Playing Dirty: Evolving Security Threats in the Gaming World

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MMOR-thingamijig?

M assively

M ultiplayer

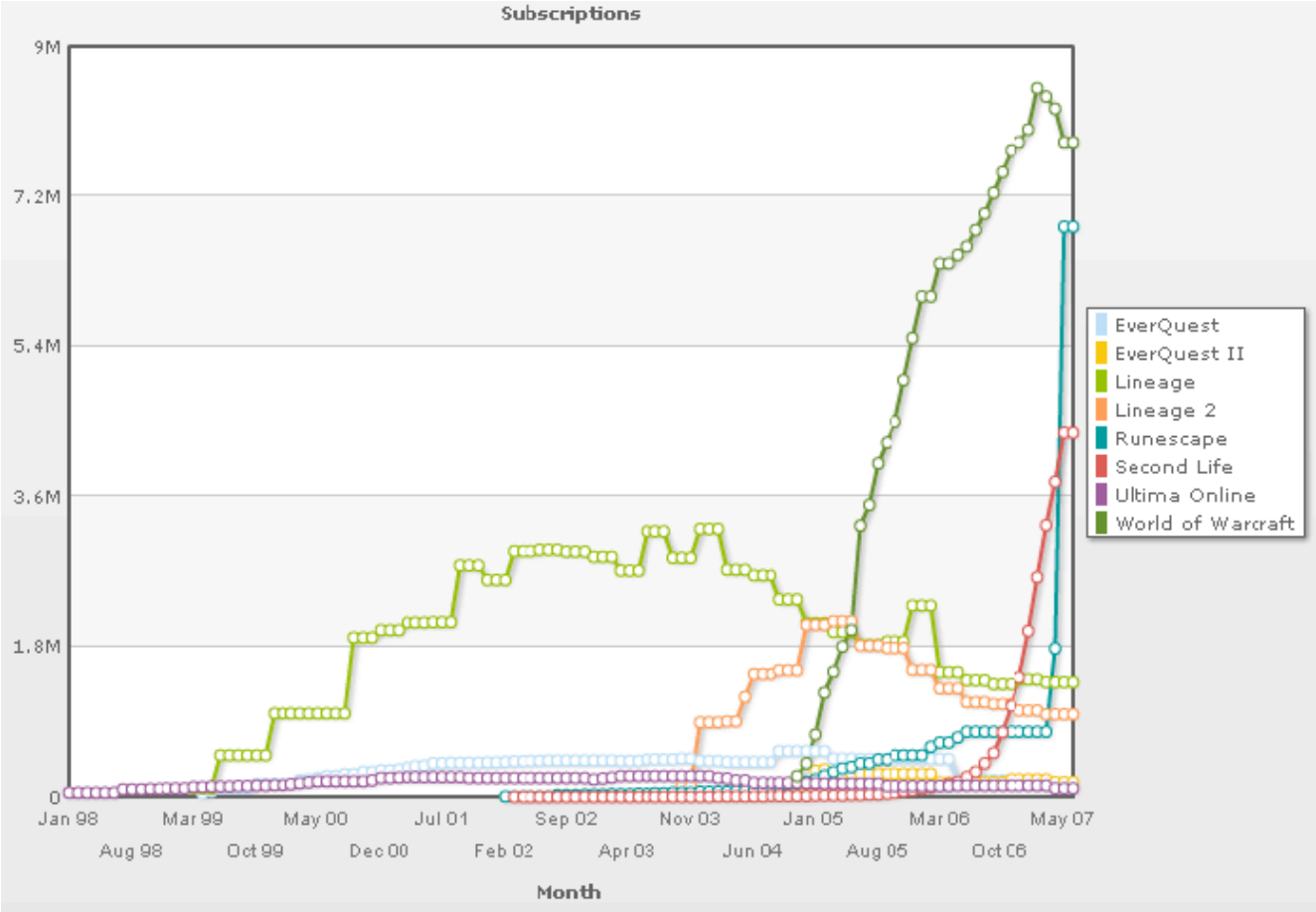
O nline

R ole

P laying

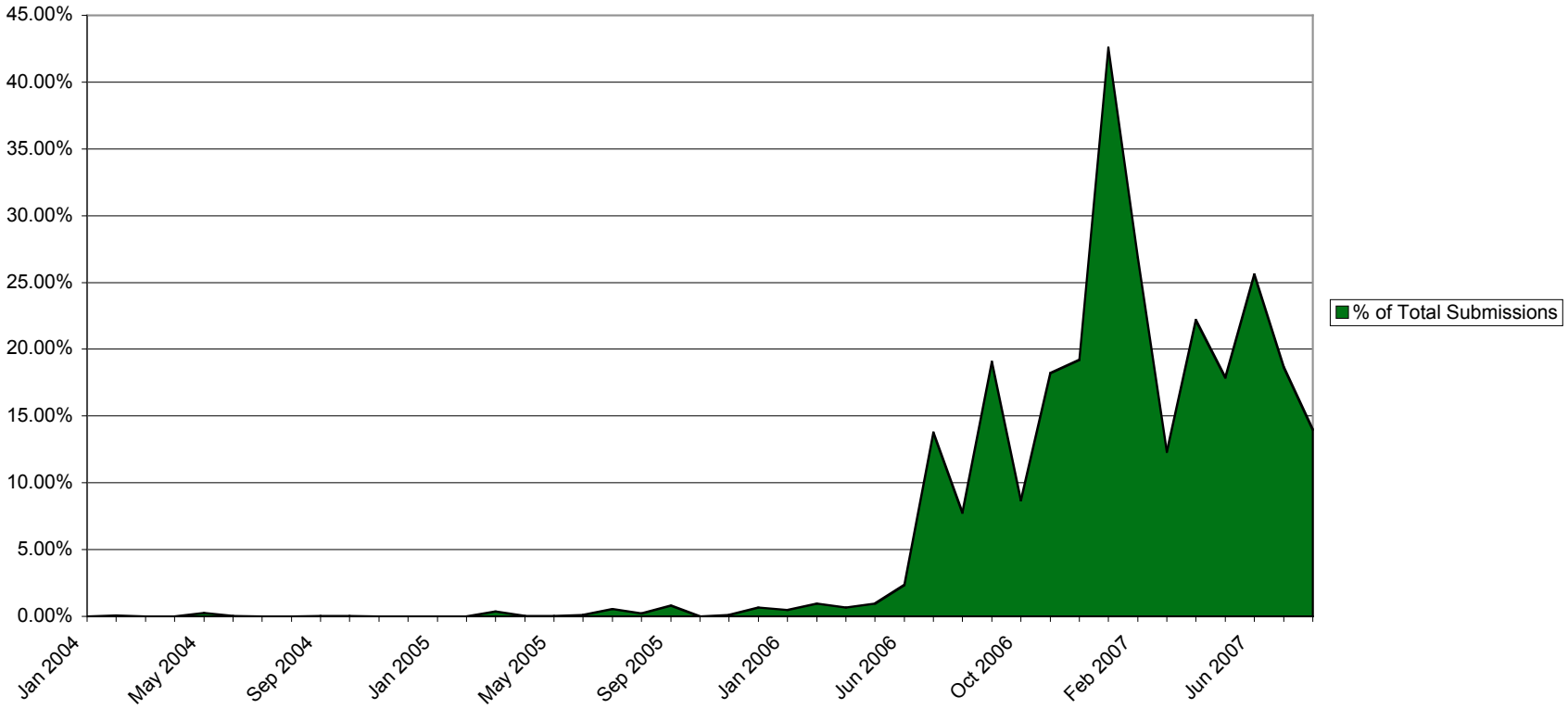
G ame

MMORPG subscription growth 1998 - 2007



