

JOeSandbox Cloud BASIC



ID: 830824

Sample Name: moP8vO1r5x.elf

Cookbook:

defaultlinuxfilecookbook.jbs

Time: 18:07:58

Date: 20/03/2023

Version: 37.0.0 Beryl

Table of Contents

Table of Contents	2
Linux Analysis Report moP8vO1r5x.elf	3
Overview	3
General Information	3
Detection	3
Signatures	3
Classification	3
Analysis Advice	3
General Information	3
Runtime Messages	3
Process Tree	4
Malware Threat Intel	4
Yara Signatures	4
Initial Sample	4
Memory Dumps	5
Snort Signatures	7
Joe Sandbox Signatures	7
AV Detection	7
System Summary	7
Stealing of Sensitive Information	7
Remote Access Functionality	7
Mitre Att&ck Matrix	7
Malware Configuration	7
Behavior Graph	7
Antivirus, Machine Learning and Genetic Malware Detection	8
Initial Sample	8
Dropped Files	8
Domains	8
URLs	8
Domains and IPs	8
Contacted Domains	8
URLs from Memory and Binaries	9
World Map of Contacted IPs	9
Public IPs	9
Joe Sandbox View / Context	9
IPs	9
Domains	9
ASNs	9
JA3 Fingerprints	9
Dropped Files	9
Created / dropped Files	10
Static File Info	10
General	10
Static ELF Info	10
ELF header	10
Sections	10
Program Segments	11
Network Behavior	11
Network Port Distribution	11
TCP Packets	11
System Behavior	11
Analysis Process: moP8vO1r5x.elf PID: 6225, Parent PID: 6121	11
General	11
File Activities	11
File Read	11

Linux Analysis Report

moP8v01r5x.elf

Overview

General Information

Sample Name:	moP8v01r5x.elf
Original Sample Name:	4ec4de6b5d0ff...
Analysis ID:	830824
MD5:	4ec4de6b5d0ff...
SHA1:	c82bb1838562...
SHA256:	d7af252edb2ce..
Tags:	32 arm elf mirai
Infos:	

Detection

MALICIOUS

SUSPICIOUS

CLEAN

UNKNOWN

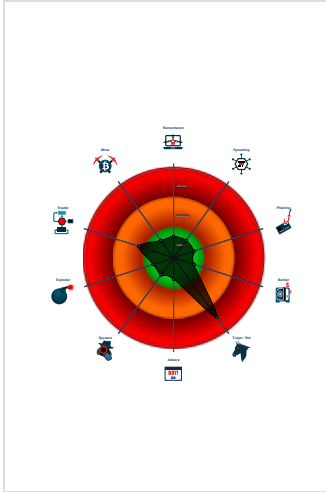
Mirai, Moobot

Score:	72
Range:	0 - 100
Whitelisted:	false

Signatures

- Malicious sample detected (through...
- Yara detected Mirai
- Multi AV Scanner detection for subm...
- Yara detected Moobot
- Yara signature match
- Sample has stripped symbol table
- Uses the "uname" system call to qu...
- Tries to connect to HTTP servers, b...
- Sample contains strings indicative o...

Classification



Analysis Advice

- Static ELF header machine description suggests that the sample might not execute correctly on this machine.
- Exit code information suggests that the sample terminated abnormally, try to lookup the sample's target architecture.
- All HTTP servers contacted by the sample do not answer. The sample is likely an old dropper which does no longer work.
- Non-zero exit code suggests an error during the execution. Lookup the error code for hints.
- Static ELF header machine description suggests that the sample might only run correctly on MIPS or ARM architectures.

General Information	
Joe Sandbox Version:	37.0.0 Beryl
Analysis ID:	830824
Start date and time:	2023-03-20 18:07:58 +01:00
Joe Sandbox Product:	CloudBasic
Overall analysis duration:	0h 6m 58s
Hypervisor based Inspection enabled:	false
Report type:	light
Cookbook file name:	defaultlinuxfilecookbook.jbs
Analysis system description:	Ubuntu Linux 20.04 x64 (Kernel 5.4.0-72, Firefox 91.0, Evince Document Viewer 3.36.10, LibreOffice 6.4.7.2, OpenJDK 11.0.11)
Analysis Mode:	default
Sample file name:	moP8v01r5x.elf
Original Sample Name:	4ec4de6b5d0ff9c80927a14e9ad1edbc.elf
Detection:	MAL
Classification:	mal72.troj.linELF@0/0@0/0

