Growth and Commoditization of Remote Access Trojans

Veronica Valeros & Sebastian Garcia

Stratosphere Research Laboratory

Czech Technical University in Prague

REMOTE ACCESS SOFTWARE

A type of computer program that allows an individual to have **full remote control** of the device where the software is installed.

REMOTE ACCESS TROJAN

CONSENT

Installation **without** user consent

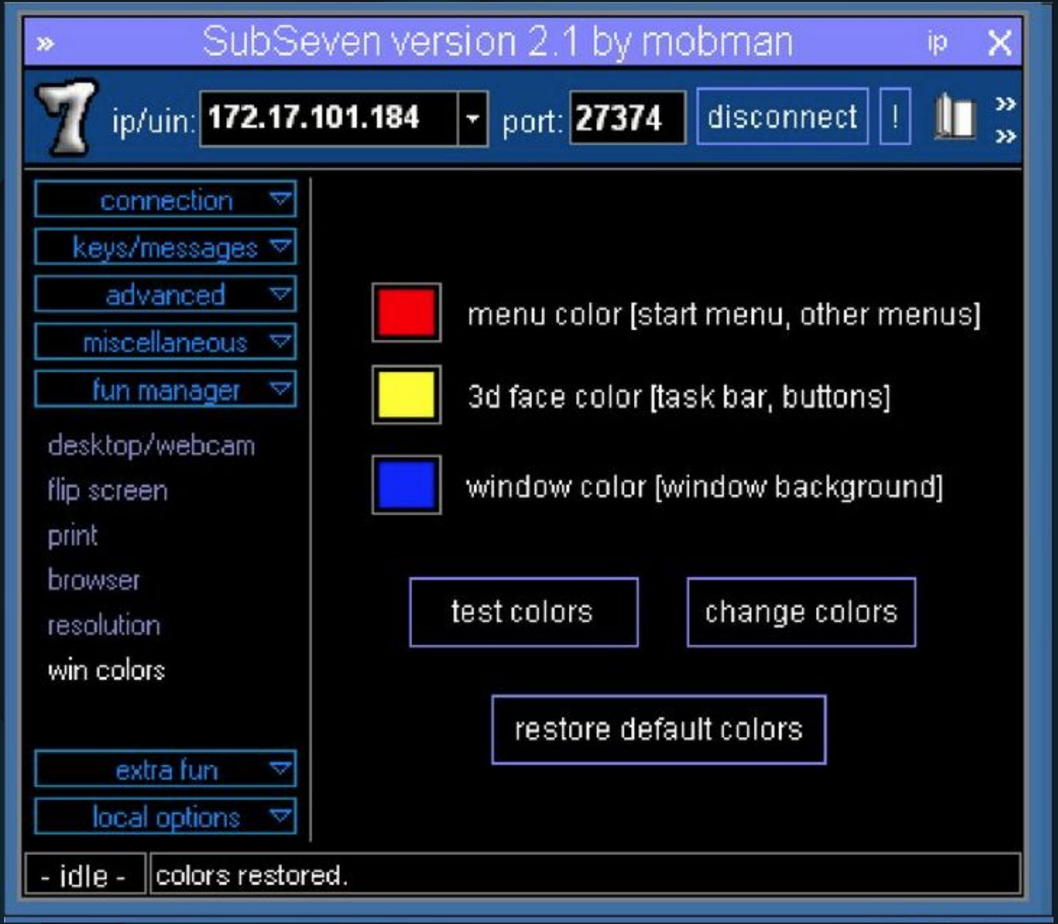
CONTROL

Remote control is performed **secretly**

EVASION

Hiding in the system to **avoid detection**

Sub7 1999



SubSeven version 2.1 by mobman

ip/uin: 172.17.101.184 port: 27374

🟥 menu color [start menu, other menus]

🟨 3d face color [task bar, buttons]

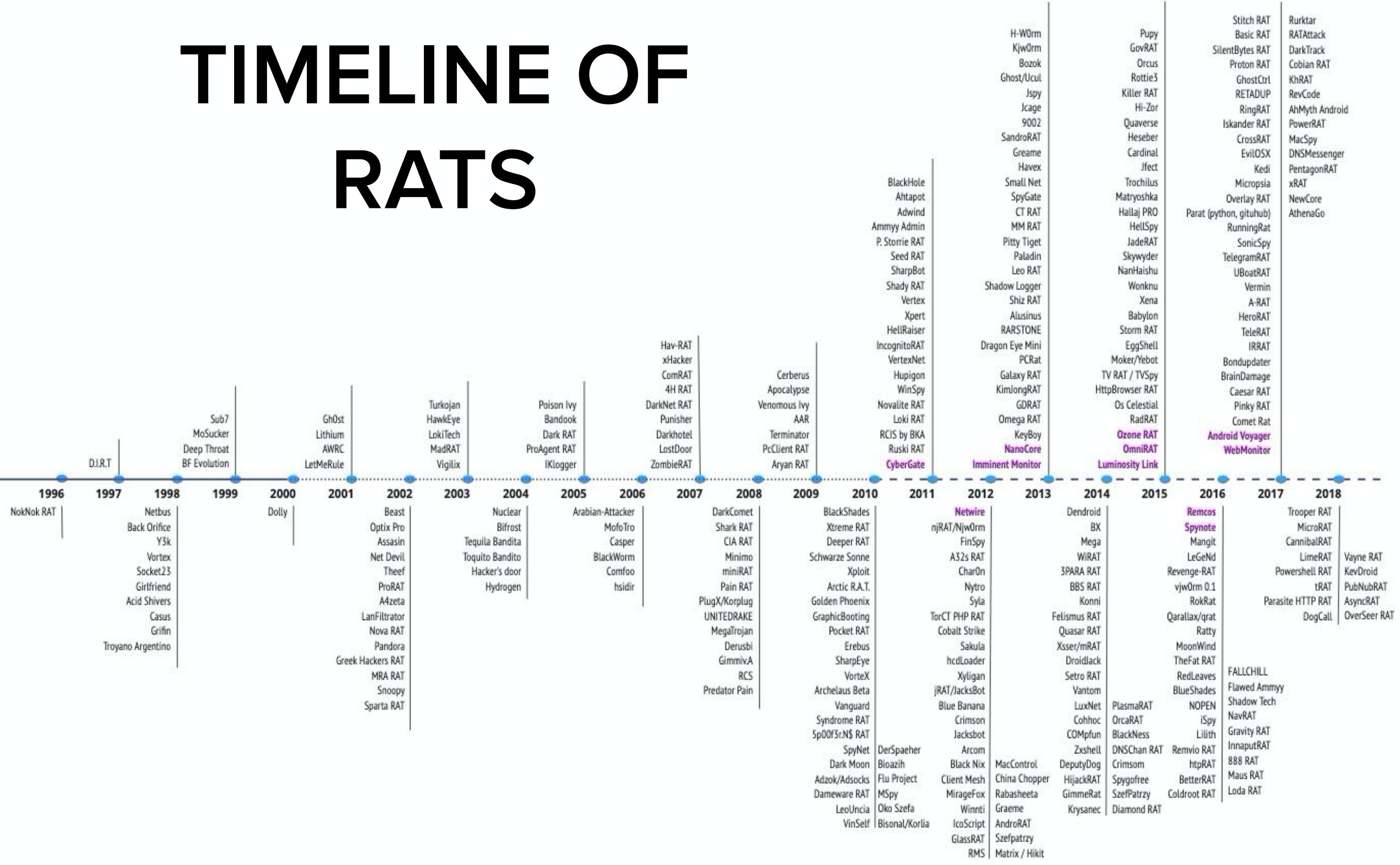
🟦 window color [window background]