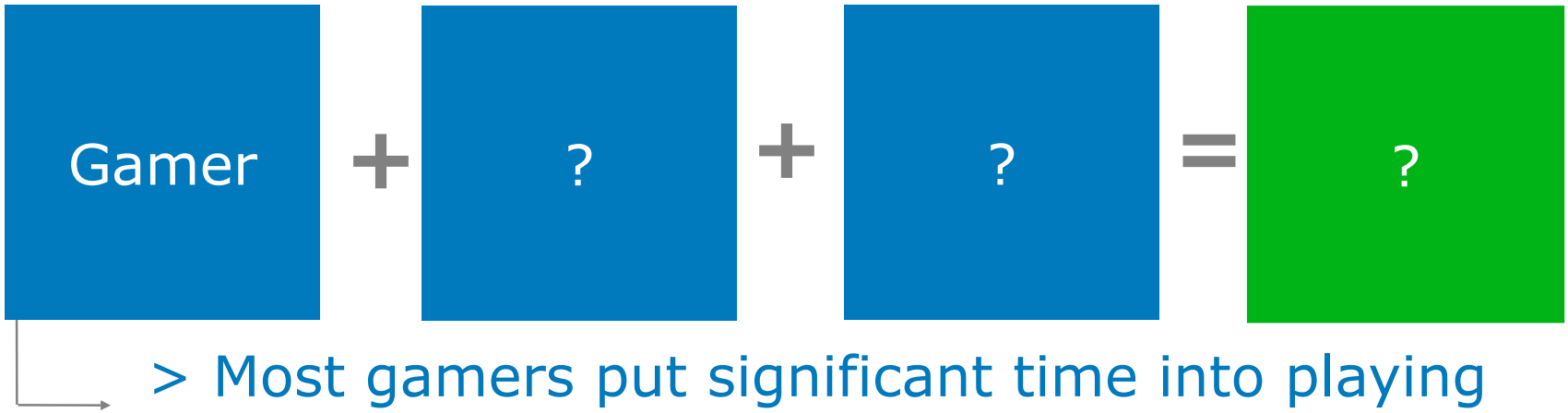
Source: http://mmogdata.voig.com

Game-targeting malware growth 2004 - 2007



Source: CA Anti-Virus Research Labs

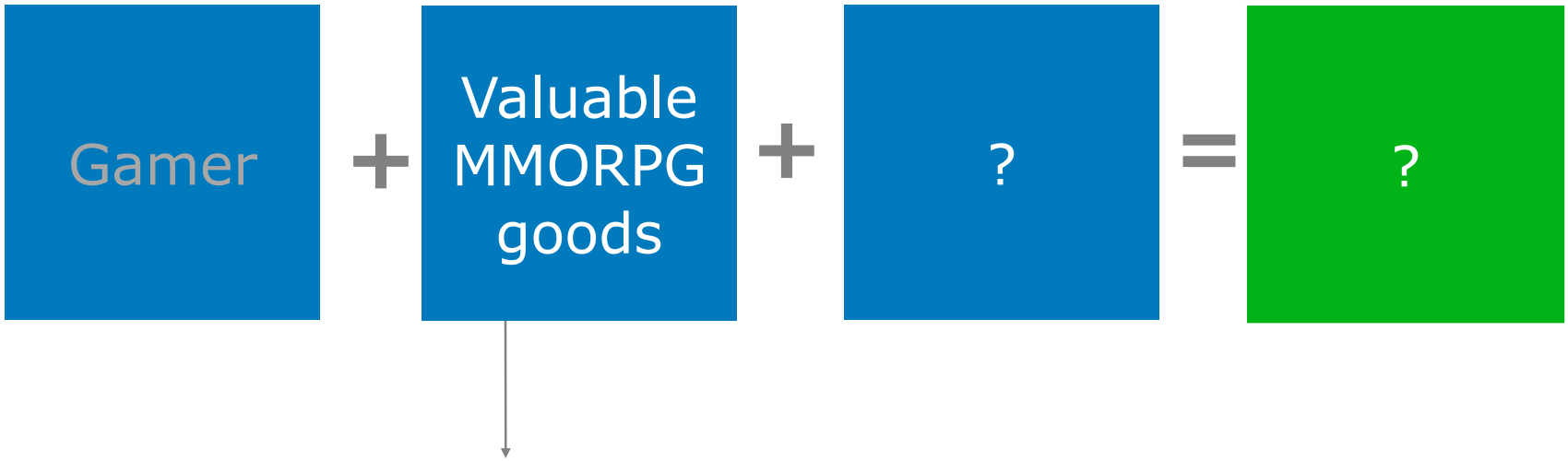
You haven't told me what a gamer is!



> Most gamers put significant time into playing an MMORPG and related activities

