SMPP Integration Guide

SMPP Integration Guide for SMS Applications at Vodafone Germany

Version 1.5

Valid from: October 2018

Vodafone GmbH

Change Log

Version	Date	Owner	Remarks
1.0	28/11/2011	Vodafone GmbH	Initial Version
1.1	01/02/2012	Vodafone GmbH	Reference for GSM 7-bit alphabet added
1.2	20/06/2012	Vodafone GmbH	Supported Data coding values corrected TON/NPI values of source address for short-number in submit_sm updated
1.3	05/05/2014	Vodafone GmbH	TON/NPI values of source address for short-number in submit_sm updated Network Error Codes added Latest SMPP PICS added
1.4	25/02/2015	Vodafone GmbH	Character set encoding explanation for Alphanumeric source-address added
1.5	05/10/2018	Vodafone GmbH	Contacts Updated

Table of Contents

Tables

Figures

1.   Purpose

The purpose of this document is to provide information relating to the SMPP Protocol support and compliances between the external applications (SME or ESME) and Vodafone Germany's SMS gateway for the flow of messages between them. The guidelines and recommendations provided further in this document should be kept as reference while communicating with the SMS gateway.

1.1   Scope of the Document

This document contains a current overview on existing SMS Infrastructure at Vodafone Germany and focuses on the integration using SMPP protocols with a detailed description of supported protocol operations. It specifies the command & response format for implementation of SMPP in Vodafone Germany's network.

It is intended for the use and implementation between SMS Gateway, and External Short Message Entities (ESME's). The scope of this document is limited to message transfer between SMSC & associated ESME's. The means whereby the messages arrive at the ESME via an interface other than SMPP is beyond the scope of this document. The document contains only the PDU's supported by Vodafone Germany's SMS Gateway. The non-supported PDU's are not included in the following document.

1.2   Target Audience

The intended audience for this document includes:

- External customers and applications developers responsible for specifying and developing SMPP compliant SME or ESME

- Network equipment providers needing to understand the specifications compliance that are required to be supported for an SMS Gateway.

- Vodafone internal development and engineering teams

- Test and System validation team members who need to verify the compliance of a product to the SMPP standard.

2. Overview of SMSC Infrastructure

Vodafone Germany offers a flexible and customer oriented infrastructure for external applications to connect. The picture below depicts the high-level SMS Infrastructure:
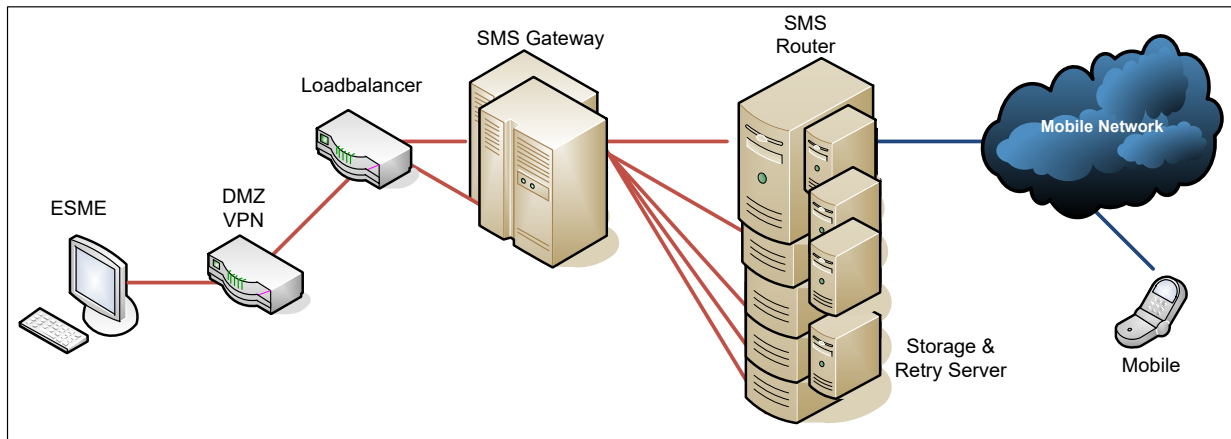
Figure 1:   *SMS Infrastructure*

Vodafone Germany's SMS gateway supports the protocol SMPP version 3.4 only for external applications (ESME, SME) to bind and to send and receive short messages into GSM cellular network.