- idle - colors restored.

What happened in the last 30 years?

- We collected, investigated, and built a corpus of the most well-known RATs in history.
- RATs are grouped in families, with slight variations of the same RATs grouped together.
- Found, referenced, and documented 337 unique families of RATs.

TIMELINE OF RATS



NokNok RAT

D.I.R.T

Netbus
Back Orifice
Y3k
Vortex
Socket23
Girlfriend
Acid Shivers
Casus
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Troyano Argentino

Sub7
MoSucker
Deep Throat
BF Evolution

Dolly

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Lithium
AWRC
LetMeRule

Beast
Optix Pro
Assasin
Net Devil
Theef
ProRAT
A4zeta
LanFiltrator
Nova RAT
Pandora
Greek Hackers RAT
MRA RAT
Snoopy
Sparta RAT

Turkojan
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Arabian-Attacker
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Comfoo
hsidir

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Dendroid
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Crimsom
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Pupy
GovRAT
Orcus
Rottie3
Killer RAT
Hi-Zor
Quaverse
Heseber
Cardinal
Jfect
Trochilus
Matryoshka
Hallaj PRO
HellSpy
JadeRAT
Skywyder
NanHaishu
Wonknu
Xena
Babylon
Storm RAT
EggShell
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Os Celestial
RadRAT
Ozone RAT
OmniRAT
Luminosity Link

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Spynote
Mangit
LeGeNd
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PubNubRAT
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OverSeer RAT

Rurktar
RATAttack
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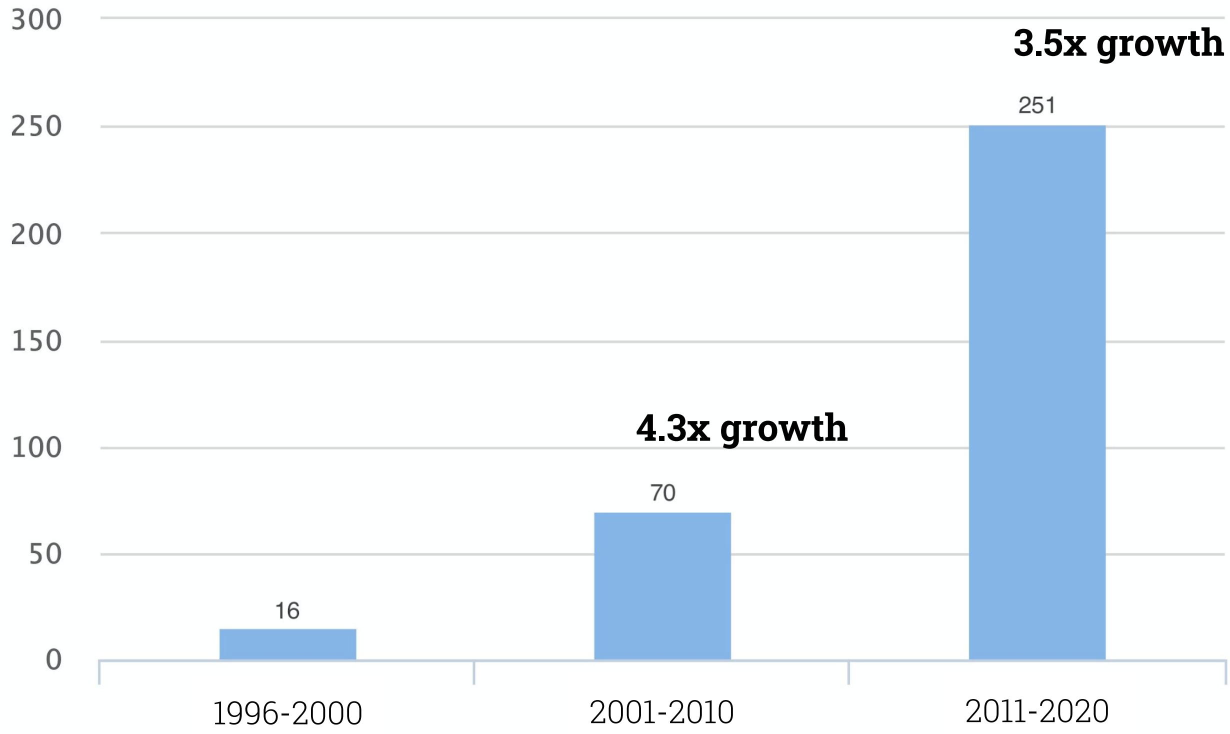
RevCode
AhMyth Android
PowerRAT
MacSpy
DNSMessenger
PentagonRAT
xRAT
NewCore
AthenaGo