Runtime Messages	
Command:	/tmp/moP8v01r5x.elf
PID:	6225
Exit Code:	139
Exit Code Info:	SIGSEGV (11) Segmentation fault invalid memory reference

Killed:	False
Standard Output:	
Standard Error:	qemu: uncaught target signal 11 (Segmentation fault) - core dumped

Process Tree

- system is Inxubuntu20
- [moP8vO1r5x.elf](#) (PID: 6225, Parent: 6121, MD5: 5ebfcae4fe2471fcc5695c2394773ff1) Arguments: /tmp/moP8vO1r5x.elf
- cleanup

Malware Threat Intel

Provided by
malpedia

Name	Description	Attribution	Blogpost URLs	Link
Mirai	Mirai is one of the first significant botnets targeting exposed networking devices running Linux. Found in August 2016 by MalwareMustDie, its name means "future" in Japanese. Nowadays it targets a wide range of networked embedded devices such as IP cameras, home routers (many vendors involved), and other IoT devices. Since the source code was published on "Hack Forums" many variants of the Mirai family appeared, infecting mostly home networks all around the world.	No Attribution	http://osint.bambenekconsulting.com/feeds/http://www.simonrozes.com/2016/10/mirai-ddos-botnet-source-code-binary-analysis/ https://blog.malwaremustdie.org/2020/02/mmd-0065-2021-linuxmirai-fbot-re.html https://blog.netlab.360.com/another-lilin-dvr-0-day-being-used-to-spread-mirai-en/ https://blog.netlab.360.com/mirai_ptea-botnet-is-exploiting-undisclosed-kguard-dvr-vulnerability-en/	http://https://malpedia.caad.fkie.fr/aunhofer.de/details/elf.mirai

Name	Description	Attribution	Blogpost URLs	Link
Moobot		No Attribution	http://https://blog.netlab.360.com/ddos-botnet-moobot-en/ https://blog.netlab.360.com/moobot-0day-unixcctv-dvr-en/ https://blog.netlab.360.com/some_details_of_the_ddos_attacks_targeting_ukraine_and_russia_in_recent_days/ https://otx.alienvault.com/pulse/6075b645942d5adf9bb8949bhttps://unit42.paloaltonetworks.com/moobot-d-link-devices/	http://https://malpedia.caad.fkie.fr/aunhofer.de/details/elf.moobot

Yara Signatures

Initial Sample

Source	Rule	Description	Author	Strings
moP8vO1r5x.elf	JoeSecurity_Moobot	Yara detected Moobot	Joe Security	
moP8vO1r5x.elf	JoeSecurity_Mirai_8	Yara detected Mirai	Joe Security	

Source	Rule	Description	Author	Strings
moP8vO1r5x.elf	Linux_Trojan_Gafgyt_28a2fe0c	unknown	unknown	0x10b14:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b28:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b3c:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b50:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b64:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b78:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10b8c:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10ba0:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10bb4:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10bc8:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10bdc:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10bf0:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c04:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c18:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c2c:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c40:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c54:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c68:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c7c:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10c90:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F 0x10ca4:\$a: 2F 78 33 38 2F 78 46 4A 2F 78 39 33 2F 78 49 44 2F 78 39 41 2F 78 33 38 2F 78 46 4A 2F

Memory Dumps				
Source	Rule	Description	Author	Strings
6225.1.00007f74d4017000.00007f74d402a000.r-x.sdmp	JoeSecurity_Moobot	Yara detected Moobot	Joe Security	
6225.1.00007f74d4017000.00007f74d402a000.r-x.sdmp	JoeSecurity_Mirai_8	Yara detected Mirai	Joe Security	

Snort Signatures

 No Snort rule has matched

Joe Sandbox Signatures

AV Detection



Multi AV Scanner detection for submitted file

System Summary



Malicious sample detected (through community Yara rule)

