



Privacy-Invasive Software and Preventive Mechanisms

Martin Boldt

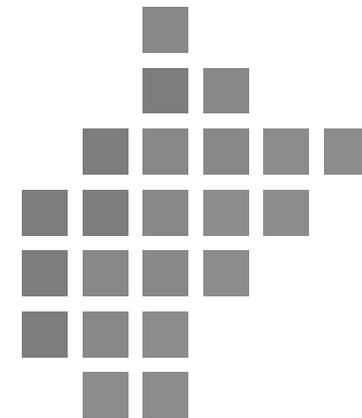
School of Engineering

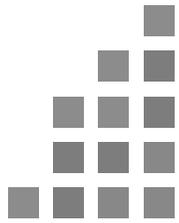
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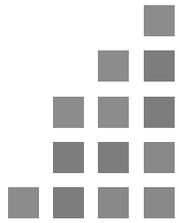
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The Spyware Problem (i)

- According to Earthlink (an American ISP) 55% of all Internet connected computers are infected with various kinds of spyware
- Spyware exists because information has value
- Spyware is a fuzzy concept without any proper definition
- The fundamental problem is the lack of standard mechanisms for managing users' informed consent during software installation



The Spyware Problem (ii)

- We use the Gator software as an example of what users face on the Internet
- During the installation users face an End User License Agreement (EULA)
- It contains 6,645 words and is presented in a small window
- Would you read it?

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Privacy Statement and End User License Agreement

PRIVACY STATEMENT & EULA

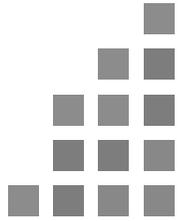
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 I do not accept the terms of these agreements

CANCEL < BACK NEXT >



The Spyware Problem (iii)

- The EULA reveals that the following programs are installed:
 - eWallet
 - Precision Time
 - Date Manager
 - Offer Companion
 - Weatherscope
 - SearchScout Toolbar
- Such programs create large revenues for the their developers
- Spyware corporations report annual revenues in excess of \$50 Million each

Welcome to MSN.com - Microsoft Internet Explorer

File Edit View Favorites Tools Help

4/25/04

Free Hotmail Windows Windows Media

Back Forward Stop Refresh Home Search

Address Enter Keyword or Web Address Here

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Search Enter Search Go

2020search 2020 Search Tools Highlight Off Last Search

POWERSTRIP Search Form Fill Email News Your selected NewsFeed is currently un

Free Pics Free Vids MORE Free Cams Gifts Meet real women!

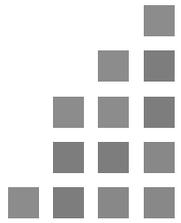
SearchIt GO Shopping Money Travel Personal Fun Recent My Se