300
250
200
150
100
50
0
3.5x growth
251
4.3x growth
70
16
1996-2000
2001-2010
2011-2020

1996-2000

Phase 1

2001-2010

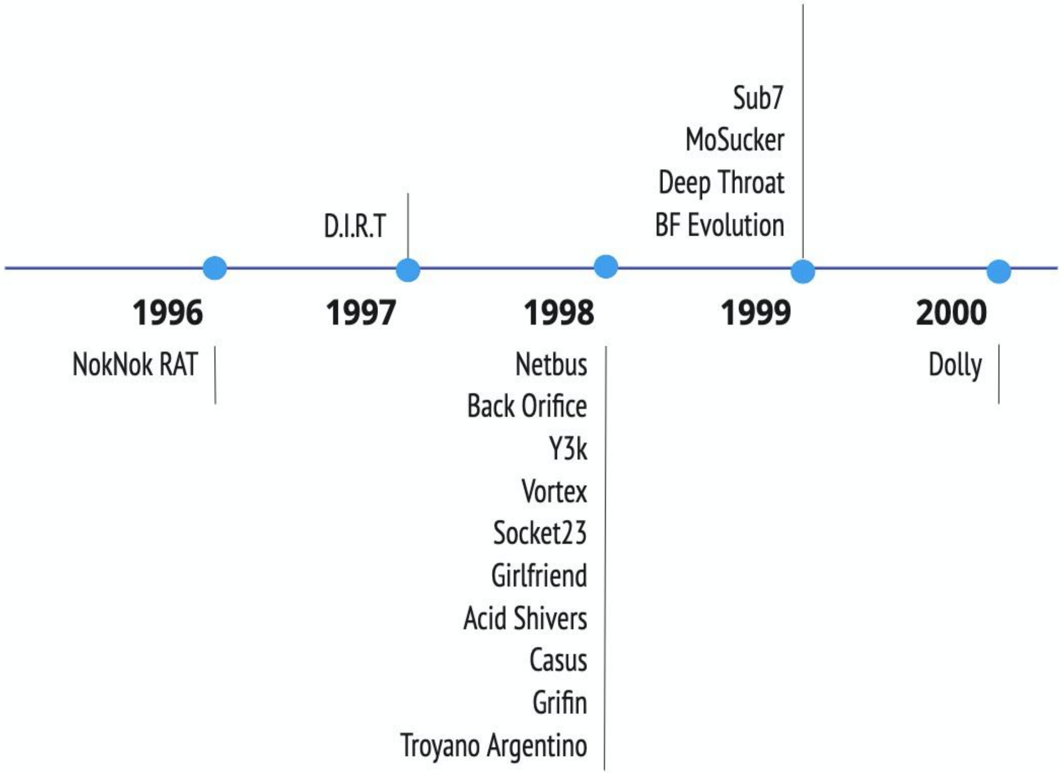
Phase 2

2011-2020

Phase 3

PHASE
01

1996-2000



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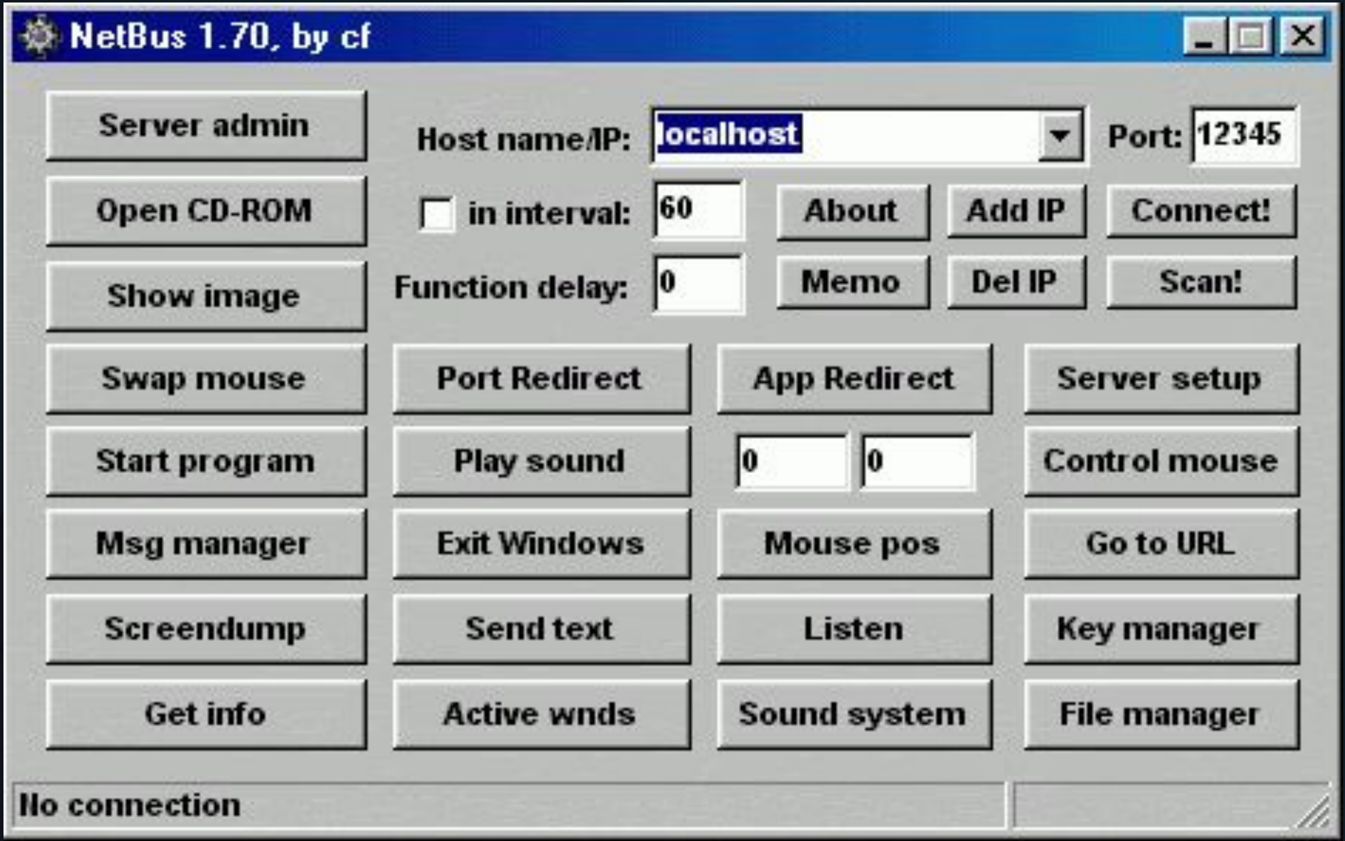
Dolly