Stealing of Sensitive Information



Yara detected Mirai

Yara detected Moobot

Remote Access Functionality



Yara detected Mirai

Yara detected Moobot

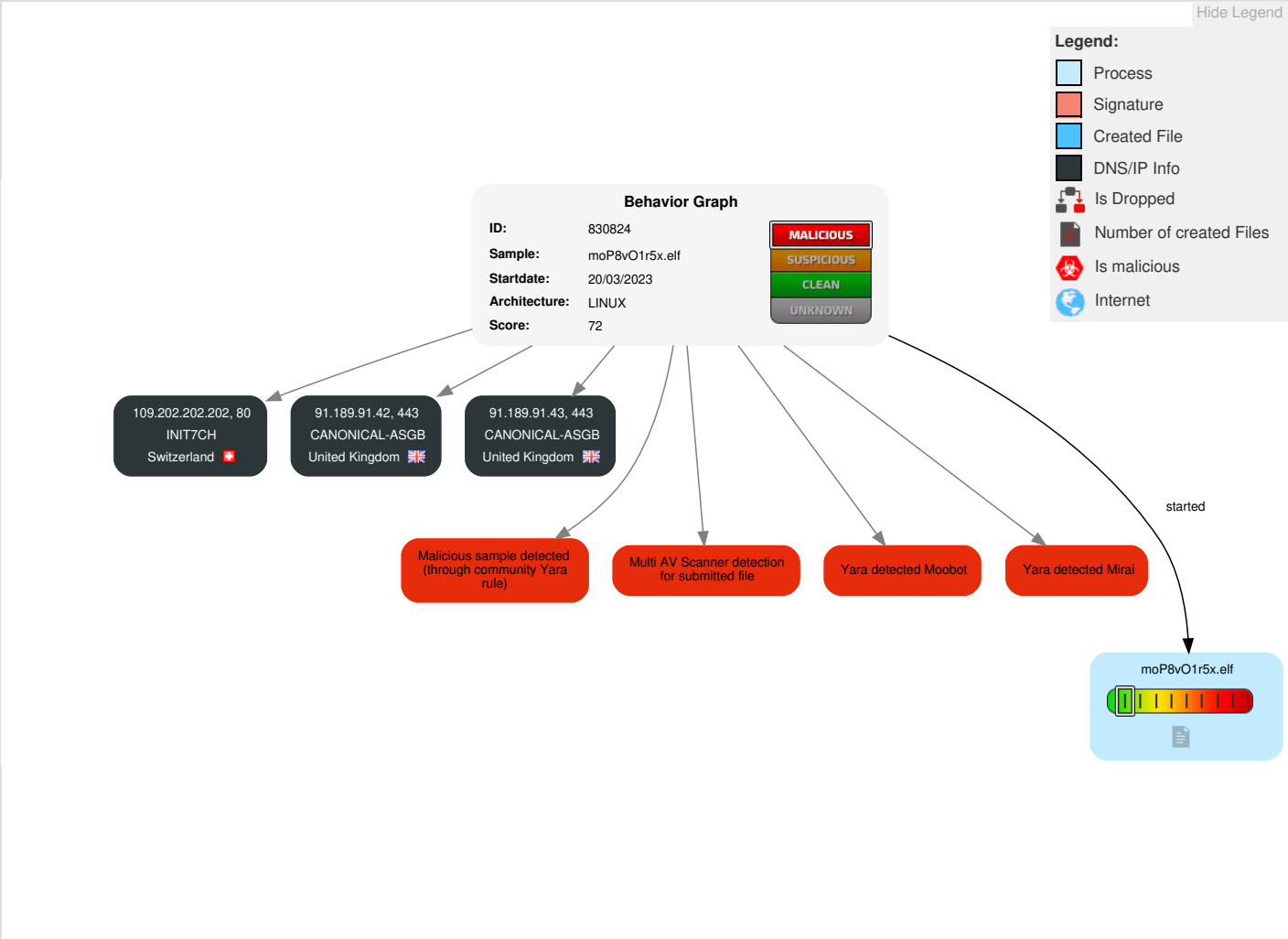
Mitre Att&ck Matrix

Initial Access	Execution	Persistence	Privilege Escalation	Defense Evasion	Credential Access	Discovery	Lateral Movement	Collection	Exfiltration	Command and Control	Network Effects	Remote Service Effects	Impact
Valid Accounts	Windows Management Instrumentation	Path Interception	Path Interception	Direct Volume Access	OS Credential Dumping	  Security Software Discovery	Remote Services	Data from Local System	Exfiltration Over Other Network Medium	 Encrypted Channel	Eavesdrop on Insecure Network Communication	Remotely Track Device Without Authorization	Modify System Partition
Default Accounts	Scheduled Task/Job	Boot or Logon Initialization Scripts	Boot or Logon Initialization Scripts	Rootkit	LSASS Memory	Application Window Discovery	Remote Desktop Protocol	Data from Removable Media	Exfiltration Over Bluetooth	 Application Layer Protocol	Exploit SS7 to Redirect Phone Calls/SMS	Remotely Wipe Data Without Authorization	Device Lockout