All the Internet Search News Calc Games Tools Me translate

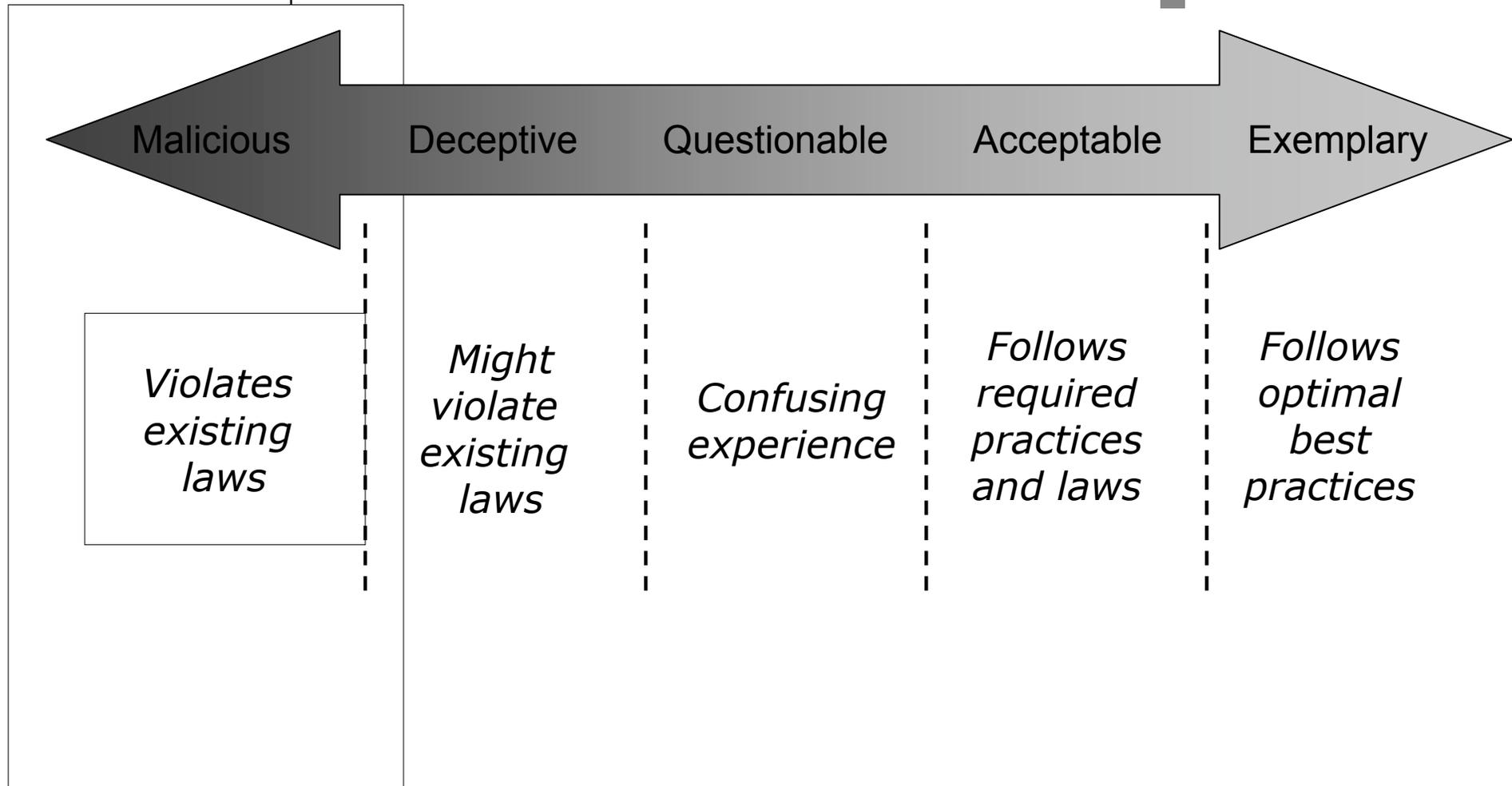
You are in World SWITCH TO DATING? POWER SEARCH CONTROLS SIGNED IN MIRROR - ON HELP PEOPLE SEEN MY PEOPLE MORE PEOPLE MY INBOX ACCEPTING CALLS TOP POP! SITES

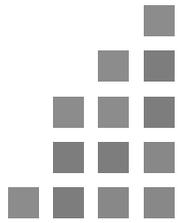
Meet Sexy Singles - Join Free!

