InfoSecurityLab

Bluetooth®

security threats

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WHAT IS BLUETOOTH?

Things You have to know about Bluetooth [1]

- It's the simple choice for convenient, wire-free, short-range communication between devices
- The range for Bluetooth transmissions varies from about 1 meter up to 100 meters
- Its speed is limited to about 1 Mbps

Things You have to know about Bluetooth [2]

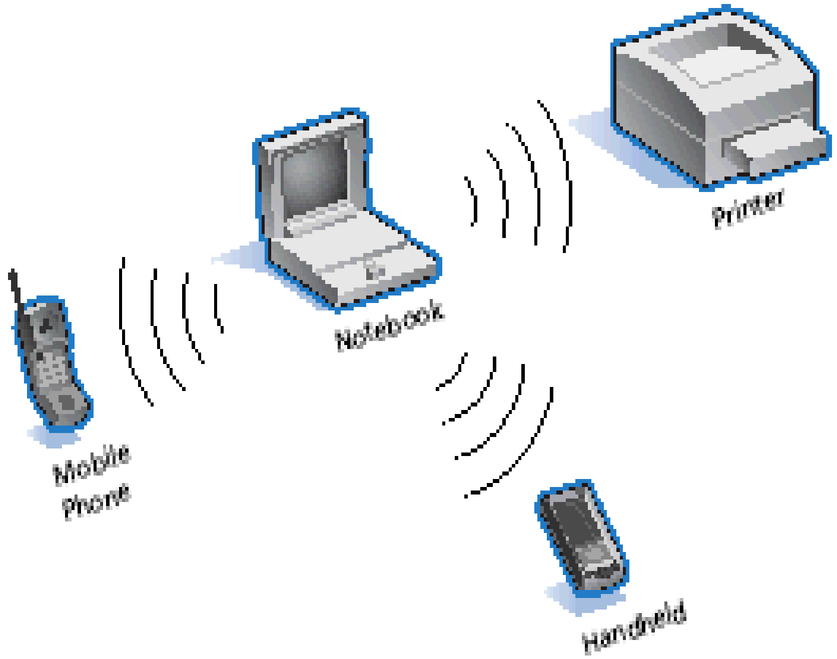
- Bluetooth can operate in one of three security models:
  - Mode 1 is non-secure
  - Mode 2 provides security at the service level, after the channel is established
  - Mode 3 provides security at the link level, before the channel is established

Things You have to know about Bluetooth [3]

- Bluetooth is an integral part of smartphones, PDAs and many notebooks.

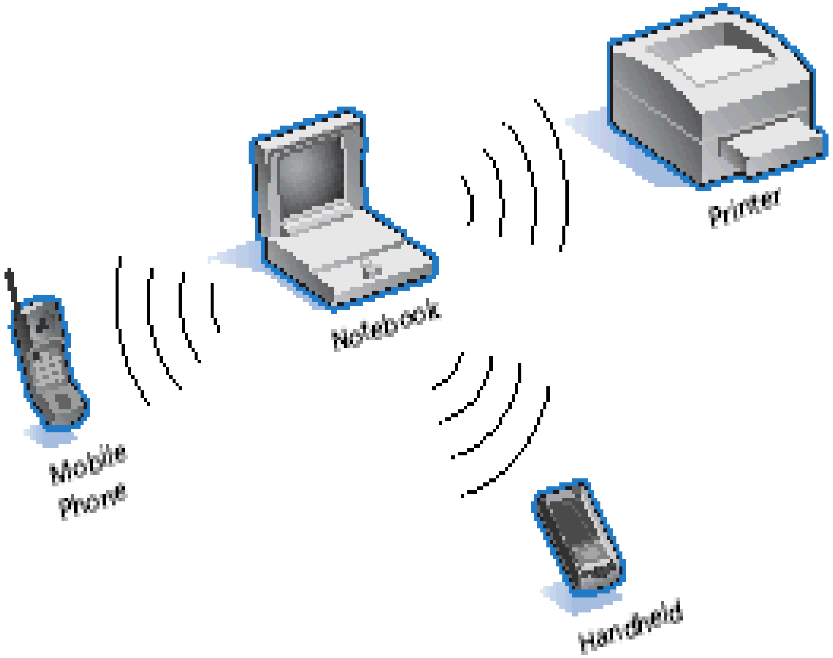
The common uses of BT technology nowadays include [1]:

- Using a wireless mobile phone headset during a call while keeping a phone in the bag
- Transferring photos or ring tones between mobile phones



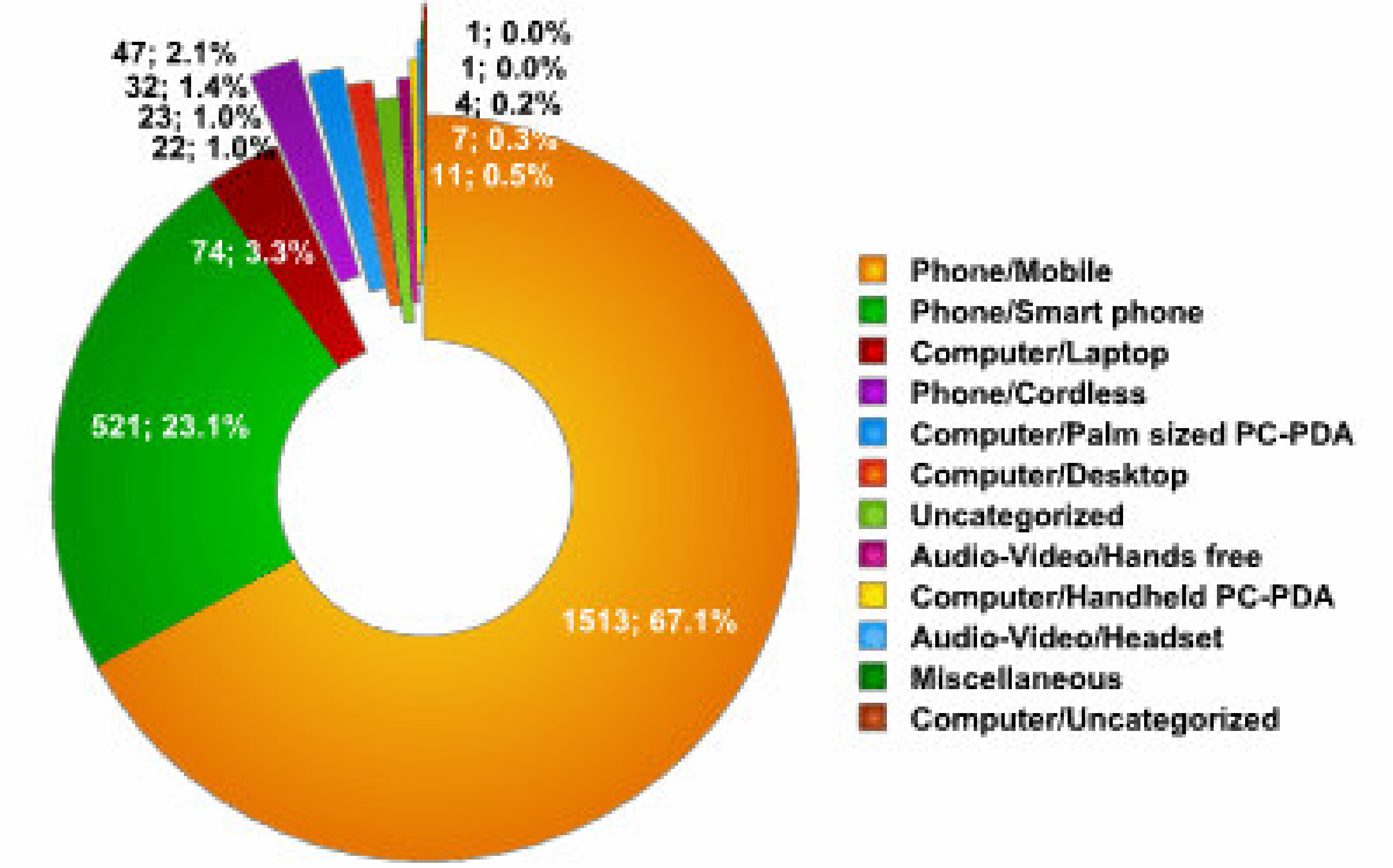
The common uses of BT technology nowadays include [2]:

