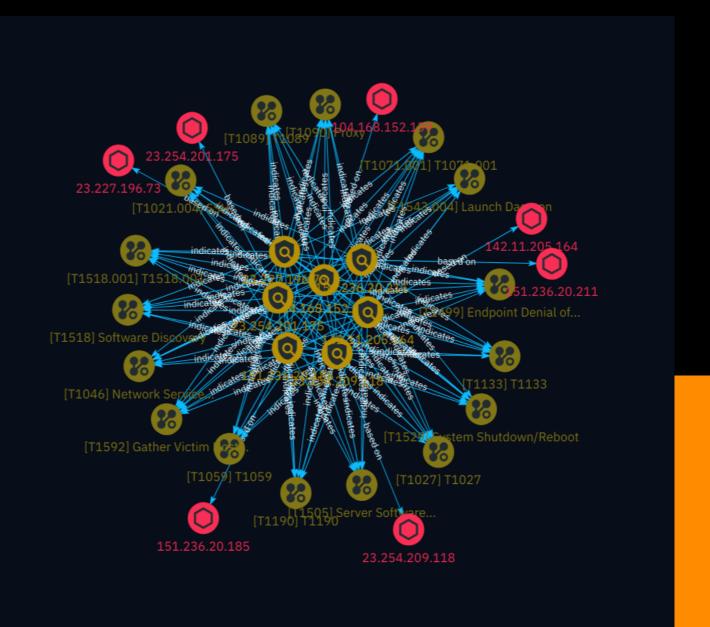
# NETMANAGEIT

# Intelligence Report Botnet 7777: Are You Betting on a Compromised Router?





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# Overview

### Description

This analysis uncovers the expansion of a significant botnet operation, dubbed Quad7 or 7777 botnet, characterized by its unique use of TCP port 7777 on compromised routers, primarily TP-Link and Hikvision devices. The research reveals a potential second tranche of bots, the 63256 botnet, comprised mainly of infected ASUS routers, indicating an evolution of the threat actor's tactics. Over a 30-day period, 12,783 active bots were identified across both infrastructures, highlighting the botnet's substantial scale. The analysis also pinpoints seven management IP addresses associated with the botnet's operations, some previously undisclosed. The findings underscore the resilience and adaptability of this persistent threat, warranting continued vigilance and collaborative efforts to mitigate its impact.

#### Confidence

100 / 100

This value represents the confidence in the correctness of the data contained within this report.

4 Overview

# Content

N/A

5 Content

# Attack-Pattern

Name	_			
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	ľ	α		Ŀ

SSH

ID

T1021.004

#### **Description**

Adversaries may use [Valid Accounts](https://attack.mitre.org/techniques/T1078) to log into remote machines using Secure Shell (SSH). The adversary may then perform actions as the logged-on user. SSH is a protocol that allows authorized users to open remote shells on other computers. Many Linux and macOS versions come with SSH installed by default, although typically disabled until the user enables it. The SSH server can be configured to use standard password authentication or public-private keypairs in lieu of or in addition to a password. In this authentication scenario, the user's public key must be in a special file on the computer running the server that lists which keypairs are allowed to login as that user.

#### **Name**

T1518.001

ID

T1518.001

#### **Description**

Adversaries may attempt to get a listing of security software, configurations, defensive tools, and sensors that are installed on a system or in a cloud environment. This may include things such as cloud monitoring agents and anti-virus. Adversaries may use the information from [Security Software Discovery](https://attack.mitre.org/techniques/ T1518/001) during automated discovery to shape follow-on behaviors, including whether or not the adversary fully infects the target and/or attempts specific actions. Example commands that can be used to obtain security software information are [netsh](https:// attack.mitre.org/software/S0108), `reg query` with [Reg](https://attack.mitre.org/software/ S0075), `dir` with [cmd](https://attack.mitre.org/software/S0106), and [Tasklist](https:// attack.mitre.org/software/S0057), but other indicators of discovery behavior may be more specific to the type of software or security system the adversary is looking for. It is becoming more common to see macOS malware perform checks for LittleSnitch and KnockKnock software. Adversaries may also utilize the [Cloud API](https://attack.mitre.org/ techniques/T1059/009) to discover cloud-native security software installed on compute infrastructure, such as the AWS CloudWatch agent, Azure VM Agent, and Google Cloud Monitor agent. These agents may collect metrics and logs from the VM, which may be centrally aggregated in a cloud-based monitoring platform.