start Welcome to MSN.com... 16° 81' 178 3:46 PM

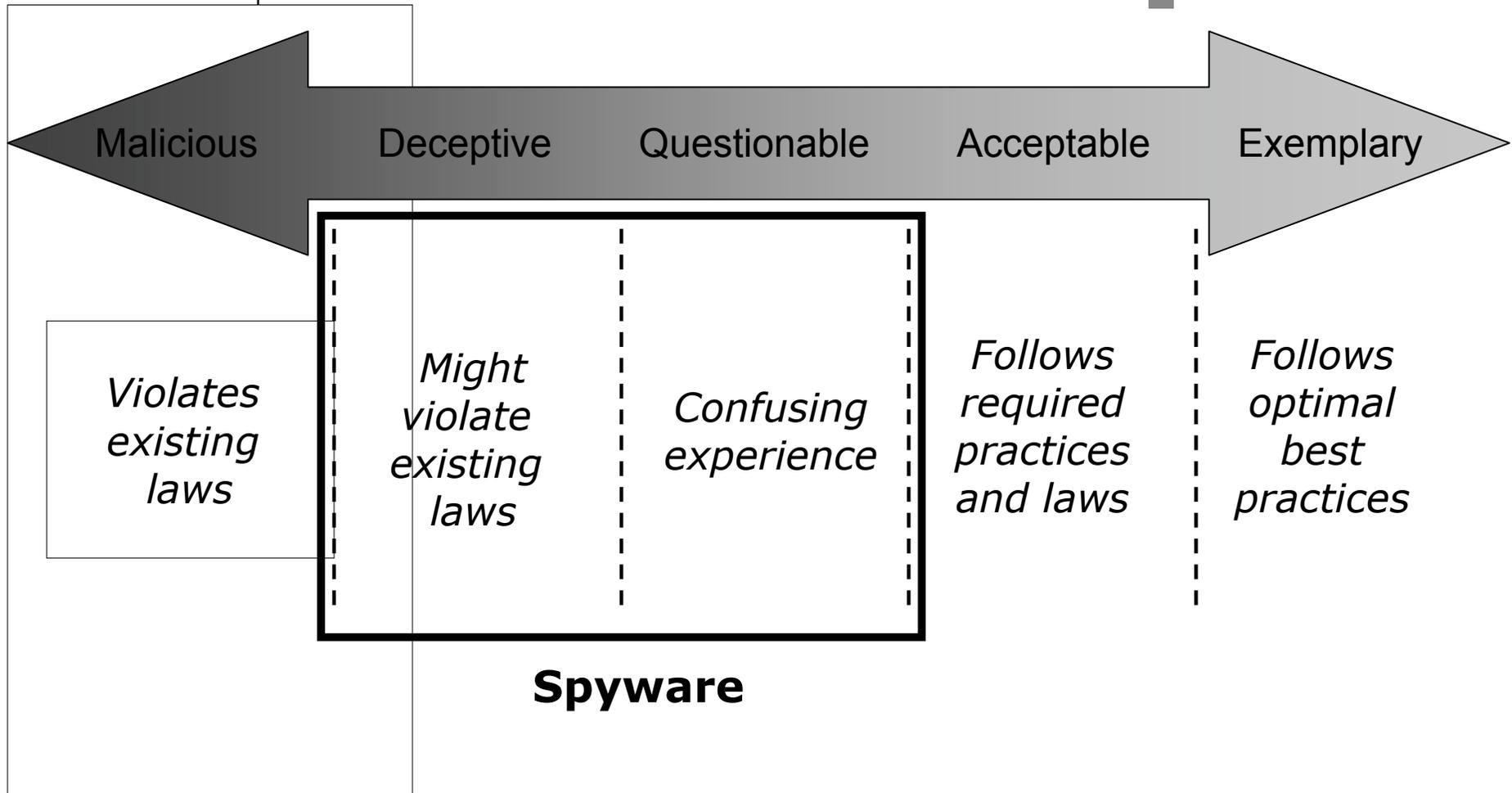


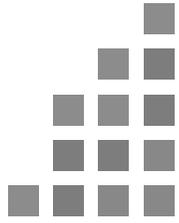
Software Behaviour





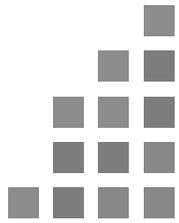
Software Behaviour





Privacy-Invasive Software (i)

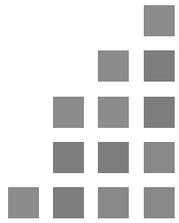
- We introduce the term *Privacy-Invasive Software* (PIS) instead of using the term spyware
- Software that cause negative privacy implications
- More descriptive and less negatively emotive as other terms such as spyware, evilware, badware, or hijackware
 - Even if we use the term "*invasive*"
- We believe an invasion of privacy could be both tolerable and requested by the users if fully transparent



Privacy-Invasive Software (ii)

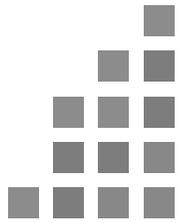
- Legitimate software is shown in white colour
- Spyware in light grey
- Malicious software in dark grey