NetBus
RAT 1999



NetBus 1.70, by cf

Host name/IP: localhost

Port: 12345

□ in interval: 60

Function delay: 0

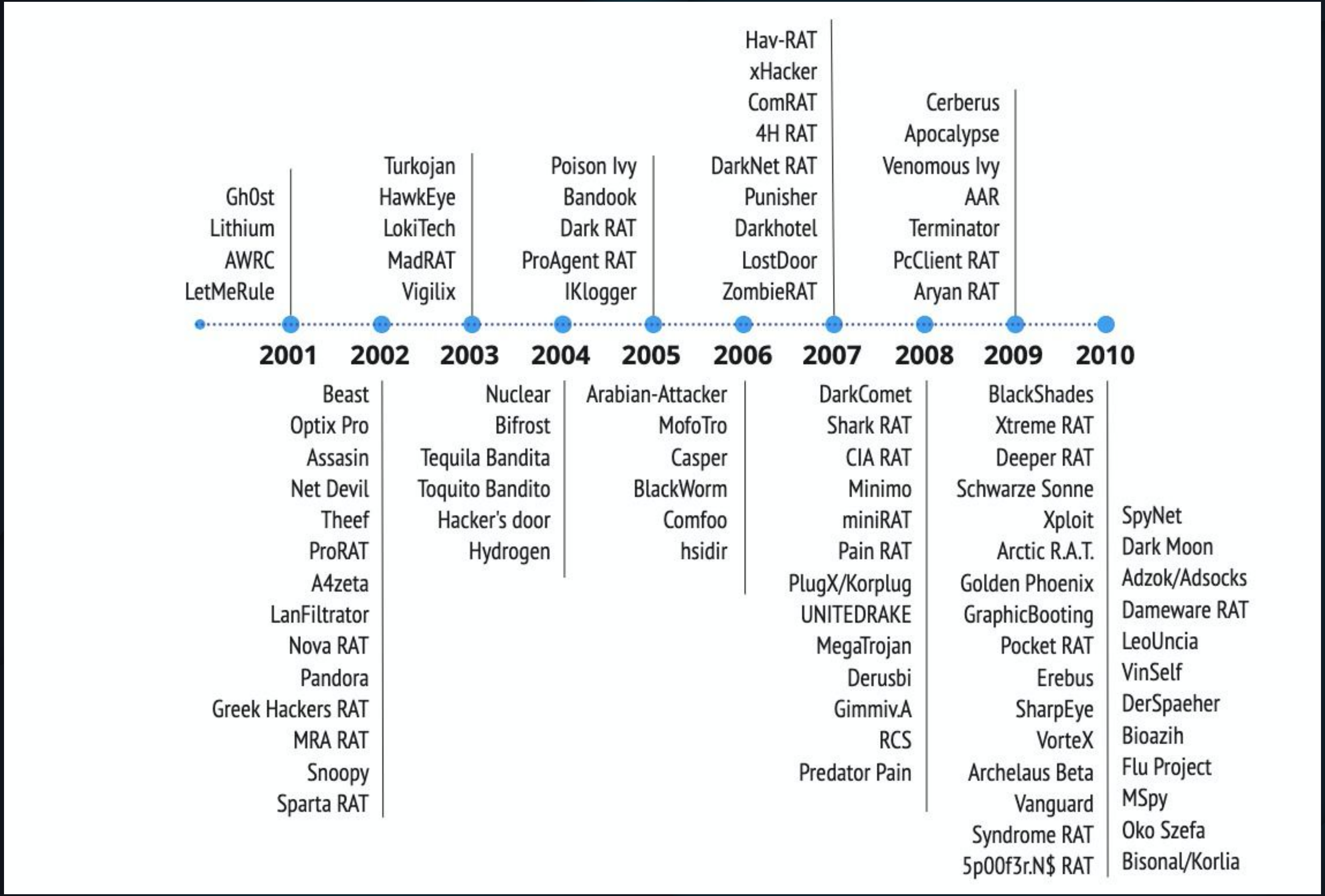
0 0

No connection

- The era of homemade RATs, for fun and amusement.
- Developers and operators were the same actor.
- Among the most prominent ones were Back Orifice, Sub7 and Netbus.
- Together they defined a generation by being innovative and disruptive.