- Connecting a printer, keyboard, or mouse to a PC without cables
- Synchronizing a calendar, phone book and other information between a PDA and a PC



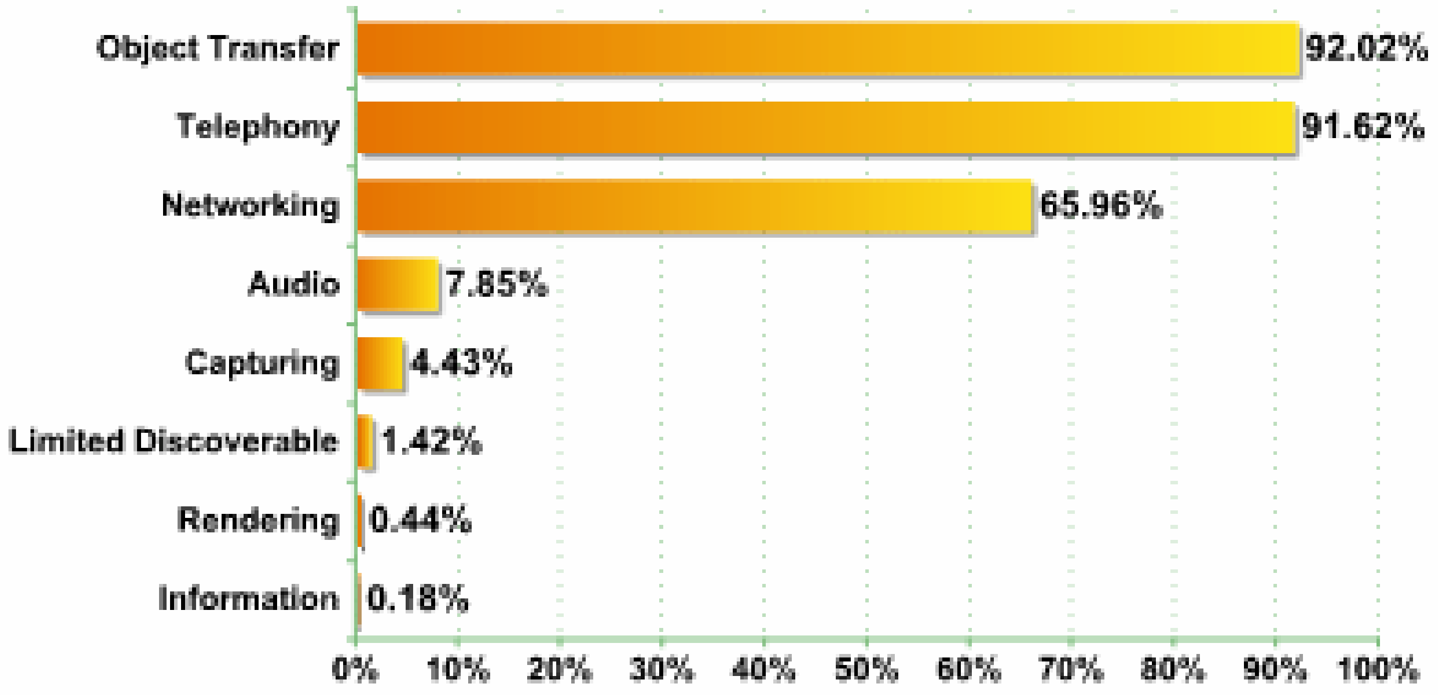
STATISTICS

Bluetooth usage in devices



http://www.viruslist.com

This graph shows, that 92.02% of people, who have bluetooth enabled devices, use object transfer (transmitting/ receiving files) in public place.



