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## All About Texting

For a brief time in the early days of mobile telephones, life got a little more interesting. They were so unprecedented that there was no etiquette for their polite use, so people made and took most personal calls anywhere and everywhere – while in line at the bank, shopping in stores, sitting in a crowded bus.

Amusing, annoying, and horrifying, these overheard half-conversations largely fell quiet once people discovered they could privately type messages instead. Though this greatly aided the world's peace of mind, the temptation to text in badly inappropriate situations, like while driving, still remains, leading to **1 out of 4 car wrecks** – all totally preventable.

For **text messaging** remains very popular, despite the never-ending irritation of those tiny, ridiculous keypads. People assume that they already know everything they need to about texting, but the whole process is more complex and less secure than many think.

### Telegrams on top of telephones

Modern telecommunications began with text by means of the **electric telegraph** in the 1840's. Packing as many messages onto a single wire at the same time was later done by different frequencies, which eventually led to the **telephone**, which sends the varied notes of the human voice down the line.

Meanwhile, telegraphy moved from a single key to wired typewriter-style keyboards. With the addition of rotary switches like telephones, **Telex** systems were born. First used by Hitler's Post Office, they spread rapidly around the world after World War II, the first truly standardized international telecom system, made obsolete with the dawn of the net.

Text messaging for consumers first had to wait until the development of the **mobile phone**, which came from the bulky **walkie-talkies** of WWII. The first **cell networks** popped up in the early 1980s, but it wasn't until the late 90s that the small, pocket phone appeared which really let texting take off.

**SMS** (Short Message Service) grew out of electronic **pgers** (remember them?). Based on letter counts of telex messages and postcards, messages were limited to **160 characters**, a restriction that soon proved irksome.

The important point is that text messaging was built **on top** of the existing telephone system. In that way, SMS is like the internet but does **not** use net protocols. SMS can carry internet links, but not long messages, photos, nor any other kind of attached media.

### Enter the internet

The invention of **email** in 1971 did not eliminate texting, just made it more complicated. Email is a basic internet service. It is modeled on old-fashioned postal letters, so its format allows long texts and attachments, and like a letter, every one has to be addressed, return addressed, and mailed. It is an awkward means for real-time conversation.

Yet SMS has its problems, too. The difficulty of typing and the strict length spawned a **shorthand** for brevity. Moreover, it's **not free** – there are small but **real charges** for both sending and receiving. Added fees for "premium" services like daily horoscopes can really add up on the phone bill. Plus, SMS is also **fundamentally insecure**, yet is often used to send security codes for two-factor authentication. It can be **spoofed**, spammed, or phished, and used to **spread malware**, too.

SMS is **not really private**, which means that carriers can see texts and even save them for an indefinite period of time, as the **Jan. 6 Committee** recently found, but it is doubtful whether **deleted ones** can be **recovered**.

But once **threaded messages** were allowed, SMS could enable an extended give and take. This was far too useful to be abandoned, and so ways were sought to add inter-

net functionality to a non-net format. That's when things started to get a little crazy.

The first way to combine SMS with net abilities was **MMS** (Multimedia Messaging Service). Not only can it deliver longer messages but also a variety of media, including audio, a photo or slideshow, a **QR code** or up to 40 seconds of video. Some MMS services allow an entire package of up to 600Kb, but MMS can be six times as **expensive** as SMS.

Sending and receiving are more complicated than with SMS. First, the media are encoded as in an email and the message is uploaded to a carrier's special server. This server checks with the recipient's set to see if it is MMS capable – that is, one with internet connections, in other words, a **smartphone**.

If it is, the content is extracted and formatted for the web, while several SMS messages carry the link to open the content and check that it worked. If the recipient's phone is **not** net-enabled, the content is sent to another web server from where it can be viewed in a browser while the link to it is sent.

Plainly, a lot can go wrong with this weird hybrid scheme. Media (like a selfie) produced by one phone might not be entirely compatible with another brand. But often when something goes wrong, it's because one of the smartphones is not properly configured.

MMS is not as useful as SMS for bulk message sending, but both can be used for spam or phishing. In certain situations, recipients might be charged even more to receive MMS content, too. But MMS was just the beginning.

## Cacophony in the bazaar

Adding people to the conversation was highly desirable, and so **online chat** was born back in the 70s. A whole host of alternative programs and protocols quickly followed. The best known of these is **IRC** (Internet Relay Chat) for its group discussion forums.

But that was for PCs. To replace SMS with a net-based format on smartphones that could support chat, file sharing, voice and video calls, universal standards for wireless carriers called (**RCS**) Rich Communication Services, have been steadily evolving since 2007.

Meanwhile, text-based net services rapidly multiplied, filling all sorts of niches. Privacy was added with **end-to-end encryption**. There are now over a dozen **recommended apps** for Google's Android phones.

**Apple's iMessage** is also encrypted; but backups in Apple's iCloud also store a decryption key. This should prevent ordinary snooping but might not stop serious state spying.

Wikipedia currently **lists** over 30 different instant messaging protocols and over 40 **clients**. Each one has its own architecture, with different levels of support for media and groups, security features, and most are proprietary. Some are free, others charge fees.

It is a bit of a mess, and not just because the technology is new and still being worked out. As SMS is built over the top of the telephone network, so too are all these apps built **over the top** of the internet, just like all the **video streaming services**. Though some are open-source, many protocols are private. With so much money to be had, there is little incentive to make it easier for anyone else.

This is clearly shown in how hard it is to text from a laptop or PC. Because of the added SMS charges, it requires an **app**, often for a yearly fee, or a text message can be sent by means of changing it into a net format.

Texting can thus be done through a **website** that harvests user information or clumsily through one's own **email client**. For the latter, what's needed is the receiver's 10-digit phone number and the name of their mobile carrier. A quick web search can then find the carrier's **SMS gateway address**, and so the recipient's address would look something like **5051234567@text.mobilecarrier.net**.

This method is neither really easy nor convenient to set up and use, but it illustrates how important communicating privately is to people. Despite any inconvenience, most of us will do what's needed simply to avoid being overheard by strangers. Thank goodness.

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