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# RUSTSCAN

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## A Detailed Guide on RustScan

In the realm of cybersecurity, network scanning tools play a vital role in reconnaissance and vulnerability assessment. Among the array of options available, Rustscan has emerged as a formidable contender, offering speed, efficiency, and versatility that distinguish it from traditional tools like Nmap.

### What sets Rustscan apart?

Rustscan is an open-source network scanner developed in the Rust programming language. Its lightweight design, optimized algorithms, and user-friendly interface make it a preferred choice for both penetration testers and security professionals.

#### Advantages of Rustscan over Nmap:

**Speed:** It is renowned for its rapid scanning capabilities. Its multithreaded architecture and optimized algorithms enable it to scan large networks significantly faster than traditional scanners like Nmap.

**Efficiency:** It prioritizes efficiency, utilizing resources intelligently and minimizing overhead. This ensures that scanning tasks are completed swiftly without excessive resource consumption.

**Ease of Use:** With its intuitive interface and simplified command structure, Rustscan is accessible to users of all levels of expertise. Its design minimizes the learning curve typically associated with network scanning tools.

**Versatility:** It offers a broad range of features and customization options, allowing users to tailor their scans to specific requirements. Whether performing basic port scanning or comprehensive service enumeration, Rustscan delivers.

### Usage (Docker)

Rustscan can run by pulling an image using docker. The installation guide is available here <https://github.com/RustScan/RustScan/wiki/Installation-Guide>

To install docker use the command:

```
apt install docker.io
```

```
└─# apt install docker.io ←
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
The following packages were automatically installed and are no longer
needed:
  cython3 debtags gir1.2-gtksource-3.0 gir1.2-javascriptcoregtk-4.0 gi
  libblockdev-fs2 libblockdev-loop2 libblockdev-part-err2 libblockdev-
  libgeos3.11.1 libgeos3.12.0 libglib2.0-dev libglib2.0-dev-bin libgum
  libpcre2-posix3 libperl5.36 libplacebo208 libplacebo292 libpostproc5
  libswscale6 libtexluajit2 libtinfo5 libucl1 libutf8proc2 libvpx7 lib
  python3-aioredis python3-apscheduler python3-backcall python3-bolton
  python3-graphql-core python3-graphql-relay python3-icalendar python3
  python3-rx python3-smoke-zephyr python3-texttable python3-tzlocal py
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  cgroupfs-mount containerd libintl-perl libintl-xs-perl libmodule-fir
```

After the docker installation, rustscan can run from the following command:

```
docker run -it --rm --name rustscan rustscan/rustscan:2.1.1 -a 192.168.1.7
```

```
(root@kali)-[~]
# docker run -it --rm --name rustscan rustscan/rustscan:2.1.1 -a 192.168.1.7
Unable to find image 'rustscan/rustscan:2.1.1' locally
2.1.1: Pulling from rustscan/rustscan
1b7ca6aea1dd: Pull complete
4c6d22701329: Pull complete
74847823a394: Pull complete
Digest: sha256:1ef645b90001c560923c2150d20e5509ced24312225dbb9daf7c1c0ac3d21b2
Status: Downloaded newer image for rustscan/rustscan:2.1.1

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|_-.\|{|}|-.-}|{|}_-.|}\_/_/\|\\|
|..-.-.-.-.-|

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: https://github.com/RustScan/RustScan :
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Please contribute more quotes to our GitHub https://github.com/rustscan/rustscan

[~] The config file is expected to be at "/home/rustscan/.rustscan.toml"
[~] File limit higher than batch size. Can increase speed by increasing batch size '-b 10000'
Open 192.168.1.7:21
Open 192.168.1.7:22
Open 192.168.1.7:23
Open 192.168.1.7:25
Open 192.168.1.7:53
Open 192.168.1.7:80
Open 192.168.1.7:111
Open 192.168.1.7:139
Open 192.168.1.7:445
Open 192.168.1.7:512
Open 192.168.1.7:513
Open 192.168.1.7:514
Open 192.168.1.7:1099
Open 192.168.1.7:1524
Open 192.168.1.7:2049
Open 192.168.1.7:2121
Open 192.168.1.7:3306
```

## Installation and Usage (Standalone)

Installation of Rustscan can be performed using cargo, the following command can be used:

**apt install cargo**

```
└─# apt install cargo ←
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
The following packages were automatically installed and are n
  cython3 debtags gir1.2-gtksource-3.0 gir1.2-javascriptcoreg
  libblockdev-fs2 libblockdev-loop2 libblockdev-part-err2 lib
  libgeos3.11.1 libgeos3.12.0 libglib2.0-dev libglib2.0-dev-b
  libpcre2-posix3 libperl5.36 libplacebo208 libplacebo292 lib
  libswscale6 libtexluaajit2 libtinfo5 libucl1 libutf8proc2 l
  python3-aioredis python3-apscheduler python3-backcall pytho
  python3-graphql-core python3-graphql-relay python3-icalenda
  python3-rx python3-smoke-zephyr python3-texttable python3-t
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  libgit2-1.7 libhttp-parser2.9 libmbdtdls14 libmbdtdx509-1 l
Suggested packages:
  cargo-doc lld-16
Recommended packages:
  cargo
The following NEW packages will be installed:
  cargo libgit2-1.7 libhttp-parser2.9 libmbdtdls14 libmbdtdx50
```

**cargo install rustscan**

```
(root@kali)-[~]  
# cargo install rustscan ←  
Updating crates.io index  
Installing rustscan v2.1.1  
Compiling libc v0.2.153  
Compiling autocfg v1.1.0  
Compiling proc-macro2 v1.0.78  
Compiling unicode-ident v1.0.12  
Compiling pin-project-lite v0.2.13  
Compiling memchr v2.7.1  
Compiling futures-core v0.3.30  
Compiling slab v0.4.9  
Compiling crossbeam-utils v0.8.19  
Compiling quote v1.0.35  
Compiling futures-io v0.3.30  
Compiling syn v2.0.51  
Compiling cc v1.0.88  
Compiling cfg-if v1.0.0  
Compiling parking v2.2.0  
Compiling concurrent-queue v2.4.0  
Compiling value-bag v1.7.0  
Compiling once cell v1.19.0
```

Make sure to add the `/root/.cargo/bin` to the path

```
Compiling rlimit v0.8.3  
Compiling subprocess v0.2.9  
Compiling gcd v2.3.0  
Compiling colorful v0.2.2  
Compiling shell-words v1.1.0  
Compiling rustscan v2.1.1  
Finished release [optimized] target(s) in 10m 54s  
Installing /root/.cargo/bin/rustscan  
Installed package `rustscan v2.1.1` (executable `rustscan`)  
warning: be sure to add `/root/.cargo/bin` to your PATH to be able to
```

```
echo $SHELL
nano .zshrc
```

```
(root@kali)-[~]
# echo $SHELL
/usr/bin/zsh
```

```
(root@kali)-[~]
# nano .zshrc
```

Add the `/root/.cargo/bin` as export PATH.

```
# Change suggestion color
ZSH_AUTOSUGGEST_HIGHLIGHT_STYLE='fg=#999'
fi

# enable command-not-found if installed
if [ -f /etc/zsh_command_not_found ]; then
    . /etc/zsh_command_not_found
fi

# Created by `pipx` on 2024-01-24 18:30:44
export PATH="$PATH:/root/.local/bin"
export PATH="$PATH:/root/.cargo/bin"
```

After installation success, Rustscan is now ready to run.



```
(root@kali)-[~]
# source .zshrc
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(root@kali)-[~]
# rustscan
-----
| {} | {} | { {} { _ } { { _ / _ } / {} \ | \ | |
| .- \ | {} | .- _ } } | | .- _ } \ _ _ } / ^ \ | \ |
|-----|
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: https://github.com/RustScan/RustScan :
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[~] The config file is expected to be at "/root/.rustscan.toml"
```

## Rustscan flags

There are a number of operations which can be performed using Rustscan, below listed are the flags to perform respective operation in Rustscan.

- a : To perform a comprehensive scan of all TCP ports.

```
rustscan -a 192.168.1.7
```



[illegible]

Discovered open port 45165/tcp on 192.168.1.7  
Discovered open port 3632/tcp on 192.168.1.7  
Discovered open port 8787/tcp on 192.168.1.7  
Discovered open port 54505/tcp on 192.168.1.7  
Completed SYN Stealth Scan at 12:36, 0.03s elapsed (30 total ports)  
Nmap scan report for 192.168.1.7  
Host is up, received arp-response (0.0018s latency).  
Scanned at 2024-02-26 12:36:34 EST for 0s