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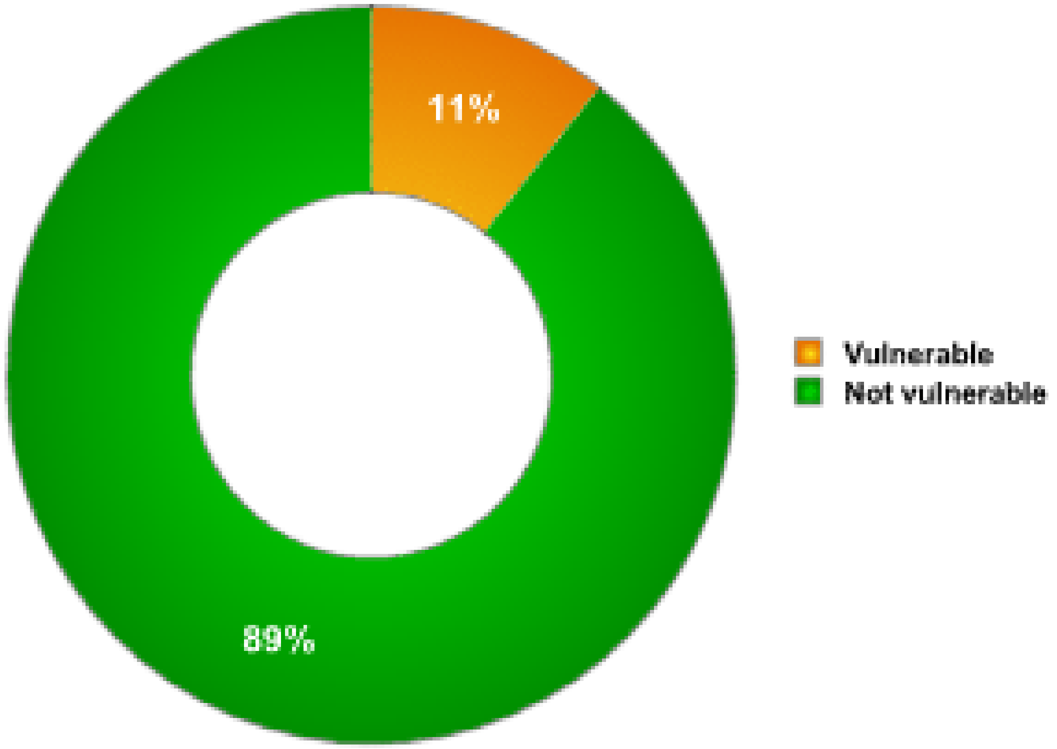
Proportion of vulnerable Bluetooth devices