#### **Name**

T1071.001

ID

T1071.001

#### **Description**

Adversaries may communicate using application layer protocols associated with web traffic to avoid detection/network filtering by blending in with existing traffic. Commands to the remote system, and often the results of those commands, will be embedded within the protocol traffic between the client and server. Protocols such as HTTP/S(Citation: CrowdStrike Putter Panda) and WebSocket(Citation: Brazking-Websockets) that carry web traffic may be very common in environments. HTTP/S packets have many fields and headers in which data can be concealed. An adversary may abuse these protocols to communicate with systems under their control within a victim network while also mimicking normal, expected traffic.

Name			
Proxy			

ID

T1090

#### **Description**

Adversaries may use a connection proxy to direct network traffic between systems or act as an intermediary for network communications to a command and control server to avoid direct connections to their infrastructure. Many tools exist that enable traffic redirection through proxies or port redirection, including [HTRAN](https://attack.mitre.org/software/S0040), ZXProxy, and ZXPortMap. (Citation: Trend Micro APT Attack Tools) Adversaries use these types of proxies to manage command and control communications, reduce the number of simultaneous outbound network connections, provide resiliency in the face of connection loss, or to ride over existing trusted communications paths between victims to avoid suspicion. Adversaries may chain together multiple proxies to further disguise the source of malicious traffic. Adversaries can also take advantage of routing schemes in Content Delivery Networks (CDNs) to proxy command and control traffic.

#### Name

Launch Daemon

ID

T1543.004

#### **Description**

Adversaries may create or modify Launch Daemons to execute malicious payloads as part of persistence. Launch Daemons are plist files used to interact with Launchd, the service management framework used by macOS. Launch Daemons require elevated privileges to install, are executed for every user on a system prior to login, and run in the background without the need for user interaction. During the macOS initialization startup, the launchd process loads the parameters for launch-on-demand system-level daemons from plist

files found in `/System/Library/LaunchDaemons/` and `/Library/LaunchDaemons/`. Required Launch Daemons parameters include a `Label` to identify the task, `Program` to provide a path to the executable, and `RunAtLoad` to specify when the task is run. Launch Daemons are often used to provide access to shared resources, updates to software, or conduct automation tasks.(Citation: AppleDocs Launch Agent Daemons)(Citation: Methods of Mac Malware Persistence)(Citation: launchd Keywords for plists) Adversaries may install a Launch Daemon configured to execute at startup by using the `RunAtLoad` parameter set to `true` and the `Program` parameter set to the malicious executable path. The daemon name may be disguised by using a name from a related operating system or benign software (i.e. [Masquerading](https://attack.mitre.org/techniques/T1036)). When the Launch Daemon is executed, the program inherits administrative permissions.(Citation: WireLurker)(Citation: OSX Malware Detection) Additionally, system configuration changes (such as the installation of third party package managing software) may cause folders such as `usr/local/bin` to become globally writeable. So, it is possible for poor configurations to allow an adversary to modify executables referenced by current Launch Daemon's plist files.(Citation: LaunchDaemon Hijacking)(Citation: sentinelone macos persist Jun 2019)

#### **Name**

Software Discovery

ID

T1518

#### **Description**

Adversaries may attempt to get a listing of software and software versions that are installed on a system or in a cloud environment. Adversaries may use the information from [Software Discovery](https://attack.mitre.org/techniques/T1518) during automated discovery to shape follow-on behaviors, including whether or not the adversary fully infects the target and/or attempts specific actions. Such software may be deployed widely across the environment for configuration management or security reasons, such as [Software Deployment Tools](https://attack.mitre.org/techniques/T1072), and may allow adversaries broad access to infect devices or move laterally. Adversaries may attempt to enumerate software for a variety of reasons, such as figuring out what security measures are present or if the compromised system has a version of software that is vulnerable to [Exploitation for Privilege Escalation](https://attack.mitre.org/techniques/T1068).