The external applications can connect either via dedicated leased-line or VPN to Vodafone Germany's network. The SMPP bind session should be established by the external application using TCP/IP port only. The sessions using PSTN or ISDN are not supported.

For integration information, please contact our [Developer Support Team](). They will provide further details on VPN, IPs, Port etc.

3. SMPP Protocol

The Short Message Peer to Peer (SMPP) protocol is designed as a data communications interface for short message transfer between a Message Center, (SMSC, SMS Gateway) and a SMS application system, (such as a WAP Proxy Server, E-Mail Gateway, Voice Mail Server).

SMPP also enables short message entities (SMEs) outside the mobile network to interface with a Message Center. Non-mobile entities that submit messages to, or receive messages from an SMSC are known as External Short Message Entities (ESMEs).

3.1   Basic Protocol Description

Short Message Peer to Peer (SMPP) protocol is an open message-transfer protocol. It is based on the exchange of request and response Protocol Data Units (PDU) between the ESME and the SMSC over an underlying TCP/IP network connection. The SMPP protocol defines:

- set of operations for the exchange of short messages between an ESME and an SMSC
- the data that an ESME application must exchange with an SMSC during SMPP operations.

For further details please refer to the SMPP v3.4 [SMPPv3.4] specification.

3.2   SMPP Sessions

In order to make use of the SMPP Protocol, a SMPP session must be established between the ESME and SMS gateway. The established session is based on an application layer TCP/IP and is usually initiated by the ESME.

There are three forms of ESME-initiated session:

• Transmitter (TX)

when authenticated as a transmitter, an ESME may submit short messages to the SMS gateway for onward delivery to Mobile Stations (MS). A transmitter session will also allow an ESME cancel, query or replace previously submitted messages. Messages sent in this manner are called application originated (AO) messages.

• Receiver (RX)

A receiver session enables an ESME to receive messages from the SMS gateway. These messages originate from mobile stations and are referred to as application terminating (AT) messages.

• Transceiver (TRx)

A TRX session is a combination of TX and RX, such that a single SMPP session can be used to submit AO messages and receive AT messages.

3.2.1 Example SMPP Sessions

To help explain the context of SMPP operations and their related states, the following examples illustrate typical dialogues for the three types of ESME.
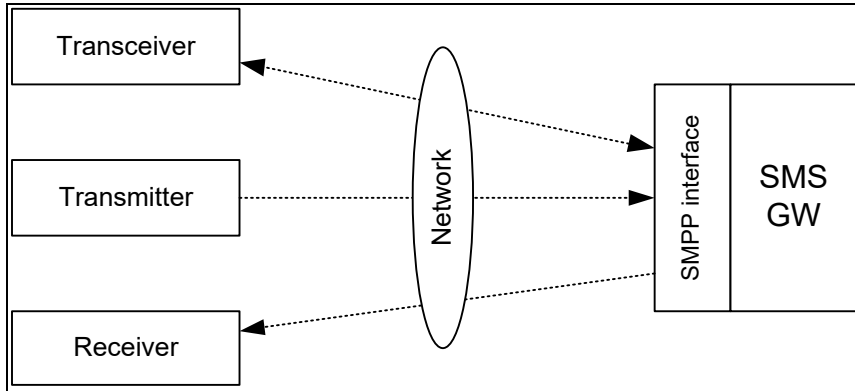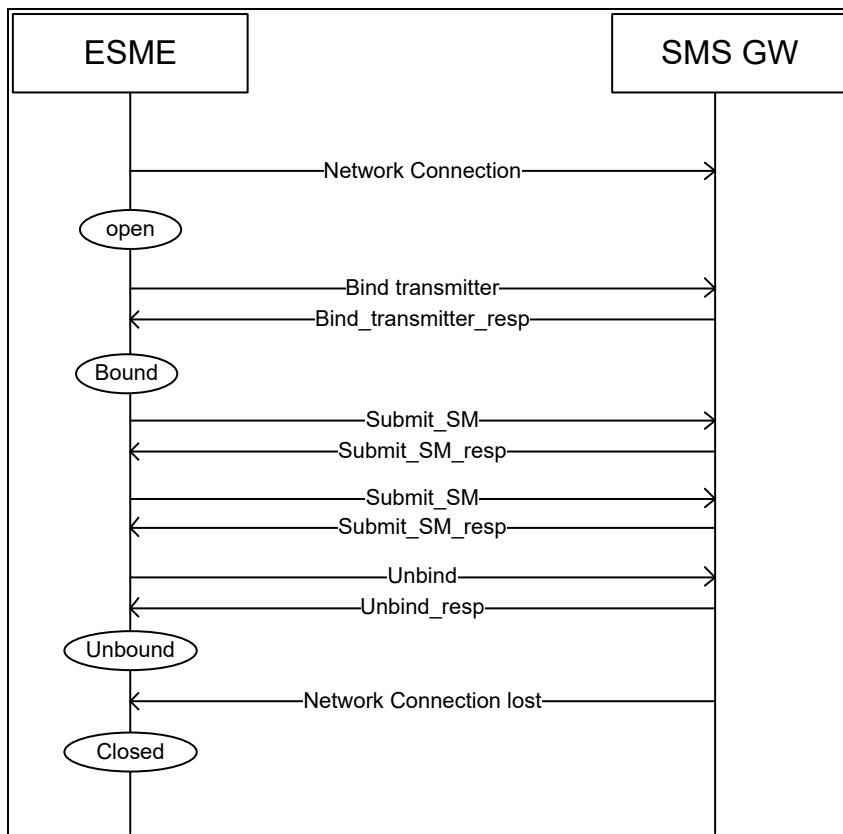