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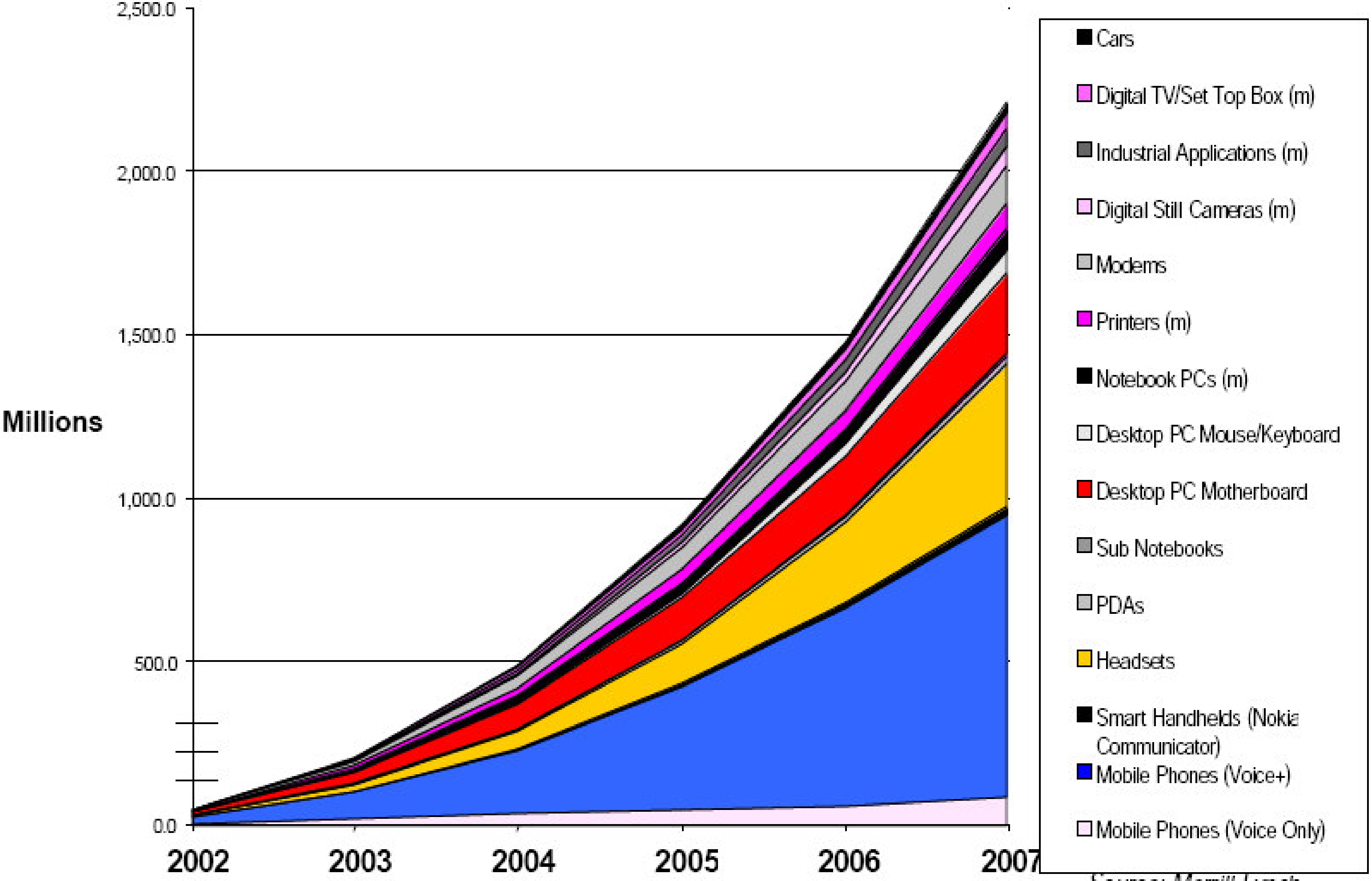
Total Number of Bluetooth End Points Shipped Per Year Estimate



Source: Merrill Lynch

SECURITY THREATS

Bluetooth dangers [1]

- Sensitive information that is not encrypted and that is transmitted between two wireless devices may be intercepted and disclosed

- Sensitive data may be corrupted during improper synchronization

Bluetooth dangers [2]

- Handheld devices are easily stolen and can reveal sensitive information
- Data may be extracted without detection from improperly configured devices

Bluetooth dangers [3]

- Malicious entities may gain unauthorized access to the computer network through wireless connections, bypassing any firewall protections

- Malicious entities may, through wireless connections, connect to other organizations for the purposes of launching attacks

Bluetooth dangers [4]

- The malicious hackers can benefit from mobile phone owners who keep their Bluetooth devices in discoverable mode
  - This happens most often because one mobile phone is required to be in discoverable mode before pairing with a new device
  - Often device owners forget to disable the discoverable mode afterwards

Secure Bluetooth interaction phases:

1. Pairing - in order to establish a "link" key, which will then be used for encryption and decryption for secure connections
2. Initialization key is generated based on each device's address, and a PIN which is shared between the devices
3. Once pairing has occurred, each device considers the other to be "trusted", and thus it grants its access to certain things on itself

You should:

- Use a long passkey number and do not perform a pairing procedure in public
    - *If a hacker is able to discover the passkey, he can calculate possible initiation keys, and then from that, calculate the link key. Making the passkey long will make it much harder to accomplish the first step*
- Passkey changes should only be possible over an authenticated or encrypted connection

POSSIBLE VULNERABILITIES

Social engineering:

- Hackers can access information on a user's phone, either by using Bluetooth to establish a 'trusted device' connection, or by persuading the user to lower security/ disable authentification for Bluetooth connections.

