other-header>*] *<WDP delimiter>*
<WDP-delimiter> ::= *<space>*
<WDP-keyword> ::= "//**SCKL**"
<WDP-port-information> ::=
<WDP-long-destination-address> |
<WDP-long-destination-address> *<WDP-long-source-address>* *<WDP-SAR- information>*

Remaining fields are used as described in /6/.

7	6	5	4	3	2	1	0
“/”							
“/”							
“S”							
“C”							
“K”							
“L”							
Destination port MSB (High hex) Destination port MSB (Low hex)							
Destination port LSB (High hex) Destination port LSB (Low hex)							
Originator Port MSB (High hex) Originator Port MSB (Low hex)							
Originator Port LSB (High hex) Originator Port LSB (Low hex)							
Reference number (High hex)							
Reference number (Low hex)							
Total number of *segment*s (High hex)							
Total number of *segment*s (Low hex)							
Segment count (High hex)							
Segment count (Low hex)							
<space>							
1 - n 8-bit characters of User Data							
7	6	5	4	3	2	1	0

Figure 2: Example of a WDP header for compatibility with legacy TDMA networks

The text based header is always terminated with a space (“ “) character. This allows future enhancements to the protocol.

Devices not supporting the concatenation should not put dummy values into the header, as they can be misinterpreted and consume valuable bandwidth. Instead they shall truncate the header and omit the Segmentation and Reassembly part of the header.

When sending from network to mobile, characters before "//SCKL" -header will be omitted.

The following table defines port numbers as approved by IANA (Intenet Assocation Numbering Authority) for use by WAP Forum.

Port Number	*Application/Protocol*
9200	Connectionless WAP Browser Proxy Server
	Protocol: WSP/Datagram
9202	Secure Connectionless WAP Browser Proxy Server
	Protocol: WSP/WTLS/Datagram
9201	WAP Browser Proxy Server
	Protocol: WSP/WTP/Datagram
9203	Secure WAP Browser Proxy Server
	Protocol: WSP/WTP/WTLS/Datagram
9204	vCard Receiver
	Protocol: vCard/Datagram
9206	Secure vCard Receiver
	Protocol: vCard/WTLS/Datagram
9205	vCalendar Receiver
	Protocol: vCalendar/Datagram
9207	Secure vCalendar Receiver
	Protocol: vCalendar/WTLS/Datagram

Figure 3: WAP Port Numbers

Port numbers to be used with vCard and vCal over TDMA SMS (connectionless service) are 9204 and 9205.

4.2 Examples

Following are examples of vCards, vCals, ring tones and CLI icons. If this kind of user data is send over TDMA SMS (CMT) it will appear in Smart Messaging or WAP capable phone as a special message. vCard goes to phonebook, vCal goes to calendar, ringtone appears as ringing tone and CLI icon appears as caller group graphic.

Example of a vCard :
//SCKL23F4 BEGIN:VCARD[CRLF]FN:John Smith[CRLF]TEL;FAX:+358400853588[CRLF]EMAIL:john.smith@nokia.com[CRLF]END:VCARD[CRLF]
- Formatted name field
- Fax number
- Email

Example of a vCalendar: (two messages, segmentation and reassembly done by WDP layer)
//SCKL23F500E4340201 BEGIN:VCALENDAR[CRLF]BEGIN:VEVENT[CRLF]CATEGORIES:PHONE CALL[CRLF]DTSTART:19980420T130000[CRLF]

//SCKL23F500E4340202 DTSTART:19980420T130000[CRLF]DESCRIPTION:+358405561424 [CRLF]AALARM:19980420T125500[CRLF]END:VEVENT[CRLF]END:VCALENDAR[CRLF]

Example of a ringing tone:

//SCKL1581 024A3A5931BDBDB995E4040044D8F51141
6615613611624D2544585985584D85185525585584584D84585584584D8934C511624C30DB0D30B38000

Example of a CLI (Caller Line ID) Icon:

//SCKL1583 3000280E018010000000C010000000401

00000006030820C7E2021830880202181088020 63C10880204341888012C26098FC128620D0801787E050
801D843070800D8C106080089810207E

5. Character Sets and Character Conversions

TDMA Smart Messaging applications using binary data (Ringing Tone and CLI Icon) require the conversion of the binary data into IRA encoded characters.

Data type	Data coding	Encoding identifier 2)
vCalender	7 bit	IRA
vCard	7 bit	IRA
Ringing tone	8 bit	IRA 1)
CLI icon	8 bit	IRA 1)

Nokia Smart Messaging Specification version 2.0.0 /7/ defines the binary data format for Ringing Tones (Chapter 3.7) and CLI icons (Chapter 3.8).

1) Each 8 bit octet is represented by two IRA (7bit) encoded characters. This is temporary solution until 8 bit data is supported by networks. Also Encoding Identifier for 8 bit binary data has to be defined. After these issues solved more compact binary delivery is possible.
2) IRA encoding is 7bit coding. Native 8bit data of ringing tones and CLI icons is sent as 7bit IRA encoded characters as explained in 1). When TDMA SMS (CMT) is used as a smart messaging bearer for binary data (CLI icons and ringing tones) the following data encoding contentions apply. If 8-bit messaging protocols like GUTS are used, there is no need for special binary data encoding.
In TDMA smart messaging mobile station expects to receive binary data as IRA encoded characters according to the following table:

Original binary data	In hex	IRA coded characters Received by MS	Binary representation of IRA characters
10101010	AA	A and A	1000001 and 1000001
11111111	FF	F and F	1000110 and 1000110

Thus each byte is represented by two 7bit characters. This payload reduction is necessary, as in 8-bit sending largest presentable hex figure is FF but in 7-bit sending each character can represent hex figures only up to 7F. That is why in TDMA smart messaging, where smart messages are IRA encoded (7-bit), we send each byte as two IRA characters. Mobile station will then decode these two IRA characters as binary data (1 byte).

Content provider or SMSC has to take care of the required conversions from regular 8bit binary data to data represented by IRA encoded characters where each character represents half a byte in hex.

6. References

/1/ ANSI-136
TIA/ EIA-136

/2/ IS07498
ISO 7498 OSI Reference Model

/3/ RFC768
J. Postel “User Datagram Protocol”, RFC768, August 1980

/4/ RFC791
J. Postel “IP: Internet Protocol”, RFC791

/5/ WAP Architecture Working Group “Wireless Application Protocol Architecture Specification”, version 1.0
http://www.wapforum.org
Arc-xx-xxx.pdf

/6/ WAP Wireless Transport Group, Wireless Datagram Protocol Specification 30-April-1998
http://www.wapforum.org
Wdp-xx-xxx.pdf

/7/ Nokia Smart Messaging specification 2.0.0
http://www.forum.nokia.com/developers/smartmsg/documents.html
Sm2-0-0.pdf