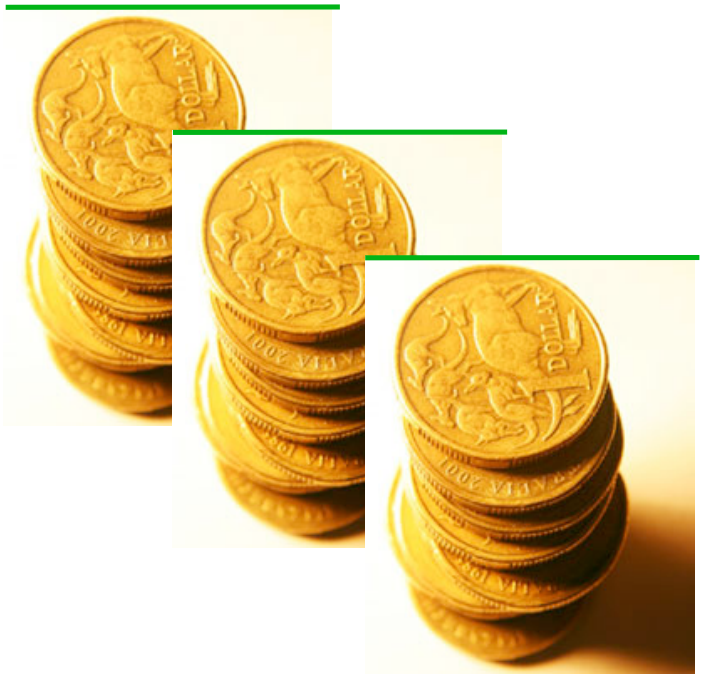
- In-game: collecting currency, buying supplies, training in a trade, building skills, establishing friendly connections
- Out-game: visiting forums, gamer websites, developer websites

Virtual goods bought with real money!