Figure 2:   SMPP ESME types
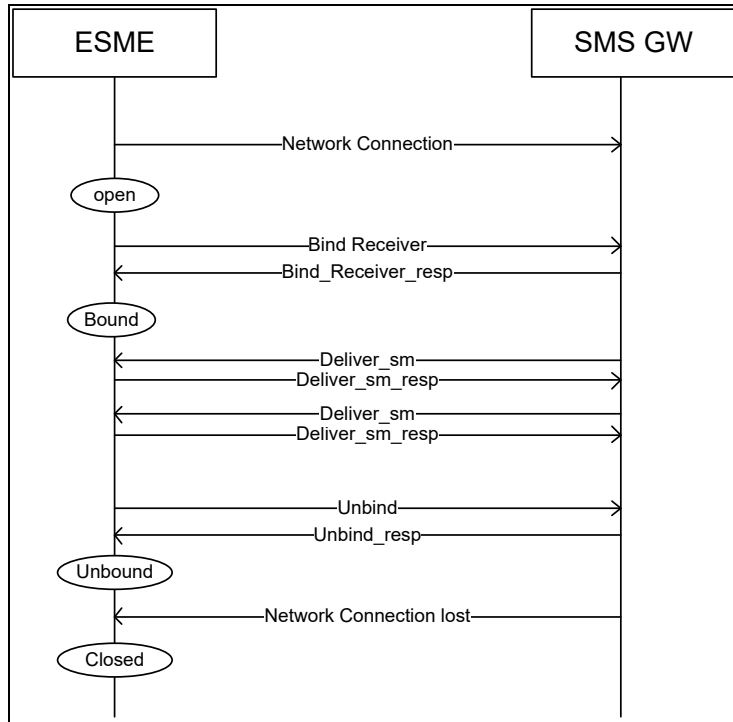

Figure 3:   Example Transmitter Session

Figure 4:   Example Receiver Session
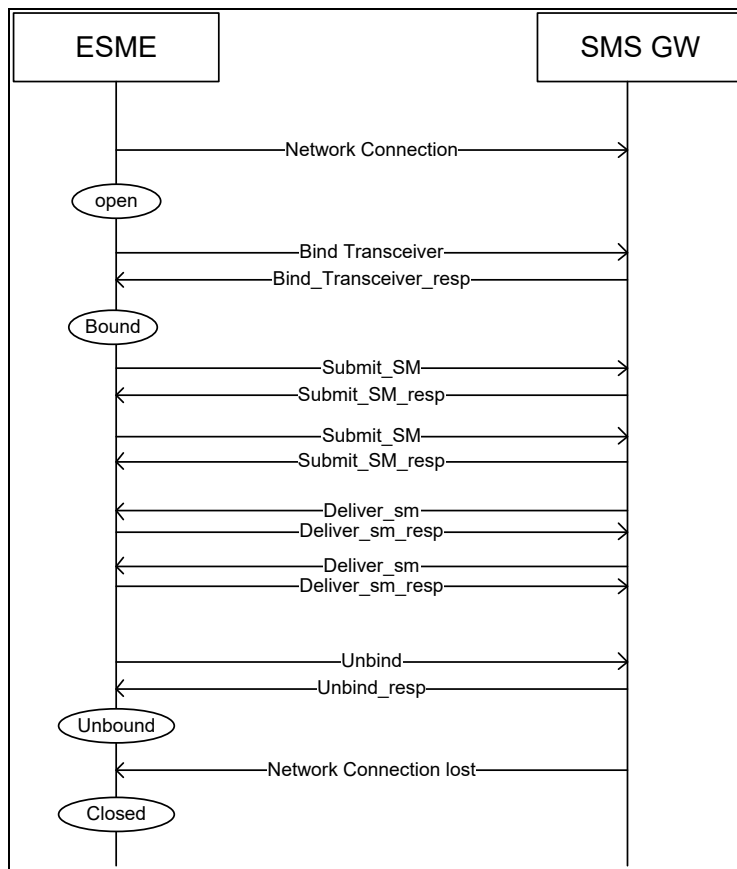
Figure 5:   Example Transceiver Session

3.2.2 Supported SMPP Session Operations

Below the table with the SMPP session operations and parameters supported by SMS gateway of Vodafone Germany

Type of bind	Description	Supported
bind_transmitter	This operation requests to bind as a transmitter	yes
bind_receiver	This operation requests to bind as a receiver	yes
bind_transceiver	This operation requests to bind as a transceiver	yes
unbind	This operation requests to close a SMPP session	yes

Table 1:   Supported SMPP Session operations

3.2.3 Recommendation on SMPP Session Operations

Vodafone Germany recommends the following settings for the external application account:

Parameter	Values
System ID	4-to-6 digit short-number (same as Short-code set for the account)
System Type	1
Application Bind Type	TRx (Transceiver)
Interface Version	0x34
Address TON (default: Null)	NULL
Address NPI (default: Null)	NULL
Address Range (default: Null)	NULL
Enquire_link is initiated by Application	Yes
Enquire_link frequency	15 seconds
Application Response timeout	15 seconds
Application Inactivity timeout	1800 seconds

Table 2:   Recommended SMPP session parameters

In case the external application would like to use different values for the above parameter, please contact our Developer Support Team first.

Please note that any change in the values of above parameter without prior notification to Vodafone may result in bind or connection failure to the SMS Gateway.

3.3   SMPP Operations