Name
T1089
ID
T1089
Description
Adversaries may disable security tools to avoid possible detection of their tools and activities. This can take the form of killing security software or event logging processes, deleting Registry keys so that tools do not start at run time, or other methods to interfere with security scanning or event reporting.
Name
Server Software Component
ID
T1505
Description
Adversaries may abuse legitimate extensible development features of servers to establish persistent access to systems. Enterprise server applications may include features that allow developers to write and install software or scripts to extend the functionality of the main application. Adversaries may install malicious components to extend and abuse server applications.(Citation: volexity_Oday_sophos_FW)
Adversaries may abuse legitimate extensible development features of servers to establish persistent access to systems. Enterprise server applications may include features that allow developers to write and install software or scripts to extend the functionality of the main application. Adversaries may install malicious components to extend and abuse

10 Attack-Pattern

ID

T1027

#### **Description**

Adversaries may attempt to make an executable or file difficult to discover or analyze by encrypting, encoding, or otherwise obfuscating its contents on the system or in transit. This is common behavior that can be used across different platforms and the network to evade defenses. Payloads may be compressed, archived, or encrypted in order to avoid detection. These payloads may be used during Initial Access or later to mitigate detection. Sometimes a user's action may be required to open and [Deobfuscate/Decode Files or Information](https://attack.mitre.org/techniques/T1140) for [User Execution](https:// attack.mitre.org/techniques/T1204). The user may also be required to input a password to open a password protected compressed/encrypted file that was provided by the adversary. (Citation: Volexity PowerDuke November 2016) Adversaries may also use compressed or archived scripts, such as JavaScript. Portions of files can also be encoded to hide the plain-text strings that would otherwise help defenders with discovery. (Citation: Linux/ Cdorked.A We Live Security Analysis) Payloads may also be split into separate, seemingly benign files that only reveal malicious functionality when reassembled. (Citation: Carbon Black Obfuscation Sept 2016) Adversaries may also abuse [Command Obfuscation](https:// attack.mitre.org/techniques/T1027/010) to obscure commands executed from payloads or directly via [Command and Scripting Interpreter](https://attack.mitre.org/techniques/ T1059). Environment variables, aliases, characters, and other platform/language specific semantics can be used to evade signature based detections and application control mechanisms. (Citation: FireEye Obfuscation June 2017) (Citation: FireEye Revoke-Obfuscation July 2017)(Citation: PaloAlto EncodedCommand March 2017)

#### Name

T1190

ID

T1190

#### **Description**

Adversaries may attempt to exploit a weakness in an Internet-facing host or system to initially access a network. The weakness in the system can be a software bug, a temporary glitch, or a misconfiguration. Exploited applications are often websites/web servers, but

can also include databases (like SQL), standard services (like SMB or SSH), network device administration and management protocols (like SNMP and Smart Install), and any other system with Internet accessible open sockets.(Citation: NVD CVE-2016-6662)(Citation: CIS Multiple SMB Vulnerabilities)(Citation: US-CERT TA18-106A Network Infrastructure Devices 2018)(Citation: Cisco Blog Legacy Device Attacks)(Citation: NVD CVE-2014-7169) Depending on the flaw being exploited this may also involve [Exploitation for Defense Evasion] (https://attack.mitre.org/techniques/T1211) or [Exploitation for Client Execution](https:// attack.mitre.org/techniques/T1203). If an application is hosted on cloud-based infrastructure and/or is containerized, then exploiting it may lead to compromise of the underlying instance or container. This can allow an adversary a path to access the cloud or container APIs, exploit container host access via [Escape to Host](https://attack.mitre.org/ techniques/T1611), or take advantage of weak identity and access management policies. Adversaries may also exploit edge network infrastructure and related appliances, specifically targeting devices that do not support robust host-based defenses.(Citation: Mandiant Fortinet Zero Day)(Citation: Wired Russia Cyberwar) For websites and databases, the OWASP top 10 and CWE top 25 highlight the most common web-based vulnerabilities. (Citation: OWASP Top 10)(Citation: CWE top 25)