Vulnerabilities in the protocol itself:

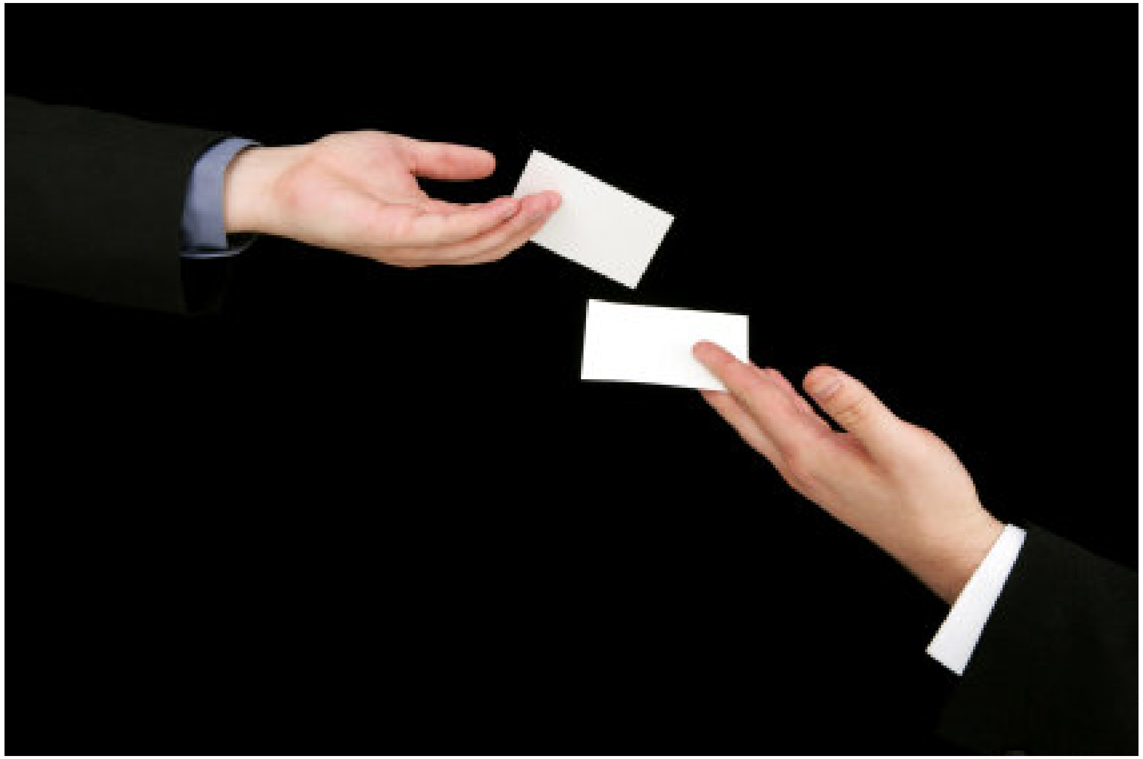
- Hackers can steal data from the telephone, make calls or send messages, conduct DoS attacks on the device, use a Bluetooth earpiece to listen to calls etc.

Malicious code:

- A telephone can be infected by a worm, which will then send itself to other devices, by Bluetooth or by MMS. Data on the victim telephone may be corrupted, stolen, or encrypted.

What is bluejacking?

- Bluejacking allows phone users to send business cards which typically contains a message in the name field to another bluetooth enabled device anonymously using Bluetooth wireless technology