Malware Configuration

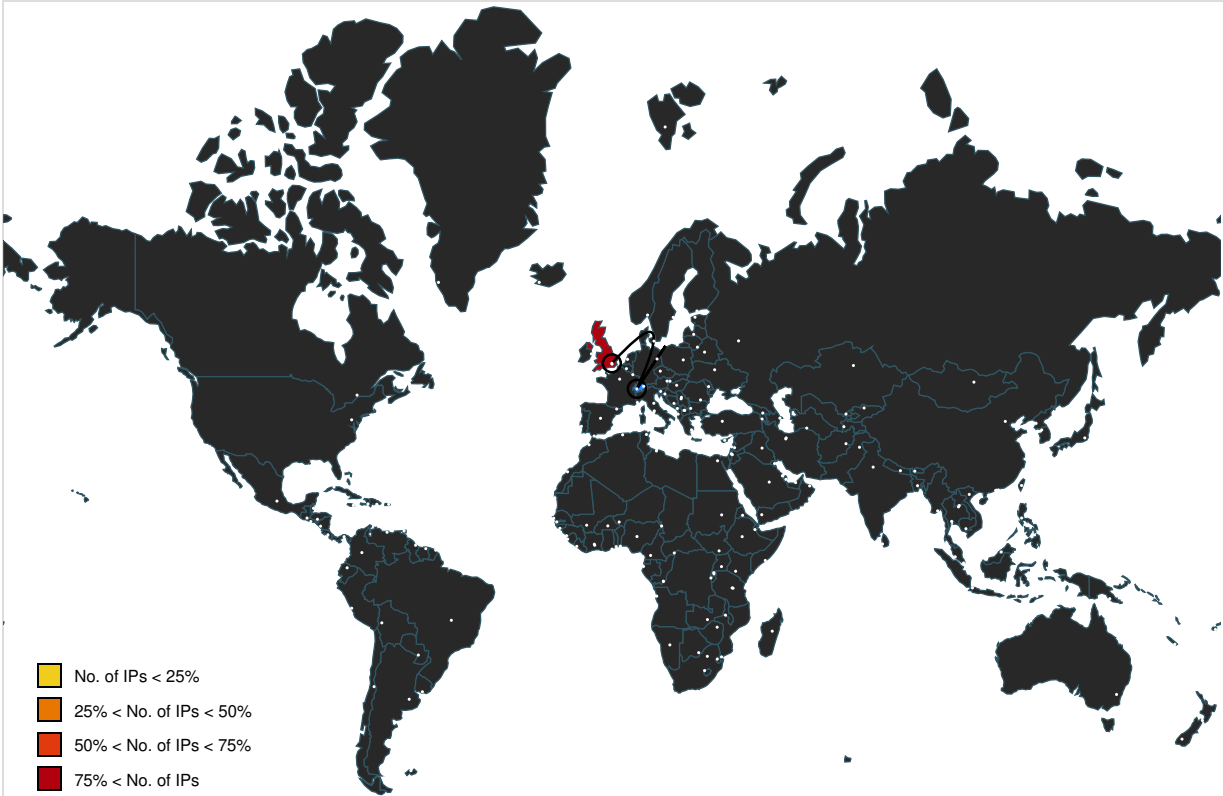
 No configs have been found

Behavior Graph



URLs from Memory and Binaries

World Map of Contacted IPs



Public IPs

IP	Domain	Country	Flag	ASN	ASN Name	Malicious
109.202.202.202	unknown	Switzerland		13030	INIT7CH	false
91.189.91.43	unknown	United Kingdom		41231	CANONICAL-ASGB	false
91.189.91.42	unknown	United Kingdom		41231	CANONICAL-ASGB	false