> The crossover of virtual and real economies

Currency selling for…



WoW	100 Gold = US$12.82
Lineage II	30 Million Adena = US$16.55
EverQuest	20 Platinum = US$24.86

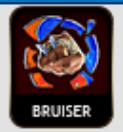
Rates retrieved August 2007

Accounts selling for…

Final Fantasy XI – Red Mage, US$1299

75		 Red Mage	Midgardsormr	Not Ranked View Gear	75 Female Mithra Summoner/75 White Mage/75 Black Mage/75 Red Mage! All Avatars, Zil/Prom Complete! 700K Gil & More!	$1299	BUY NOW

EverQuest II – Bruiser, US$699

70		 Bruiser	Befallen (evil)	Not Ranked View Gear	70 Male Dark Elf Bruiser / 55 Tailor With Awesome Gear, Tons of Fabled & A 60 Barbarian Warrior!	$699	BUY NOW

World of Warcraft – Mage, US$1199

70		 Mage	 Ysera US (Normal)	★★★★½ View Gear	✶ Level 70 Undead Mage With Awesome Gear, Mixed Epic & Rare Items, EPIC NETHERRAY & NETHERDRAKE & Tons Of Extras! MUST HAVE! ✶ Includes A Level 63 Rogue!	$1199	BUY NOW

Example rates retrieved from http://www.accounts.net, September 2007

Known as the Real Money Trade (RMT)

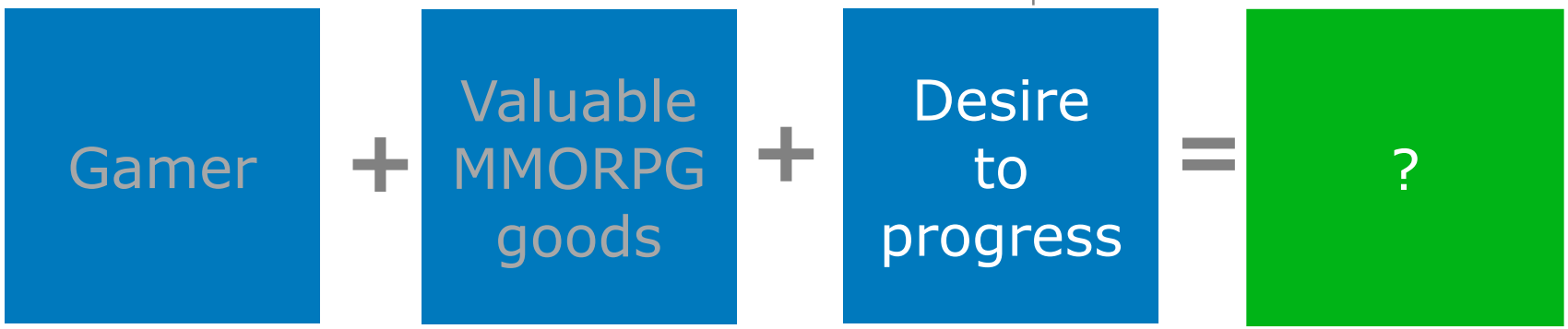
> RMT refers to exchange of real money for virtual goods

> Malware authors, highly motivated by the opportunity to profit, use malware to obtain stolen accounts and goods that can then be resold for real profit

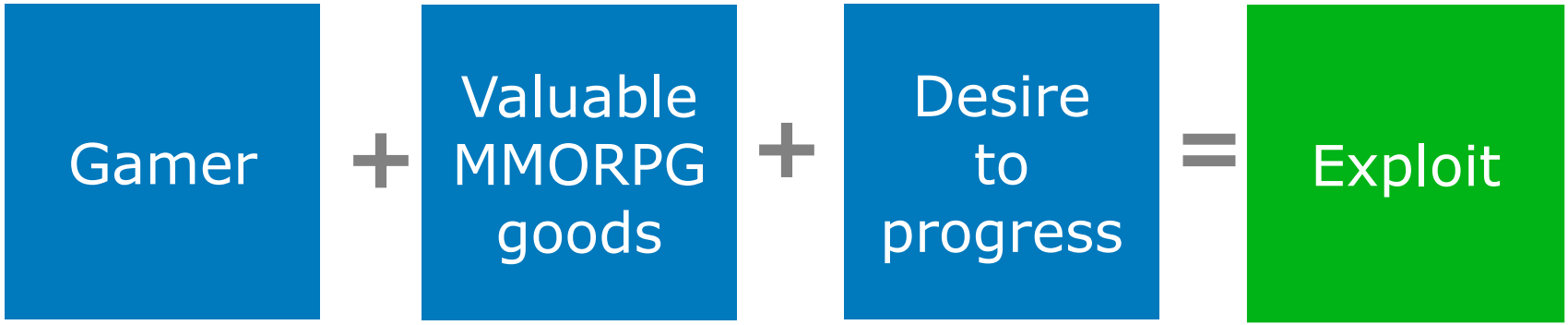
What do gamers really want?