Bluejacking

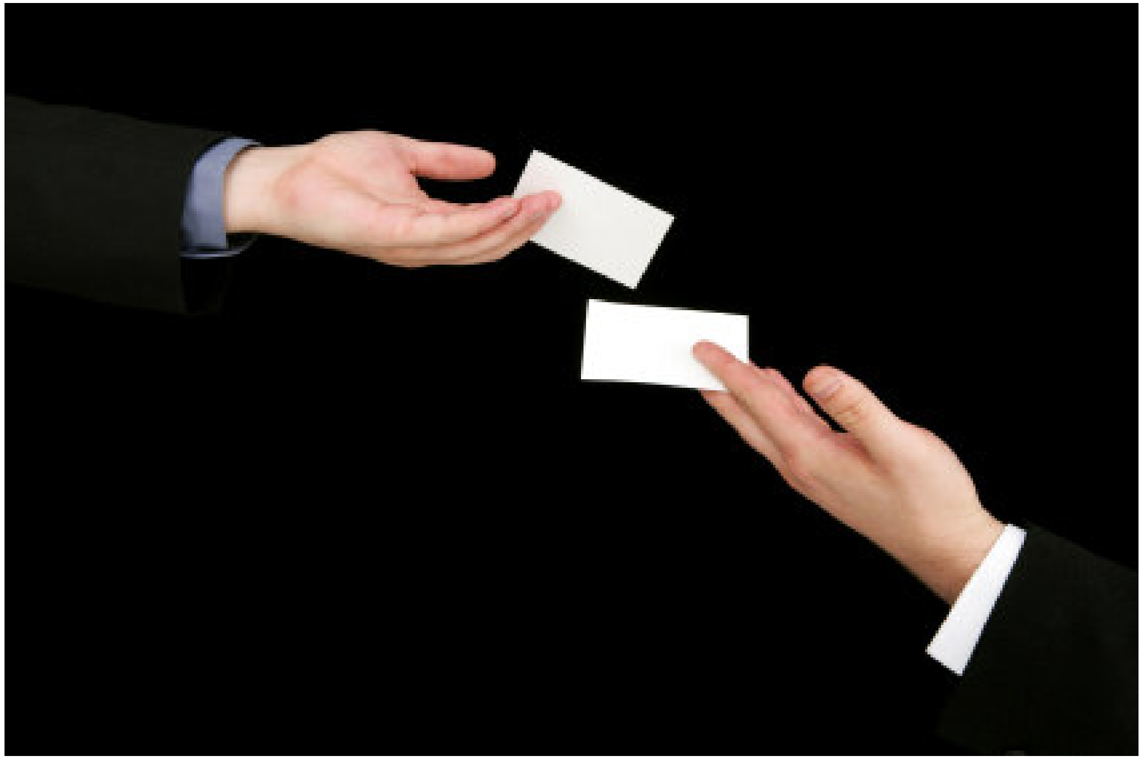
- If a malicious individual names their phone something like "Click accept to win!!" then they can gain access to someone's Bluetooth device if the owner falls for the trick

What is bluesnarfing?

- Connects to Bluetooth phones without the phone owner's knowledge and download the phonebook, the calendar, and sometimes more
- Advanced version of bluesnarfing can even alter those files in some bluesnarfed phones

How bluesnarfing works [1]

- Bluesnarfing is realized by special software
- Bluesnarfing works through the mechanism for exchanging business cards



How bluesnarfing works [2]

1. The bluesnarfing software connects to a target Bluetooth device via Bluetooth's OBEX Push profile
2. Then instead of pushing a business card, it pulls, using a "get" request for files with known names, such as the phonebook file (telecom/pb.vcf) or the calendar file (telecom/cal.vcs)

What is bluebugging?

- A bluebugger can wirelessly direct a phone to make calls without the owner's knowledge