#### **Name**

Gather Victim Host Information

ID

T1592

#### **Description**

Adversaries may gather information about the victim's hosts that can be used during targeting. Information about hosts may include a variety of details, including administrative data (ex: name, assigned IP, functionality, etc.) as well as specifics regarding its configuration (ex: operating system, language, etc.). Adversaries may gather this information in various ways, such as direct collection actions via [Active Scanning](https://attack.mitre.org/techniques/T1595) or [Phishing for Information](https://attack.mitre.org/techniques/T1598). Adversaries may also compromise sites then include malicious content designed to collect host information from visitors.(Citation: ATT ScanBox) Information about hosts may also be exposed to adversaries via online or other accessible data sets (ex: [Social Media](https://attack.mitre.org/techniques/T1593/001) or [Search Victim-Owned Websites](https://attack.mitre.org/techniques/T1594)). Gathering this information may reveal opportunities for other forms of reconnaissance (ex: [Search Open Websites/Domains](https://attack.mitre.org/techniques/T1593) or [Search Open Technical

Databases](https://attack.mitre.org/techniques/T1596)), establishing operational resources (ex: [Develop Capabilities](https://attack.mitre.org/techniques/T1587) or [Obtain Capabilities](https://attack.mitre.org/techniques/T1588)), and/or initial access (ex: [Supply Chain Compromise](https://attack.mitre.org/techniques/T1195) or [External Remote Services](https://attack.mitre.org/techniques/T1133)).

#### Name

System Shutdown/Reboot

ID

T1529

#### **Description**

Adversaries may shutdown/reboot systems to interrupt access to, or aid in the destruction of, those systems. Operating systems may contain commands to initiate a shutdown/ reboot of a machine or network device. In some cases, these commands may also be used to initiate a shutdown/reboot of a remote computer or network device via [Network Device CLI](https://attack.mitre.org/techniques/T1059/008) (e.g. `reload`).(Citation: Microsoft Shutdown Oct 2017)(Citation: alert\_TA18\_106A) Shutting down or rebooting systems may disrupt access to computer resources for legitimate users while also impeding incident response/recovery. Adversaries may attempt to shutdown/reboot a system after impacting it in other ways, such as [Disk Structure Wipe](https://attack.mitre.org/techniques/T1561/002) or [Inhibit System Recovery](https://attack.mitre.org/techniques/T1490), to hasten the intended effects on system availability.(Citation: Talos Nyetya June 2017) (Citation: Talos Olympic Destroyer 2018)

#### **Name**

Network Service Discovery

ID

T1046

#### **Description**

Adversaries may attempt to get a listing of services running on remote hosts and local network infrastructure devices, including those that may be vulnerable to remote software exploitation. Common methods to acquire this information include port and/or vulnerability scans using tools that are brought onto a system.(Citation: CISA AR21-126A FIVEHANDS May 2021) Within cloud environments, adversaries may attempt to discover services running on other cloud hosts. Additionally, if the cloud environment is connected to a on-premises environment, adversaries may be able to identify services running on non-cloud systems as well. Within macOS environments, adversaries may use the native Bonjour application to discover services running on other macOS hosts within a network. The Bonjour mDNSResponder daemon automatically registers and advertises a host's registered services on the network. For example, adversaries can use a mDNS query (such as `dns-sd -B \_ssh.\_tcp .`) to find other systems broadcasting the ssh service.(Citation: apple doco bonjour description)(Citation: macOS APT Activity Bradley)

#### **Name**

T1059

ID

T1059

#### **Description**

Adversaries may abuse command and script interpreters to execute commands, scripts, or binaries. These interfaces and languages provide ways of interacting with computer systems and are a common feature across many different platforms. Most systems come with some built-in command-line interface and scripting capabilities, for example, macOS and Linux distributions include some flavor of [Unix Shell](https://attack.mitre.org/ techniques/T1059/004) while Windows installations include the [Windows Command Shell] (https://attack.mitre.org/techniques/T1059/003) and [PowerShell](https://attack.mitre.org/ techniques/T1059/001). There are also cross-platform interpreters such as [Python] (https://attack.mitre.org/techniques/T1059/006), as well as those commonly associated with client applications such as [JavaScript](https://attack.mitre.org/techniques/ T1059/007) and [Visual Basic](https://attack.mitre.org/techniques/T1059/005). Adversaries may abuse these technologies in various ways as a means of executing arbitrary commands. Commands and scripts can be embedded in [Initial Access](https:// attack.mitre.org/tactics/TA0001) payloads delivered to victims as lure documents or as secondary payloads downloaded from an existing C2. Adversaries may also execute commands through interactive terminals/shells, as well as utilize various [Remote