After the authentication and connection set up to Vodafone Germany's SMS gateway, the ESME can submit and receive messages. Below the table depicts the SMPP operations recommended by Vodafone Germany:

Type of bind	Description	Supported
enquire_link	This operation provides a check on connectivity status	yes
submit_sm	This operation submits a short text message	yes
deliver_sm	This operation manages AT messages and delivery reports	yes
query_sm	This operation checks the status of previously submitted message	yes
cancel_sm	This operation cancels the delivery of previously submitted message	yes
replace_sm	This operation replaces previously submitted message	yes
generic_sm	This operation indicates the receipt of an invalid PDU	yes

Table 3:   Supported SMPP operations

All other operations are not fully supported by the SMS gateway. In case any other operation is used by the ESME, the messages may not get delivered or rejected by the gateway.

Vodafone Germany will not provide support on any operations other than the ones mentioned above and Vodafone reserves the right to bar any operations except the ones mentioned above.

3.3.1 General Guidelines on SMPP Submit Operations settings

Vodafone Germany recommends the following settings of **submit_sm** operation for the external application, when delivering the message to the SMS Gateway:

Parameter	Values
SMPP Operation to be used to send messages	submit_sm (and not data_sm)
Source Address TON	0 (Unknown) for Short-number 1 (International) for MSISDN 5 (Alphanumeric) for Alphanumeric
Source Address NPI	1 (ISDN) for Short-number 1 (ISDN) for MSISDN 1 (ISDN) for Alphanumeric
Destination Address TON	1 (International)
Destination Address NPI	1 (ISDN)