PHASE
02

2001-2010



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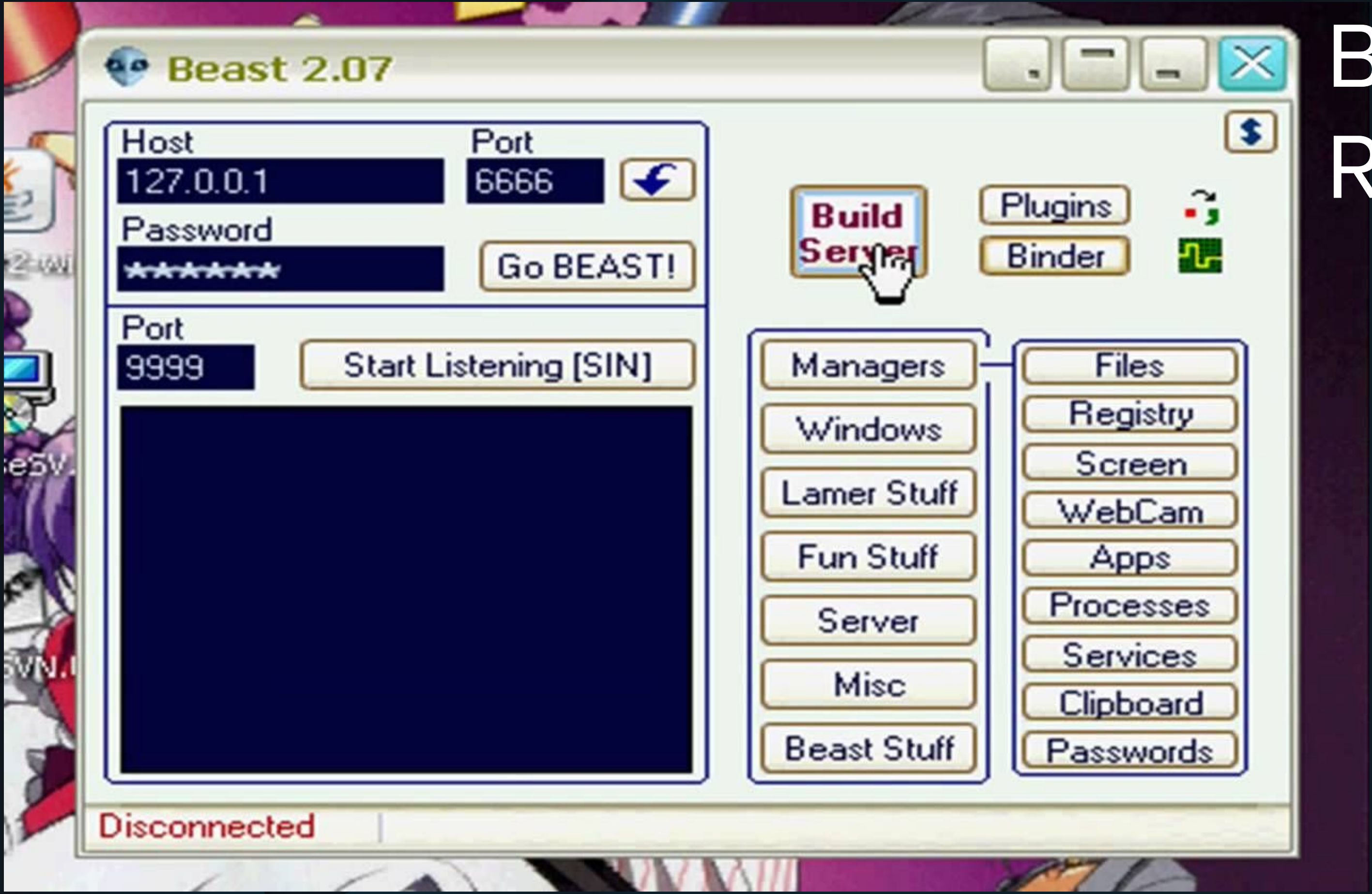
Beast
RAT 2002