Services](https://attack.mitre.org/techniques/T1021) in order to achieve remote Execution. (Citation: Powershell Remote Commands)(Citation: Cisco IOS Software Integrity Assurance - Command History)(Citation: Remote Shell Execution in Python)

Name

T1133

ID

T1133

#### **Description**

Adversaries may leverage external-facing remote services to initially access and/or persist within a network. Remote services such as VPNs, Citrix, and other access mechanisms allow users to connect to internal enterprise network resources from external locations. There are often remote service gateways that manage connections and credential authentication for these services. Services such as [Windows Remote Management] (https://attack.mitre.org/techniques/T1021/006) and [VNC](https://attack.mitre.org/ techniques/T1021/005) can also be used externally.(Citation: MacOS VNC software for Remote Desktop) Access to [Valid Accounts](https://attack.mitre.org/techniques/T1078) to use the service is often a requirement, which could be obtained through credential pharming or by obtaining the credentials from users after compromising the enterprise network.(Citation: Volexity Virtual Private Keylogging) Access to remote services may be used as a redundant or persistent access mechanism during an operation. Access may also be gained through an exposed service that doesn't require authentication. In containerized environments, this may include an exposed Docker API, Kubernetes API server, kubelet, or web application such as the Kubernetes dashboard.(Citation: Trend Micro Exposed Docker Server)(Citation: Unit 42 Hildegard Malware)

#### **Name**

**Endpoint Denial of Service** 

ID

T1499

#### **Description**

Adversaries may perform Endpoint Denial of Service (DoS) attacks to degrade or block the availability of services to users. Endpoint DoS can be performed by exhausting the system resources those services are hosted on or exploiting the system to cause a persistent crash condition. Example services include websites, email services, DNS, and web-based applications. Adversaries have been observed conducting DoS attacks for political purposes(Citation: FireEye OpPoisonedHandover February 2016) and to support other malicious activities, including distraction(Citation: FSISAC FraudNetDoS September 2012), hacktivism, and extortion.(Citation: Symantec DDoS October 2014) An Endpoint DoS denies the availability of a service without saturating the network used to provide access to the service. Adversaries can target various layers of the application stack that is hosted on the system used to provide the service. These layers include the Operating Systems (OS), server applications such as web servers, DNS servers, databases, and the (typically webbased) applications that sit on top of them. Attacking each layer requires different techniques that take advantage of bottlenecks that are unique to the respective components. A DoS attack may be generated by a single system or multiple systems spread across the internet, which is commonly referred to as a distributed DoS (DDoS). To perform DoS attacks against endpoint resources, several aspects apply to multiple methods, including IP address spoofing and botnets. Adversaries may use the original IP address of an attacking system, or spoof the source IP address to make the attack traffic more difficult to trace back to the attacking system or to enable reflection. This can increase the difficulty defenders have in defending against the attack by reducing or eliminating the effectiveness of filtering by the source address on network defense devices. Botnets are commonly used to conduct DDoS attacks against networks and services. Large botnets can generate a significant amount of traffic from systems spread across the global internet. Adversaries may have the resources to build out and control their own botnet infrastructure or may rent time on an existing botnet to conduct an attack. In some of the worst cases for DDoS, so many systems are used to generate requests that each one only needs to send out a small amount of traffic to produce enough volume to exhaust the target's resources. In such circumstances, distinguishing DDoS traffic from legitimate clients becomes exceedingly difficult. Botnets have been used in some of the most high-profile DDoS attacks, such as the 2012 series of incidents that targeted major US banks.(Citation: USNYAG IranianBotnet March 2016) In cases where traffic manipulation is used, there may be points in the global network (such as high traffic gateway routers) where packets can be altered and cause legitimate clients to execute code that directs network packets toward a target in high volume. This type of capability was previously used for the purposes of web censorship where client HTTP traffic was modified to include a reference to JavaScript that generated the DDoS code to overwhelm target web servers.(Citation: ArsTechnica Great Firewall of China) For attacks attempting to saturate the providing network, see [Network Denial of Service](https://attack.mitre.org/ techniques/T1498).