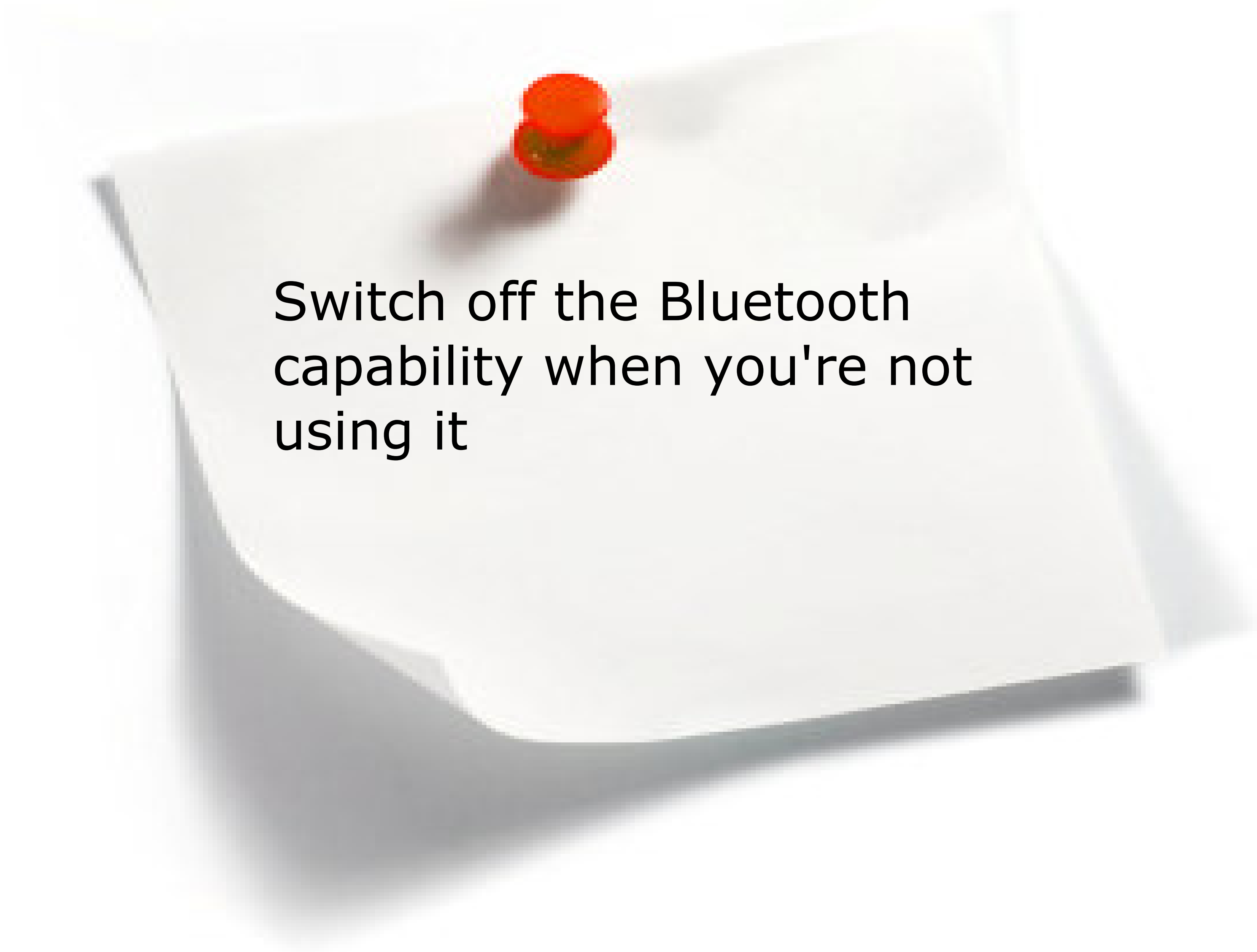
- Set call forwarding and then receive calls intended for the bluebug victim

Bluebugging

- Bluebuggers also have bluesnarf capability, so they can read phonebooks and calendars and more
- They can even read a phone's call list to see who their victims called or who called them. They can even alter those lists.

HOW TO USE BLUETOOTH SECURE

Switch the phone into "invisible" mode when you do not need bluetooth, so it will not be recognized by other Bluetooth devices



Switch off the Bluetooth capability when you're not using it

Never add funny sounding messages from unknown sources to your contacts/address book

CONFIDENTIAL

Avoid storing sensitive data such as your social security number, credit card numbers, and passwords on any wireless device

Stay up-to-date on Bluetooth developments and security issues

Regularly check for news on software updates or any specific security vulnerabilities

Install security updates and antivirus software that is available

For Bluetooth devices to pair with each other you must first establish a 128-bit key that is used to encrypt all communications

*Compared to **40-bit encryption**, **128-bit encryption** offers **88** additional bits of key length. This translates to **2^{88}** or a whopping **309,485,009,821,345,068,724,781,056** additional combinations required for a **brute-force crack**.*

Always use application-level security: Point-to-Point Tunneling Protocol, Secure Sockets Layer or VPN

Restrict access to trusted devices

Don't accept files transmitted via Bluetooth wireless technology or any other technology from unknown or suspicious entities

Evaluate a product's user interface to decide how easily it lets users set up and manage security

Require link-level security to be active in all Bluetooth devices