Host 127.0.0.1

Port 6666

Password *******

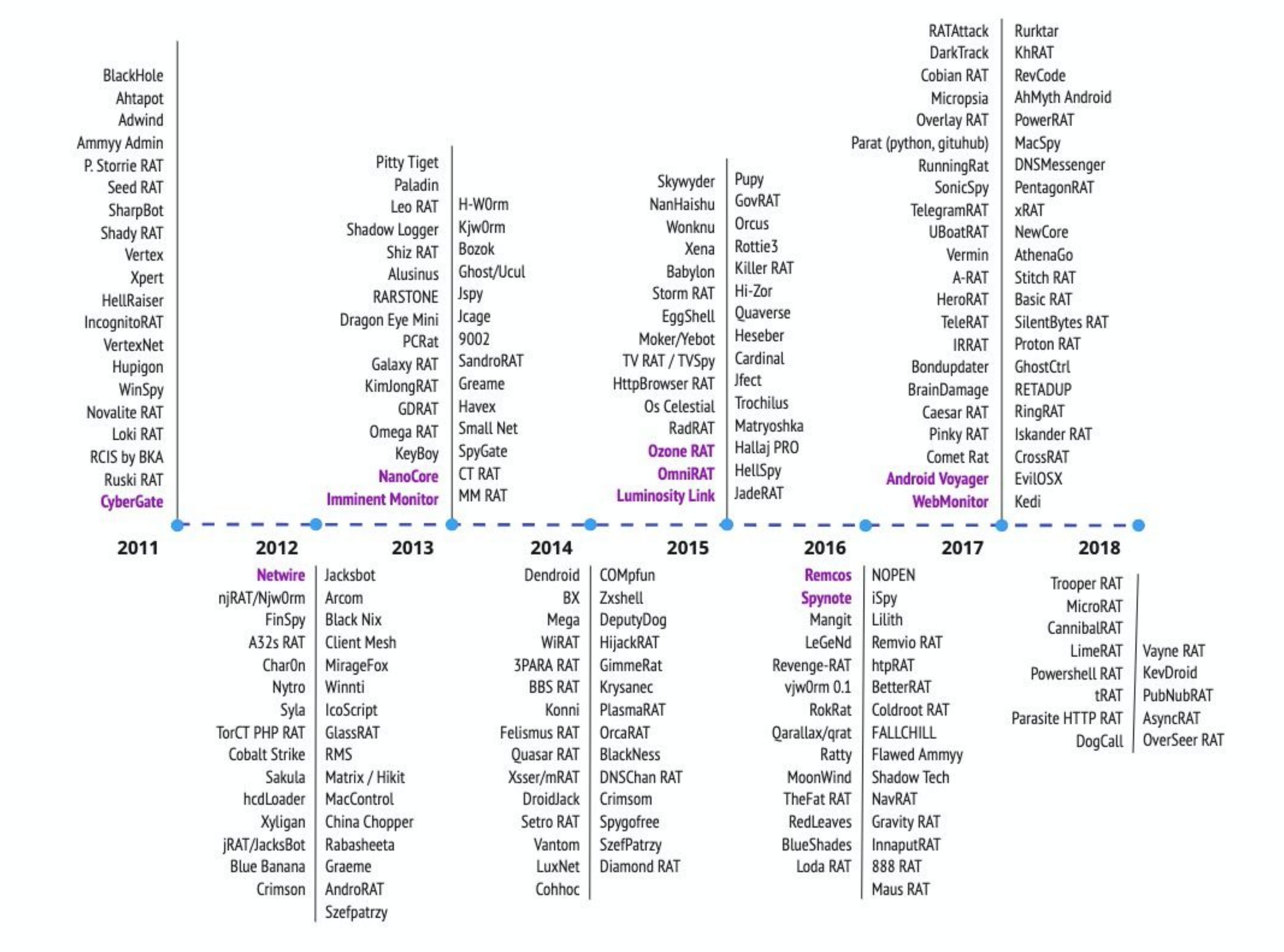
Port 9999

Disconnected

- RATs started to be used for attacks and for profit.
- Developers and operators are now different actors.
- Among the highlights of this period are Gh0st, PoisonIvy and DarkComet.
- The market started to mature.

PHASE 03

2011-2020



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CrossRAT
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2011 2012 2013 2014 2015 2016 2017 2018

Netwire
njRAT/Njw0rm
FinSpy
A32s RAT
Char0n
Nytro
Syla
TorCT PHP RAT
Cobalt Strike
Sakula
hcdLoader
Xyligan
jRAT/JacksBot
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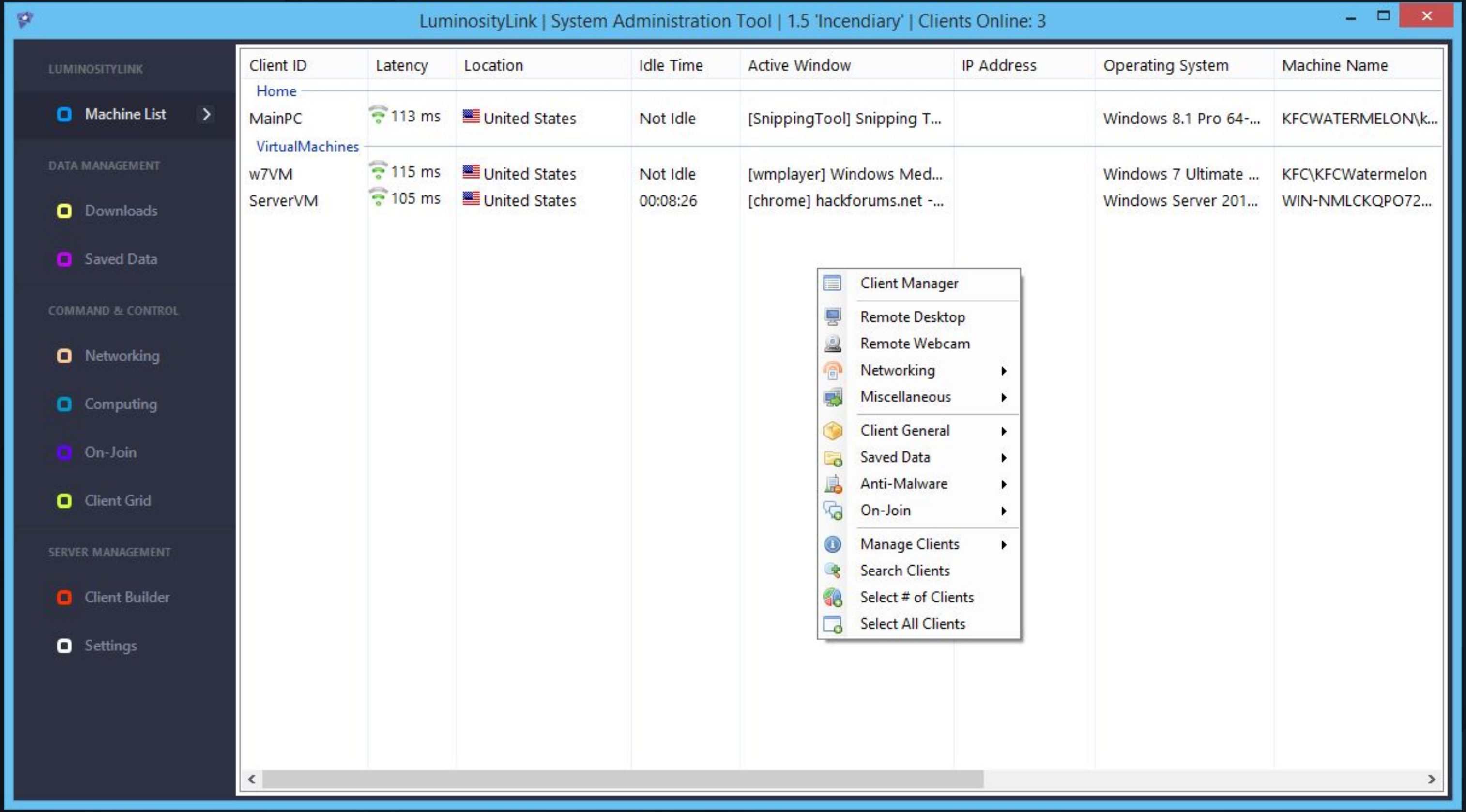
Luminosity RAT 2015