# **Indicator**

#### **Name**

151.236.20.211

#### **Description**

#### **Pattern Type**

stix

#### **Pattern**

[ipv4-addr:value = '151.236.20.211']

HEIRESEAN.
Name
23.227.196.73
Pattern Type
stix
Pattern
[ipv4-addr:value = '23.227.196.73']
Name
104.168.152.139
Pattern Type
stix
Pattern
[ipv4-addr:value = '104.168.152.139']
Name
142.11.205.164
Description
**ISP:** Hostwinds LLC. **OS:** Windows (build 10.0.17763) Services: **3389:** ``` Remote Desktop Protocol

Desktop Protocol NTLM Info: OS: Windows 10 (version 1809)/Windows Server 2019 (version 1809) OS Build: 10.0.17763 Target Name: HWC-HWP-8726760 NetBIOS Domain Name: HWC-

\x03\x00\x00\x13\x0e\xd0\x00\x00\x124\x00\x02\x1f\x08\x00\x02\x00\x00\x00 Remote

#### **Pattern Type**

stix

#### **Pattern**

[ipv4-addr:value = '142.11.205.164']

#### **Name**

151.236.20.185

#### Description

#### **Pattern Type**

stix

# **Pattern** [ipv4-addr:value = '151.236.20.185'] 23.254.201.175 **Description** \*\*ISP:\*\* Hostwinds LLC. \*\*OS:\*\* Windows (build 10.0.17763) ----- Services: \*\*3389:\*\* ``` Remote Desktop Protocol \x03\x00\x00\x13\x0e\xd0\x00\x00\x124\x00\x02\x1f\x08\x00\x02\x00\x00\x00 Desktop Protocol NTLM Info: OS: Windows 10 (version 1809)/Windows Server 2019 (version 1809) OS Build: 10.0.17763 Target Name: HWC-HWP-8784090 NetBIOS Domain Name: HWC-HWP-8784090 NetBIOS Computer Name: HWC-HWP-8784090 DNS Domain Name: hwchwp-8784090 FQDN: hwc-hwp-8784090 \*\*\* ------**Pattern Type** stix **Pattern** [ipv4-addr:value = '23.254.201.175'] Name 23.254.209.118 **Pattern Type** stix **Pattern**

[ipv4-addr:value = '23.254.209.118']

# indicates

Name	
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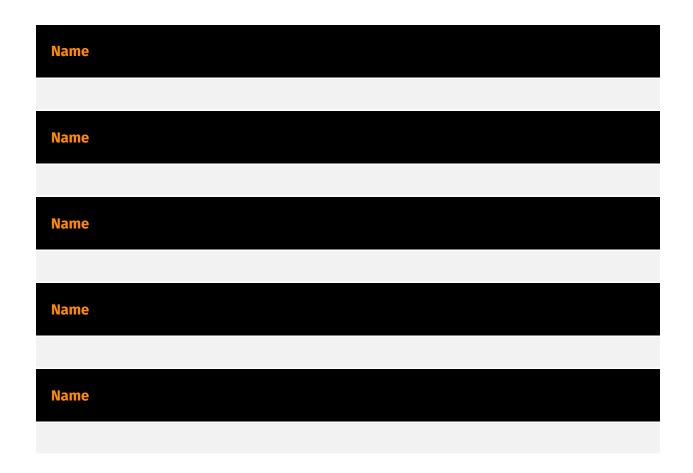
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Name

# based-on



based-on

# IPv4-Addr

Value
151.236.20.185
23.254.209.118
23.254.201.175
151.236.20.211
104.168.152.139
142.11.205.164
23.227.196.73

30 IPv4-Addr

# **External References**

- https://www.team-cymru.com/post/botnet-7777-are-you-betting-on-a-compromised-router
- https://otx.alienvault.com/pulse/66b4ac5c63b5e94dcbf5449f

31 External References