	Tolerable negative consequences	Moderate negative consequences	Severe negative consequences
High consent	Legitimate software	Adverse software	Double agents
Medium consent	Semi-transparent software	Unsolicited software	Semi-parasites
Low consent	Covert software	Trojans	Parasites



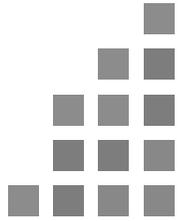
Preventive Mechanisms (i)

- Today's anti-spyware tools use the same methods to target spyware as anti-malware tools use to combat viruses and worms
- These methods are not optimal in the spyware context
- "Innocent" software is negatively affected by anti-spyware tools



Preventive Mechanisms (ii)

- We believe that new and more *user-oriented* countermeasures are needed
- Mechanisms that inform users about how the software affect them and their computer system
- We put forward the idea of using *collaborative reputation systems* to inform users
- Reputation systems are successfully used by for instance Amazon.com, eBay.com and IMDb.com



Preventive Mechanisms (iii)

- Gather previous users' knowledge about software and present it to the new user
- Software reputations highlighted by such a system is the same as users today gain from computer magazines and Web sites
- We have developed a prototype tool, which is integrated into Windows XP's installation process

<http://www.softwarereputation.com>

Firefox is about to execute

Program information

Filename: Firefox Setup 2.0.0.1.exe
Path: C:/Documents and Settings/A...o/Firefox Setup 2.0.0.1.exe
Filesize: 5971432 bytes
Rating: 9/10
Excellent
Description: Firefox (4.42.0.0)

Vendor information

Name: Mozilla
Rating: 9/10

Comment

1 of 1 users thought this comment was useful

Installer for latest version of Mozilla Firefox. Safe to run and good application, better than IE for safe web browsing. Very nice add-ons, especially mouse gestures.

Malicious behavior

	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	0 % (0 / 1) users voted yes
	100 % (1 / 1) users voted yes
	100 % (2 / 2) users voted yes

Statistics

Last week (allowed/denied)

Allowed	81.2% of 16
Denied	18.8%

Development over last 30 days (allowed/denied)

Remember this decision

Rate and comment on Firefox [?] [X]

Program information

Filename: Firefox Setup 2.0.0.1.exe
Path: C:/Documents and Settings/Administrator/My Documents/demo/Firefox Setup 2.0.0.1.exe
Filesize: 5971432 bytes
Vendor name: Mozilla

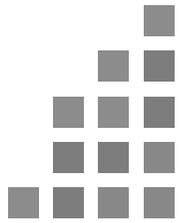
Description:

Your ranking and comment

★ ★ ★ ★ ★ ★ ★ ★ ★ 7/10
Good

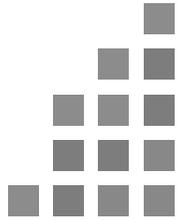
Comment:

Does the software automatically register itself as a startup program without asking? ▼



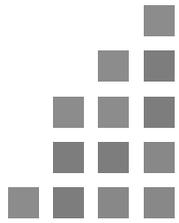
Antagonistic intentions (i)

- In an initial attempt to address antagonistic intentions from community users, we assign each user a *trust factor*
- A user's vote impact depends on this value
- The system also make use of a meta reputation system that allow community users to rate each others' contributions



Antagonistic intentions (ii)

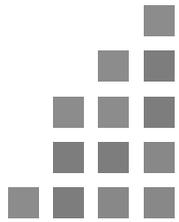
- It would also be possible to allow users to subscribe to the contributions from only a predefined subset of all community users, e.g. only a trusted subgroup
- The prototype rely on simple e-mail addresses for distinguishing between different users during registration
- Other measures than e-mail addresses are needed for identification



System impact

- The widespread use of such a system would help users prevent undesired software to covertly install on their computer
- The PIS classification is transformed in the following way as the user is presented with information about software

	Negligible Negative Consequences	Moderate Negative Consequences	Severe Negative Consequences
High Consent	Legitimate Software	Adverse Software	Double Agents
Low Consent	Covert Software	Trojans	Parasites



The End

Questions?

More information is available at:
<http://psi.bth.se/mbo/>

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