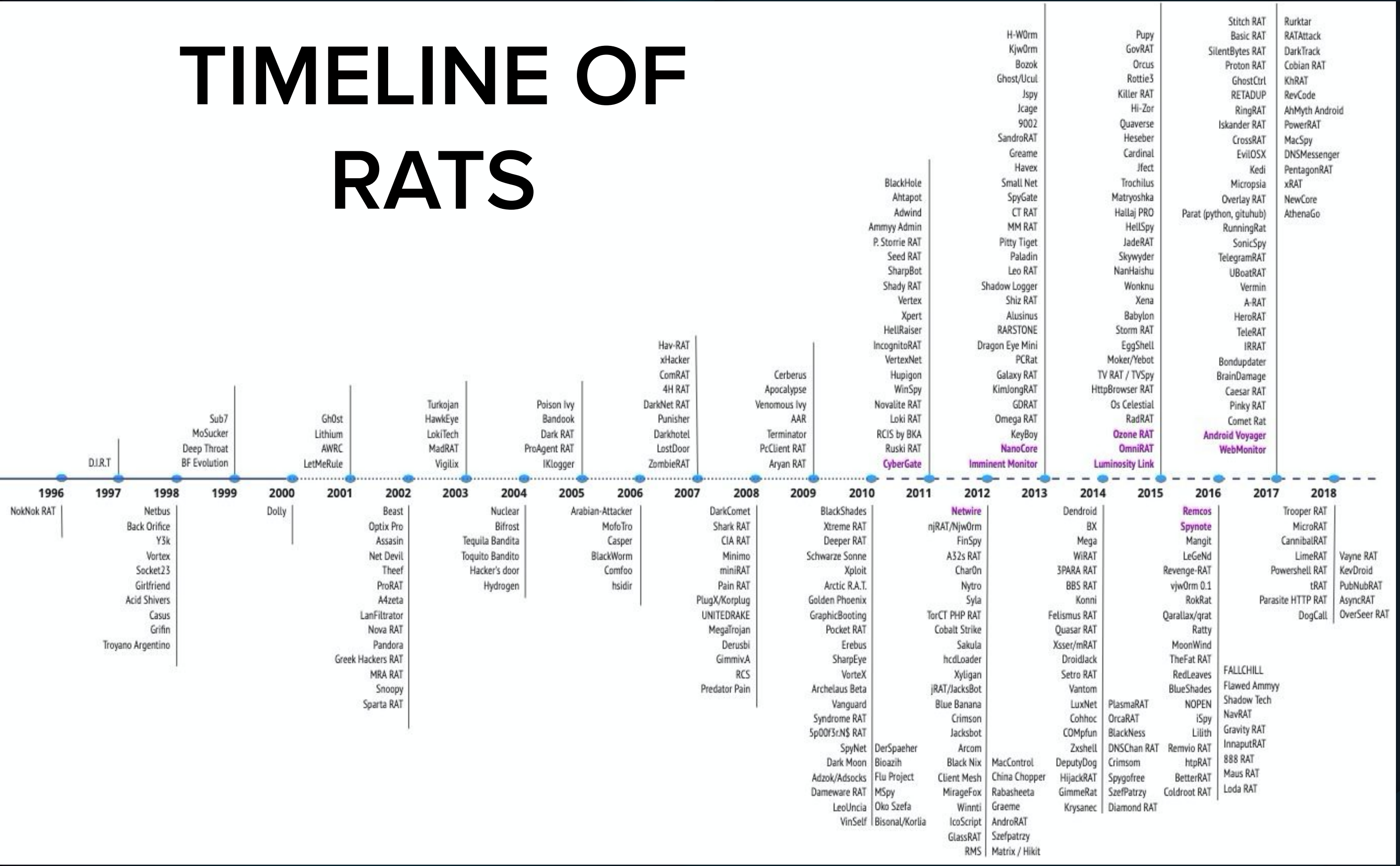


LuminosityLink | System Administration Tool | 1.5 'Incendiary' | Clients Online: 3

Client ID	Latency	Location	Idle Time	Active Window	IP Address	Operating System	Machine Name
Home							
MainPC	113 ms	United States	Not Idle	[SnippingTool] Snipping T...		Windows 8.1 Pro 64-...	KFCWATERMELON\k...
VirtualMachines							
w7VM	115 ms	United States	Not Idle	[wmplayer] Windows Med...		Windows 7 Ultimate ...	KFC\KFCWatermelon
ServerVM	105 ms	United States	00:08:26	[chrome] hackforums.net -...		Windows Server 201...	WIN-NMLCKQPO72...

- Multi-tiered operators driving the market of RATs.
- Developers became **entrepreneurs**.
- Among the highlights of this period are NanoCore, NjRAT, and Imminent Monitor
- Sellers provide **support**, new features, and **host** part of the infrastructure.