> MMORPGs typically offer gamers a "rags-to-riches" experience

> *"Getting a bunch of characters to 70 is a pain. Getting money to equip them is a pain… We use the Glider to skip the painful parts and have more fun. "* MMO Glider website



So far, this is interesting but not security relevant…



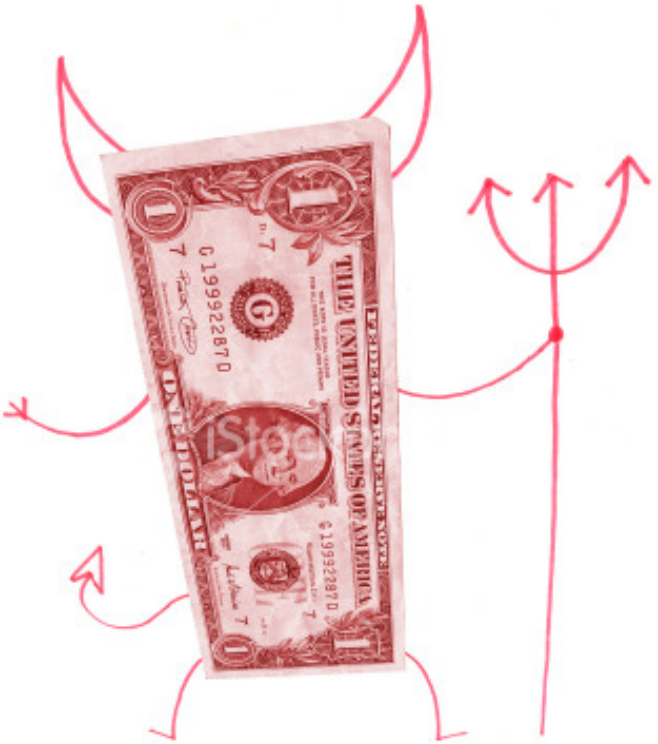
> This is the point where the financially motivated malware author can prey on and exploit a gamer's desire to progress in the game with less manual effort

What's in it for a malware author?

Money

> Malware authors almost strictly profit-motivated

> More than 30 million estimated MMORPG subscribers regularly spending money on access to virtual worlds



Just money or something else too?

Notoriety

Revenge

Fun

> Emerleox (alias Fujacks) malware author told various sources he wanted to have some fun and also wanted revenge on IT organisations who did not hire him

> (He also sold Emerleox and variants to 12 people, earning US$12,500)

Using the user

> Social engineering enables an attacker to manipulate users

> Different traps laid to catch users of various abilities, from the novice to the savvy

No patch, no trust

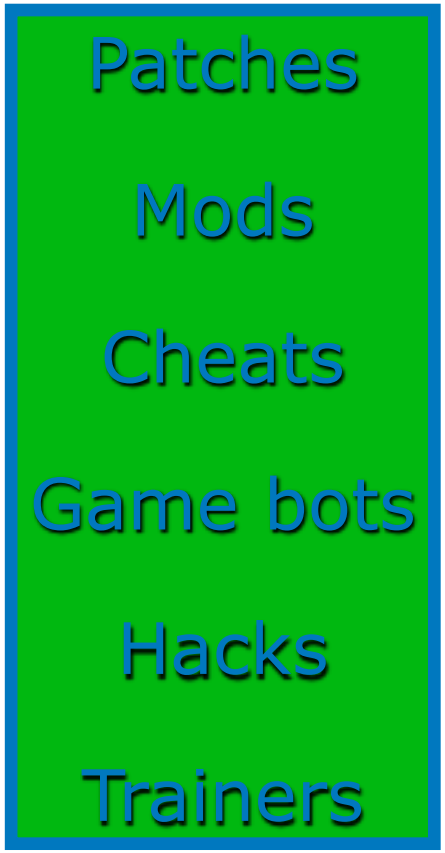
> Hacking into websites and planting malicious code is a common way malware writers deliver game targeting malware to systems

> Using techniques such as SQL injection, exploit code or links to exploit-ridden websites can be inserted into the main pages of these compromised sites