Table 4:   Recommended SMPP submit_sm operation settings

3.3.2 General Settings on SMPP Deliver Operations settings

Vodafone Germany's SMS Gateway uses the following default settings for **deliver_sm** operation when sending messages to the ESME:

Parameter	Values
SMPP operation used for incoming mobile originated message from the subscriber	deliver_sm
Originator Address TON	1 (International)
Originator Address NPI	1 (ISDN)
Destination Address TON	0 (Unknown) for short-number 1 (International) for MSISDN
Destination Address NPI	1 (ISDN) for short-number 1 (ISDN) for MSISDN
SMPP operation used for delivery receipts	deliver_sm
Originator Address TON	Same as destination Address TON of submit_sm
Originator Address NPI	Same as destination Address NPI of submit_sm
Destination Address TON	Same as originator Address TON of submit_sm
Destination Address NPI	Same as originator Address NPI of submit_sm

Table 5:   General SMPP deliver_sm operation settings

3.3.3 Limitations on supported SMPP Parameters

The deployed SMS Gateway has certain limitations. Please find below a list :

Description	Values
Supported SMPP version	3.4
SMS Gateway mode	Non-AGW mode*
Maximum Message size accepted by SMS Gateway	640 byte
Maximum Length size of *message_id* sent by SMS Gateway	13 byte
Maximum Length size of PDU Header accepted by SMS Gateway	2048 byte
Values supported by SMS Gateway in *registered_delivery* field	0, 1, 5
Payload type values by SMS Gateway	0, 1
Data coding fields supported by SMS Gateway	0(GSM 7bit)**, 4 (8-bit binary) *** 8 (16-bit UCS2) ***
Character set supported for Alphanumeric source address are any digit 0-9 and alphabetical characters a-z or A-Z. Symbols, special characters including German letters (ä, ö, ü, Ä, Ö, Ü) are not supported	Digits and English Alphabets only from the standard 7-bit ASCII table
Number of characters sent in the '*text*' subfield of '*short_message*' parameter of deliver_sm field for Delivery Receipt (see subfield '*text*' in Table B-1 of SMPPv3.4 specification)	None

Table 6:   Limitations on supported SMPP parameters

Remarks

* :SMS gateway works in a non-AGW mode, hence only the operations mentioned in the above Chapter "SMPP Operations" are fully supported.

** : GSM 7bit encoding is unpacked GSM 7bit default alphabet including GSM 7bit default extension table as defined in Chapter 6.2.1 and 6.2.1.1 of the 3GPP TS 23.038. National Language Identifier (Ch. 6.2.1.2) is currently not supported. Please refer to the document [3GPP_TS_23.038] for further details.

*** : GSM 8bit and 16bit data encoding as specified in Chapter 6.2.2 and 6.2.3 respectively of the 3GPP TS 23.038. Please refer to the document [3GPP_TS_23.038] for further details.

3.4   Network Error Codes

Vodafone Germany Network is a mobile operator which supports 3GPP standard. Hence, the **Network Type value** is set to **3** in the "network_error_code" parameter. (refer to chapter 5.3.2.1: Page 152 of SMPP Specification SMPP v3.4.pdf) .

The table below shows the actual network error codes that can be received in the network_error_code parameter of the **deliver_sm** of a delivery receipt:

Error Code	Description
1	MT number is unknown in the MT network's HLR
2	MT number is unknown in the MT network's HLR
4	Short message was spooled for retry - not delivered on first attempt
5	MT number is unknown in the MT network's MSC
9	MT number is classed as an illegal subscriber in the MT network's MSC
11	MT HLR sends back "Tele-service not provisioned" error in response to SRI-SM
12	MT handset is listed as an Illegal device on the MSC
13	Customer is barred according to the MT HLR from receiving SMS
15	MT customer is part of a CUG that is not allowed to receive SMS
21	SMS not supported in the MT network
22	SMS not supported in the MT MSC
23	MT number is unknown in the MT network's HLR
27	MT number is unknown in the MT network's HLR
31	MT handset is busy. The signaling control channel is in use. (Receiving another SMS at the same time)
32	GPRS - As above
34	System failure in the MT network.
35	Data Missing in either the MT HLR or MSC
36	Unexpected data value received in response to a FSM or SRI
40	Memory capacity exceeded on the MT handset
41	MT handset protocol error
42	MT handset is not equipped to support SMS
43	Short message type "0" not supported by the MT handset.
44	MT network unable to replace the SMS on the MT customer's handset
45	Unspecified protocol error on the MT handset
46	Message class not supported on the MT handset
47	Unspecified DCS (Data coding scheme) error on the MT handset
48	Transfer layer PDU not supported by MT handset
49	SIM card full on MT handset
50	MT handset's SIM is unable to store the message
51	Error in MT handset

