

SMS System

“A telephone number is a sequence of digits assigned to a landline telephone subscriber station connected to a telephone line or to a wireless electronic telephony device, such as a radio telephone or a mobile telephone, or to other devices for data transmission via the public switched telephone network (PSTN) or other public and private networks.

A telephone number serves as an address for switching telephone calls using a system of destination code routing.”
[https://en.wikipedia.org/wiki/Telephone_number]

Thus, a telephone number uniquely identifies a device, the target device, to which one might wish to make a voice call or to send a text (SMS) message. This problem focuses on sending text messages.

“Short Message/Messaging Service, commonly abbreviated as SMS, is a text messaging service component of most telephone, Internet and mobile device systems. It uses standardized communication protocols that let mobile devices exchange short text messages. An intermediary service can [in some cases,] facilitate a text-to-voice conversion to be sent to landlines . . . [which normally cannot receive text messages].

The [SMS] service allows users to send and receive messages of up to 160 characters (when entirely alpha-numeric) to and from GSM mobiles.

Although most SMS messages are sent from one mobile phone to another, support for the service has expanded to include other mobile technologies, such as CDMA networks and Digital AMPS.”

[https://en.wikipedia.org/wiki/Telephone_number]

Thus, SMS allows sending a text message of up to 160 characters to a target device via the target device’s uniquely identifying telephone number. The text message itself contains no information other than the message itself, e.g., it does not have a time stamp.

Questions 1 through 2 deal with the parts of the Internet, PSTNet, and SMS network as seen by cellphones that send and receive SMS text messages. Its scope consists of Requirements R1, R2, R3 and R4:

- R1.** A cellphone that is currently powered on is able to send a text message of up to 160 characters to a target device identified by a telephone number.
- R2.** A cellphone that is currently powered on is able to receive a text message of up to 160 characters from a source device identified by a telephone number.
- R3.** A cellphone that is currently powered on, that has sent a text message to a target device receives an acknowledgment of the sent message’s delivery to the target device; this acknowledgement consists of only the target device’s identifying telephone number and the text message itself.
- R4.** A cellphone that is currently powered on, that has received a text message knows only the source device’s identifying telephone number and the text message itself.

For clarification, note that there is no mention of time stamps, because, in fact, no time stamps are transmitted with any text messages.

The intent of R1 through R4 is to specify the behavior of simple GSM SMS text messaging as it has been for years, so that the intuition you have gained from experience with GSM SMS text messaging is valid!