TIMELINE OF RATS



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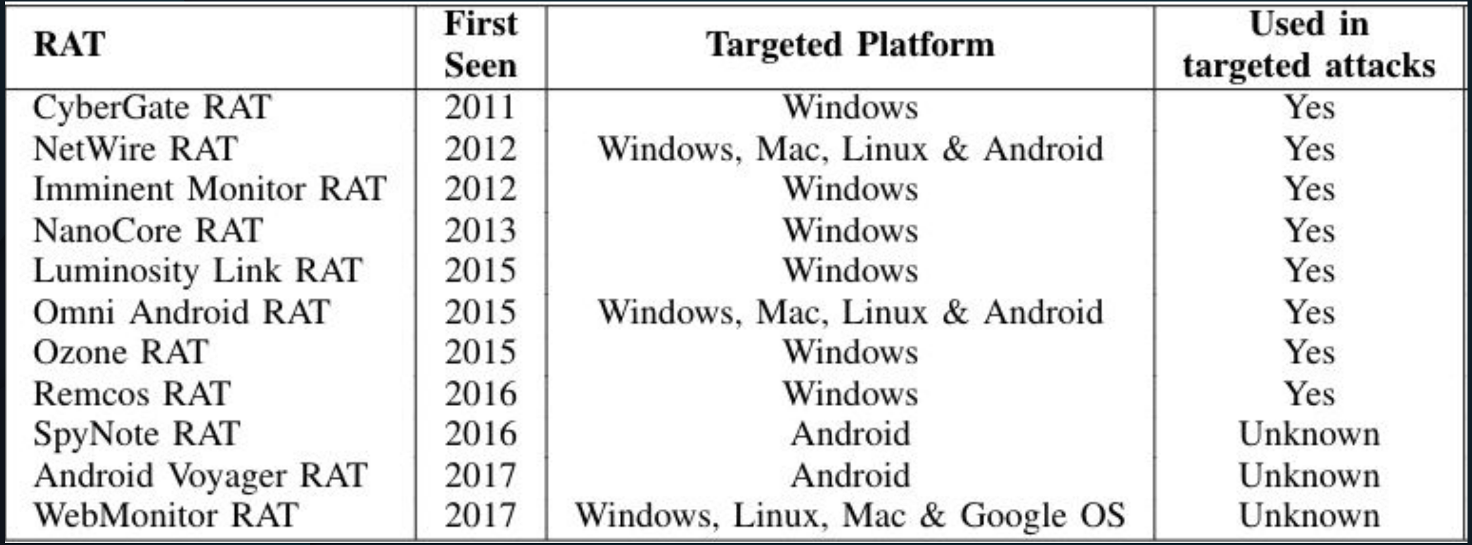
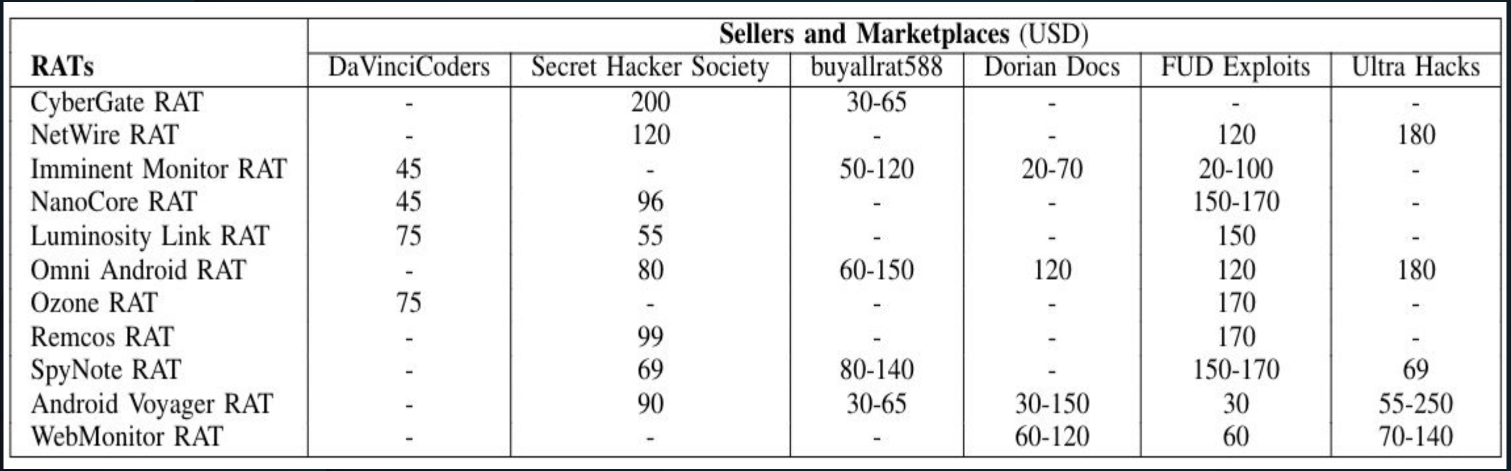
RATs in Markets

Eleven of the most common RATs in 2019-2020



RAT	First Seen	Targeted Platform	Used in targeted attacks
CyberGate RAT	2011	Windows	Yes
NetWire RAT	2012	Windows, Mac, Linux & Android	Yes
Imminent Monitor RAT	2012	Windows	Yes
NanoCore RAT	2013	Windows	Yes
Luminosity Link RAT	2015	Windows	Yes
Omni Android RAT	2015	Windows, Mac, Linux & Android	Yes
Ozone RAT	2015	Windows	Yes
Remcos RAT	2016	Windows	Yes
SpyNote RAT	2016	Android	Unknown
Android Voyager RAT	2017	Android	Unknown
WebMonitor RAT	2017	Windows, Linux, Mac & Google OS	Unknown

Commercialized prices of RATs in online marketplaces



RATs	Sellers and Marketplaces (USD)					
	DaVinciCoders	Secret Hacker Society	buyallrat588	Dorian Docs	FUD Exploits	Ultra Hacks
CyberGate RAT	-	200	30-65	-	-	-
NetWire RAT	-	120	-	-	120	180
Imminent Monitor RAT	45	-	50-120	20-70	20-100	-
NanoCore RAT	45	96	-	-	150-170	-
Luminosity Link RAT	75	55	-	-	150	-
Omni Android RAT	-	80	60-150	120	120	180
Ozone RAT	75	-	-	-	170	-
Remcos RAT	-	99	-	-	170	-
SpyNote RAT	-	69	80-140	-	150-170	69
Android Voyager RAT	-	90	30-65	30-150	30	55-250
WebMonitor RAT	-	-	-	60-120	60	70-140

BUILDER

CRYPTER

PLUGINS

Commoditization of RATs

But why?
Who is buying all these?

- Business Email Compromise
- Cyber espionage
- Targeted Attacks
- Stalkerware

RATs are essential for any type of cybercriminal activity

Where are the RATs going?

Veronica Valeros

veronica.valeros@aic.fel.cvut.cz

@verovaleros

Sebastian Garcia

sebastian.garcia@agents.fel.cvut.cz

@eldracote

THANKS!

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