Malicious Code & wireless networks

By: Brett Neilson

Overview

- Wireless technology, networks & devices
- Defining wireless threats
- Why malicious code will spread on wireless networks
- Economic impact & potential damages
- Protecting against malicious threats

Wireless technology & networks

What is wireless?

- Merriam Webster says:
  - Wireless: *adjective*
    1: Having no wire or wires

- Basic Components of a wireless system
  - Antenna
    - The conduit of sorts
  - Transmitter
    - Sends the RF
  - Receiver
    - Receives the RF

So who is using it?

- Everybody
  - TV / Radio / Satellite
  - Police / Fire / EMS
  - Cell Phones / Pagers
  - Building access cards
  - Automatic Toll Collection (Toll Tags)

Mobile Data Terminals (MDT)

- Very popular with Police and Fire
- Allows instant access to dispatcher data
- More secure???
  - Up until recently legal to monitor

- New features include
  - Live video monitoring

Cellular Technologies

1G (First Generation) – 1983 to present – Analog cellular service – Voice only	2G (Second Generation) – 1995 to present – Digital / PCS Services – Data speeds (9.6 – 19Kbps) – Text messaging
2.5G (Not quite 3G) – 2001 to present – Digital / PCS Services – Data speeds (56Kbps) – Email messaging	3G (Third Generation) – 2002 and beyond (In progress) – Data speeds (144+Kbps) – Video and Audio

802.11 Networks

802.11 1 to 2 Mbps 2.4 GHz	**802.11a** 54 Mbps 5.15-5 GHz
802.11b 11 Mbps 2.4 GHz	**802.11g** 20 Mbps 2.4 Ghz

Wireless Devices

- PDA
  - Palm & iPAQ
  - Strong Growth in 2000
    - Slowly shrinking thereafter
  - Renewed interest due to advances
  - New suppliers entering the market
- Converged Devices
  - PDA & Phone combined into one
  - All the features w/ all the connectivity
  - Designed for size not security
- Wireless (Security) Cameras
- RFID devices

Defining Wireless Threats

Defining the wireless threats

- WarDriving
  - Searching and Logging
- Data Snooping
  - Capturing data
- Jamming
  - Disrupting legitimate signals
- Insertion Attacks
  - Unauthorized clients and APs

Defining the wireless threats

- Malicious Code
  - Virus
    - A piece of code that can replicate itself
      - SMS - URLs & Attachments
  - Worm
    - A program that can copy itself to other disks
      - Masquerades as valid program
  - Trojan
    - A program that launches other programs or code
      - Masquerades as valid program

Emerging threats

- Liberty Trojan (PLAM) - September 2000
  - Deleted applications and was unable to replicate itself
- Timophonica (Spain) - January 2001
  - First automatic dialer
- 911 - April 2001
  - Caused phones to repeatedly dial 911
  - Sent to over 100,000 phones
- Flooder - August 2001
  - Sends unwanted SMS messages
- Phage & Vapor – September 2001
  - Deleted files and hid applications

Why Malicious Code will spread

Why Malicious Code will spread…

- In nature, viruses infect all organisms, even the tiniest bacteria.
  - Small Pox, Plague, SARS
- Likewise, computer viruses infect all platforms that reach a any level of sophistication.
  - Melissa, LoveBug, Klez

Four main factors

1) Protection is poor or non-existent
2) Power of new devices
3) Standardization of networks
4) Increased connection of devices

Protection is poor or non-existent

- Very little built in protection
  - Nokia 9000 series has malicious code protection
- Data transmissions are protected but unchecked
  - Currently no carrier has the ability to scan SMS or MMS delivery servers for malicious code.
  - Current security only offers limited protection and next to no scanning abilities

Power of new devices

- PDAs are now able to run PC like applications
  - Increased power means increased automation
    - Automation is often targeted by virus writers.
- Devices are often synchronized on a regular basis
  - Thus opening a door for the spread of malicious code
- Common language for developing apps
  - Makes it easier to create malicious code

Standardization of networks

- The more standard the easier malicious code will spread
  - Same as in the wired world
- Trend is moving away from proprietary standards and is focusing more on TCP/IP related standards
- Email messaging brought us Melissa and LuvBug
  - Standardized wireless networks are sure to do the same

Increased connection of devices

- More connectivity than ever
  - Bluetooth
  - WiFi 802.11
  - Cellular
- Allows for multiple ways to the internet and email
- Increased SMS/MMS popularity and exposure due to links and attachments