What you see is not what you get

> Malware can be disguised as legitimate programs or third party applications

> Luring the oblivious, the curious, and the ambitious



Fooling the gamer

> Downloaded from unofficial gaming websites and/or fraudulent websites

> Downloaded via links posted on gaming forums

> Circulated through in-game chat and through emails

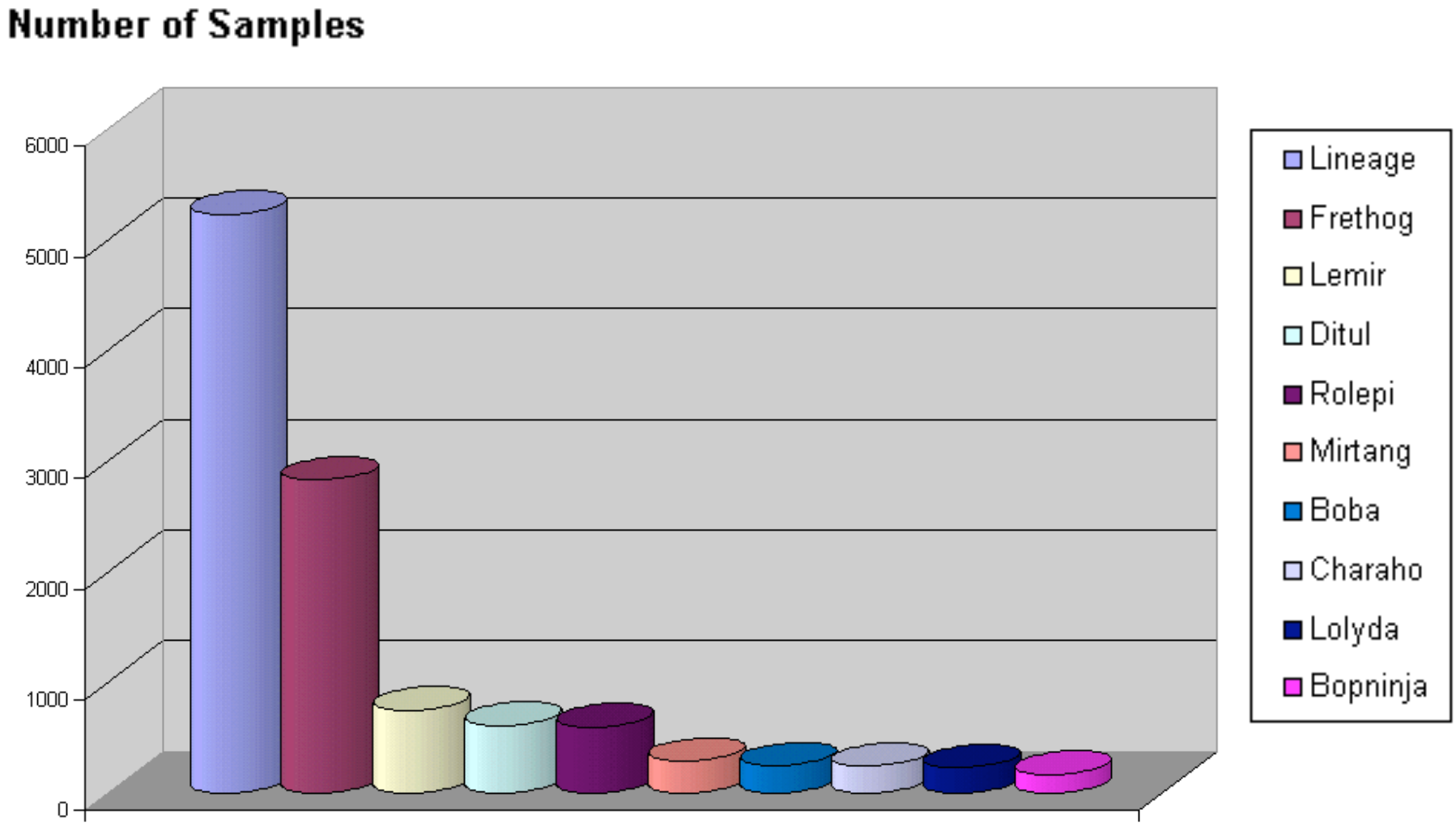
Fraudulent Nokia site Source: http://www.websense.com/securitylabs/alerts/alert.php?AlertID=441

What about the malware itself?