Joe Sandbox View / Context

IPs

No context

Domains

No context

ASNs

No context

JA3 Fingerprints

No context

Dropped Files

No context

Created / dropped Files

 No created / dropped files found

Static File Info

General

File type:	ELF 32-bit LSB executable, ARM, EABI4 version 1 (SYSV), statically linked, stripped
Entropy (8bit):	6.066871763525802
TrID:	ELF Executable and Linkable format (generic) (4004/1) 100.00%
File name:	moP8vO1r5x.elf
File size:	79160
MD5:	4ec4de6b5d0ff9c80927a14e9ad1edbc
SHA1:	c82bb18385624b1012dfae643efb9d579848b859
SHA256:	d7af252edb2ce2c65069af7e6f28d0937b272dd278dc3a75bdfc00a5b8d9b7cb
SHA512:	d5ae2174f331b98a7dbfce7ce213b6782f3f01ecd083ac325b9862f535cf714bef8ba8d7b4c38d31a78281049f6d1a49f359fe60ac021cc8a7c4bdf79e5c6e6a
SSDEEP:	1536:2lnHaxP6XkC/zTks7IDHtfMwoQRyVacx0mIEi6zTKvclC+5UYIWL:nxiX1LgbtfbWVaiZTKvclC+uR2
TLSH:	C4730756B8814B12C5D512BAFA2E118E332317FCE3DFB2129E206B2477C696B0E37D55
File Content Preview:	.ELF.....(.....T...4...X3.....4. ...((.....0...0...0.....Q.td.....-...L.....@-...@...0...S.....0...S...../.0...0...@.../.2.....0....-..@0...S

Static ELF Info

ELF header

Class:	
Data:	
Version:	
Machine:	
Version Number:	
Type:	
OS/ABI:	
ABI Version:	
Entry Point Address:	
Flags:	
ELF Header Size:	
Program Header Offset:	
Program Header Size:	
Number of Program Headers:	
Section Header Offset:	
Section Header Size:	
Number of Section Headers:	
Header String Table Index:	

Sections

Name	Type	Address	Offset	Size	EntSize	Flags	Flags Description	Link	Info	Align
	NULL	0x0	0x0	0x0	0x0	0x0		0	0	0
.init	PROGBITS	0x8094	0x94	0x10	0x0	0x6	AX	0	0	4
.text	PROGBITS	0x80b0	0xb0	0x10978	0x0	0x6	AX	0	0	16
.fini	PROGBITS	0x18a28	0x10a28	0x10	0x0	0x6	AX	0	0	4
.rodata	PROGBITS	0x18a38	0x10a38	0x1e48	0x0	0x2	A	0	0	8
.init_array	INIT_ARRAY	0x23004	0x13008	0x4	0x0	0x3	WA	0	0	4
.fini_array	FINI_ARRAY	0x23008	0x1300c	0x4	0x0	0x3	WA	0	0	4
.got	PROGBITS	0x23010	0x13014	0x74	0x4	0x3	WA	0	0	4
.data	PROGBITS	0x23084	0x13088	0x260	0x0	0x3	WA	0	0	4
.bss	NOBITS	0x232e4	0x132e8	0x253c	0x0	0x3	WA	0	0	4

Name	Type	Address	Offset	Size	EntSize	Flags	Flags Description	Link	Info	Align
.ARM.attributes	ARM_ATTRIBUTES	0x0	0x132e8	0x10	0x0	0x0		0	0	1
.shstrtab	STRTAB	0x0	0x132f8	0x5d	0x0	0x0		0	0	1

Program Segments											
Type	Offset	Virtual Address	Physical Address	File Size	Memory Size	Entropy	Flags	Flags Description	Align	Prog Interpreter	Section Mappings
LOAD	0x0	0x8000	0x8000	0x12880	0x12880	6.1758	0x5	R E	0x8000		.init .text .fini .rodata
LOAD	0x13004	0x23004	0x23000	0x2e4	0xa81c	3.7415	0x6	RW	0x8000		.init_array .fini_array .got .data .bss
GNU_STACK	0x0	0x0	0x0	0x0	0x0	0.0000	0x7	RWE	0x4		

Network Behavior

Network Port Distribution



Total Packets: 6

- 80 (HTTP)
- 443 (HTTPS)

TCP Packets

System Behavior

Analysis Process: moP8vO1r5x.elf PID: 6225, Parent PID: 6121

General

Start time:	18:08:46
Start date:	20/03/2023
Path:	/tmp/moP8vO1r5x.elf
Arguments:	/tmp/moP8vO1r5x.elf
File size:	4956856 bytes
MD5 hash:	5ebfcae4fe2471fcc5695c2394773ff1

File Activities

File Read