Economic Impact and Potential Damages

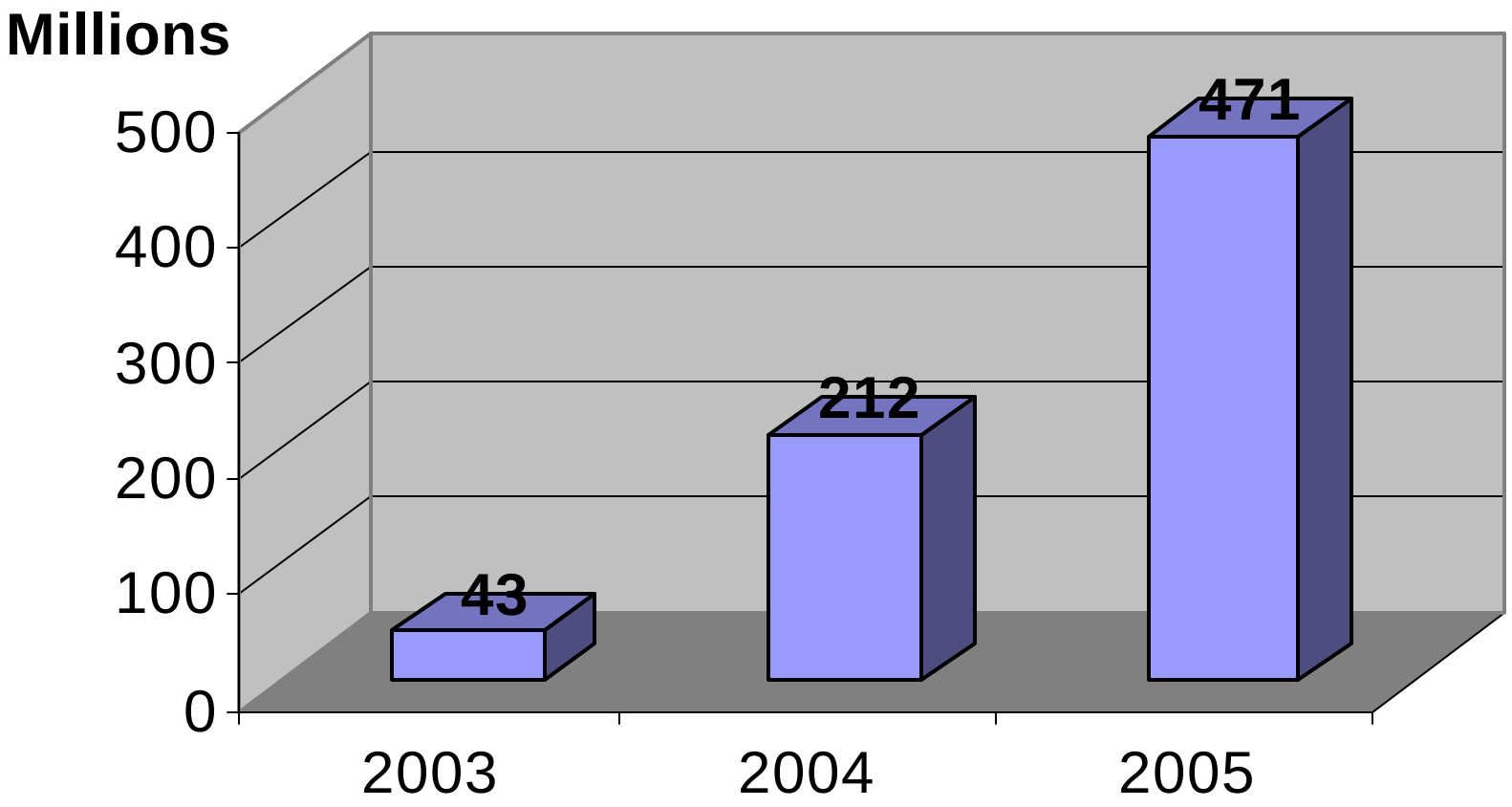
Damages

- Users receive unwanted messages
- Some devices send unwanted messages
- Data in devices is erased, deleted or stolen
- Device becomes unusable
- Network slowdowns (congestion)
- Network performance suffers
- Network intrusion

Impact

- Customer complaints
- Higher turnover from unhappy customers
- Cost from unwanted traffic
  - May not be just dollars
- Dropped calls
- Un-infecting or cleaning devices & servers/network
- Purchasing new technology

So what's the financial impact?



So what needs to be done?

Protecting against malicious threats

- Protection must be implemented at every point possible
  - Devices, Switches, Towers, COs, etc.
- Mobile operators need to start offering scanning services to their clients and need to start scanning their servers and data streams.
- Delivering a solution now rather than latter could save millions of dollars in lost revenue and expenses.
  - AV Vendors need to start step up to the plate
- Mobile operators and device manufactures need to have plans for addressing thousands if not millions of simultaneous infections on their networks.

Conclusion

- Top four reasons malicious code will spread
  1. Current protection of wireless networks/devices is minimal
  2. Increased computing power
  3. Standardization
  4. Growing connectivity
- Not changing security could result in large economic losses
  - $471 Million per 5 Million users estimated for 2005
- Mobile Operators, Administrators, Manufactures and Developers should act now and think proactively in a effort to better protect their systems.

Thank you…

Brett Neilson
defcon@brettneilson.com