> CA Anti-Virus Research labs have classified over 45 different malware families that target MMORPGs

> 80% of these are information stealing trojans that contain keylogging and/or data gathering capabilities

Game information stealing trojans
Top Ten families



Face the facts

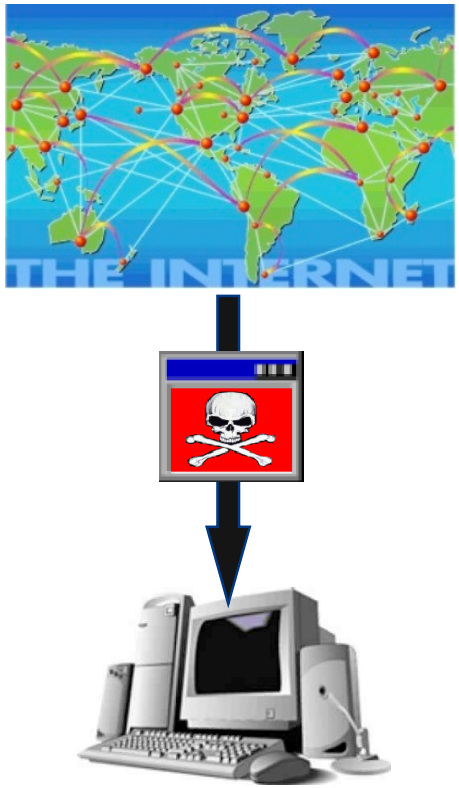
> Three of the most targetted MMORPGs are Lineage II, Legend of Mir II and World of Warcraft

> Win32/Lemir was one of the earliest game information stealing trojan families to emerge

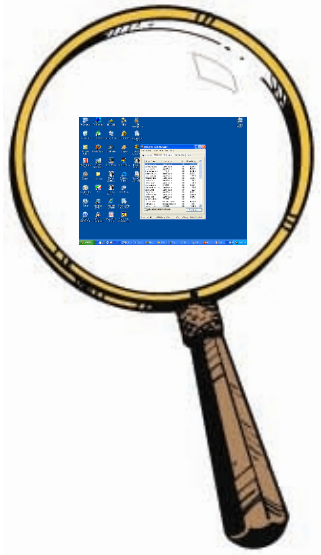
> Many of these trojans originate from China

> No coincidence that many MMORPGs originate from and are extremely popular in East Asia

What game do these trojans play?



Downloaded onto system



System activity monitored

Game information logged

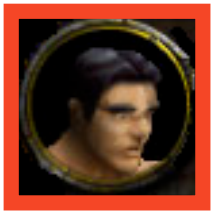
Information dispatched

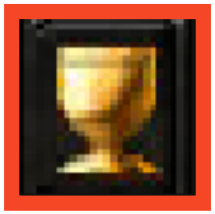
What information is logged?