52	Memory capacity exceeded on the MT handset
53	SIM application toolkit busy on the MS handset
54	SIM data download error on the MT customer's handset
55	Unspecified MS handset error
60	Absent subscriber. No reason known
61	Absent subscriber due to phone being switched off
62	Absent subscriber due to phone out of coverage (cannot be paged by the MSC)
63	Absent subscriber due to roaming restriction/restricted area
64	Absent subscriber due to being deregistered in the HLR
65	Absent subscriber due to being purged in the VLR (off for 24+ hours)
66	Absent subscriber (GPRS) cannot be paged by the SGSN
67	Absent subscriber due to GPRS detached
68	Absent subscriber due to deregistration in the HLR (GPRS)
69	Absent subscriber due to GPRS MS purged in VLR
70	Absent subscriber due to unidentified subscriber on the MSC
71	Absent subscriber due to unidentified subscriber on the SGSN
72	Absent subscriber due to no response via the IP-SM-GW
80	SS7 error. "Duplicate invoke ID"
81	SS7 error. "Service not supported" - The carrier may not support SMS
82	SS7 error. "Mistyped parameter"
83	SS7 error. "No response from peer"
84	SS7 error. Returned when the C7 stack is congested
85	SS7 error. Returned when the C7 stack is shutting down.
86	SS7 error. "Unrecognised error"
87	SS7 error. "Unexpected error"
88	SS7 error. "Unexpected response from peer"
89	SS7 error. "Service completion failure"
90	SS7 error. "invalid response received"
92	SS7 error. "Global Title Translation error"
93	Alphanumeric source address with more than 11 characters or message content is not GSM compliant

Table 7:   Network Error Codes

3.5   PICS of SMPP

Vodafone Germany has released a PICS document for SMPP version 3.4. Please refer to this document [VF_SMPPv3.4_PICS] for details on SMPP operations and parameters supported by SMS gateway.

Remarks

*:SMS gateway works in a non-AGW mode, hence only the operations mentioned in chapter "SMPP Operations" are fully supported.

4. Contact Us

For **technical** information and queries please contact:

Team:	Developer Support
Email:	developer.support@vodafone.com
Address:	Vodafone GmbH
	Ferdinand-Braun-Platz 1,
	D-40549, Düsseldorf, Germany

For further information regarding **commercial** and **contractual** queries please contact:

Name:	Claudio Di Padova
Fax:	+49-211-533-1819
Email:	claudio.dipadova@vodafone.com
Address:	Vodafone GmbH
	Ferdinand-Braun-Platz 1,
	D-40549, Düsseldorf, Germany

For queries and information on **Vodafone Corporate SMS** product please contact:

Name:	Soenke Peters
Fax:	+49-211-533-1925
Email:	soenke.peters@vodafone.com
Address:	Vodafone GmbH
	Ferdinand-Braun-Platz 1,
	D-40549, Düsseldorf, Germany

5.   Attachments

Please find below the list of documents that may be attached to form the complete package.

[SMPPv3.4]:   Specification SMPP v3.4.pdf

[VF_SMPPv3.4_PICS]:   Vodafone Germany SMS Gateway SMPP v3.4 PICS.pdf

[3GPP_TS_23.038]:   Specification 3GPP TS 23.038 version 10.0

6. Glossary

List all abbreviations used in the document and describe them.

AGW	Application Gateway
DMZ	De-Militarized Zone
ESME	External Short Message Entity
GSM	Global System for Mobile Communications
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MSISDN	Mobile Subscriber ISDN
NPI	Numbering Plan Identification
NACK	Negative Acknowledgement
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
RX	Receiver
SME	Short Message Entity
SMPP	Short Message Peer to Peer Protocol
SMS	Short Message Service
SMSC	Short Message Service Centre
TON	Type Of Number
TRX	Transceiver
TX	Transmitter
VPN	Virtual Private Network