> Username and password

> In-game information

Level	Currency	Role
Occupation	Server name	Location
Character	Equipment	Items



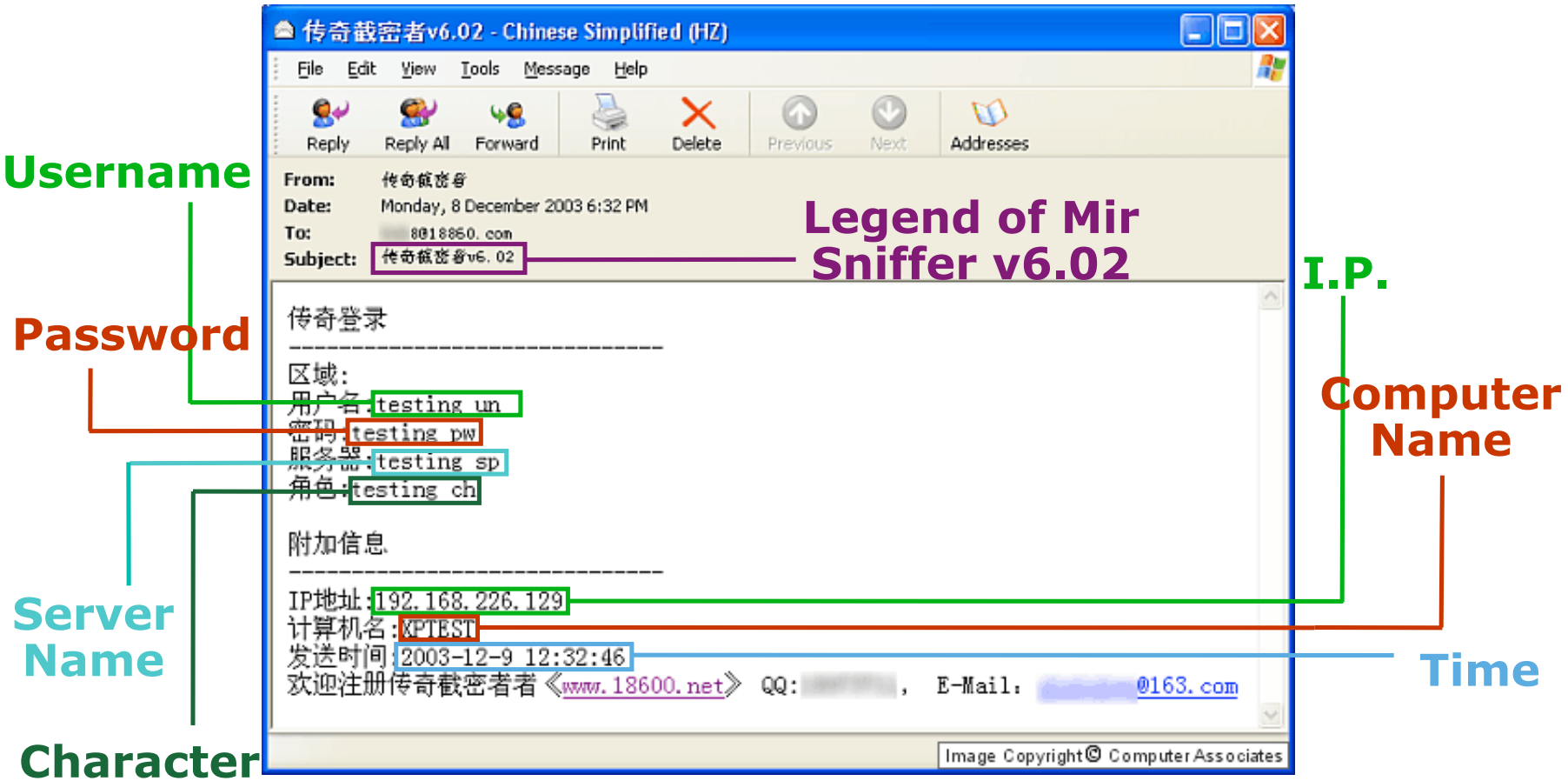



Sending the information to the author

> Gathered information can be stored in a log file on local machine
  - Attached to an email and sent to a pre-determined email address
  - Uploaded to a web server via HTTP

> Malware can construct a specially crafted URL containing stolen information
  - Posted to a web server to be processed by a server side script

Dispatching the information



Casting a wider net

> Traditional file infectors and worms have been used by malware authors to compromise further systems

> Win32/Looked and Win32/Emerleox (alias Fujacks) are among the more widespread file-infecting worms found in the wild in late 2006, early 2007

> Both capable of spreading through network shares and downloading game information stealing trojans onto compromised systems

Win32/Emerleox (alias Fujacks)

> Contains multiple avenues of attack

- Infects executables (exe, scr, pif, com)
- Appends IFRAME to scripts (html, htm, asp, php) that points to a malicious website
- Spreads through network shares and removable drives
- Downloads file containing list of URLs that point to other malware (including updates of the worm or game information stealing trojans)

Win32/Looked

> Similar to Emerleox, it infects executables and spreads through network shares

> Downloads a large number of game information stealing trojans onto a system

> Some variants have been observed to download up to 20 trojans onto a system

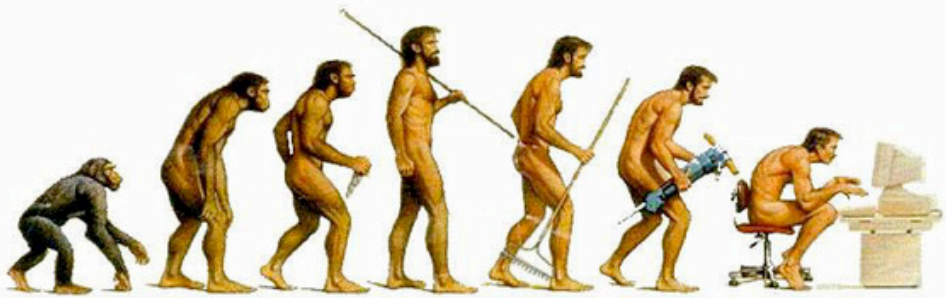
> Downloaded trojans include game information stealing trojans that target various MMORPGs such as World of Warcraft, Lineage, Legend of Mir, Zero Online, Ultima Online

How they have evolved

> Self-replicating, file infecting, downloading

> Use of encryptors and packers

> Use of process injection to obfuscate activity



Do we know how to keep gamers and their machines safe?

> Role of:

- Game developers
- Gaming community
- Anti-Virus Industry

Conclusion

> Game targeting malware has caused strife to gamers and game developers alike

> Game targeting malware will continue to cause havoc as long as the popularity of MMORPGs remains high

> If there is demand, malware authors will deliver



Questions?

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