PORT	STATE	SERVICE	REASON
21/tcp	open	ftp	syn-ack ttl 64
22/tcp	open	ssh	syn-ack ttl 64
23/tcp	open	telnet	syn-ack ttl 64
25/tcp	open	smtp	syn-ack ttl 64
53/tcp	open	domain	syn-ack ttl 64
80/tcp	open	http	syn-ack ttl 64
111/tcp	open	rpcbind	syn-ack ttl 64
139/tcp	open	netbios-ssn	syn-ack ttl 64
445/tcp	open	microsoft-ds	syn-ack ttl 64
512/tcp	open	exec	syn-ack ttl 64
513/tcp	open	login	syn-ack ttl 64
514/tcp	open	shell	syn-ack ttl 64
1099/tcp	open	rmiregistry	syn-ack ttl 64
1524/tcp	open	ingreslock	syn-ack ttl 64
2049/tcp	open	nfs	syn-ack ttl 64
2121/tcp	open	ccproxy-ftp	syn-ack ttl 64
3306/tcp	open	mysql	syn-ack ttl 64
3632/tcp	open	distccd	syn-ack ttl 64
5432/tcp	open	postgresql	syn-ack ttl 64
5900/tcp	open	vnc	syn-ack ttl 64
6000/tcp	open	X11	syn-ack ttl 64
6667/tcp	open	irc	syn-ack ttl 64
6697/tcp	open	ircs-u	syn-ack ttl 64
8009/tcp	open	ajp13	syn-ack ttl 64
8180/tcp	open	unknown	syn-ack ttl 64
8787/tcp	open	msgsrvr	syn-ack ttl 64
45165/tcp	open	unknown	syn-ack ttl 64
45712/tcp	open	unknown	syn-ack ttl 64
54505/tcp	open	unknown	syn-ack ttl 64
57231/tcp	open	unknown	syn-ack ttl 64

MAC Address: 00:0C:29:55:9F:CF (VMware)

Read data files from: /usr/bin/./share/nmap

Nmap done: 1 IP address (1 host up) scanned in 0.19 seconds

Raw packets sent: 31 (1.348KB) | Rcvd: 31 (1.348KB)

**--ulimit** : To adjust the ulimit for file descriptors to handle large-scale scans. If the scan is running slow adding this flag with a value of 5000 will make it run faster.

```
rustscan -a 192.168.1.7 --ulimit 5000
```

```
(root@kali)-[~]
# rustscan -a 192.168.1.7 --ulimit 5000
.....
| {} | {} | { { _ { _ } { { _ / _ _ } / { } \ | ' | |
| .- . \ | { _ } | .- . _ } } | | .- . _ } \ \ _ _ } / ^ \ | \ |
.....
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: http://discord.skerritt.blog :
: https://github.com/RustScan/RustScan :
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[~] The config file is expected to be at "/root/.rustscan.toml"
[~] Automatically increasing ulimit value to 5000.
Open 192.168.1.7:21
Open 192.168.1.7:22
Open 192.168.1.7:25
Open 192.168.1.7:53
Open 192.168.1.7:80
Open 192.168.1.7:139
Open 192.168.1.7:445
Open 192.168.1.7:512
Open 192.168.1.7:513
Open 192.168.1.7:514
Open 192.168.1.7:1099
Open 192.168.1.7:1524
Open 192.168.1.7:2049
Open 192.168.1.7:2121
Open 192.168.1.7:3306
Open 192.168.1.7:3632
Open 192.168.1.7:23
Open 192.168.1.7:111
Open 192.168.1.7:5432
Open 192.168.1.7:5900
Open 192.168.1.7:6000
Open 192.168.1.7:6667
Open 192.168.1.7:6697
Open 192.168.1.7:8009
```

**-p** : To define specific ports to be scanned.

```
rustscan -a 192.168.1.7 -p 21,22,23
```

```

(root@kali)-[~]
# rustscan -a 192.168.1.7 -p 21,22,23

```

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 : <https://github.com/RustScan/RustScan> :  
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```

[~] The config file is expected to be at "/root/.rustscan.toml"
[!] File limit is lower than default batch size. Consider upping
[!] Your file limit is very small, which negatively impacts Rust
Open 192.168.1.7:21
Open 192.168.1.7:23
Open 192.168.1.7:22
[~] Starting Script(s)
[~] Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-02-26 12:
Initiating ARP Ping Scan at 12:39
Scanning 192.168.1.7 [1 port]
Completed ARP Ping Scan at 12:39, 0.06s elapsed (1 total hosts)
Initiating Parallel DNS resolution of 1 host. at 12:39
Completed Parallel DNS resolution of 1 host. at 12:39, 0.01s el
DNS resolution of 1 IPs took 0.01s. Mode: Async [#: 3, OK: 0, NX
Initiating SYN Stealth Scan at 12:39
Scanning 192.168.1.7 [3 ports]
Discovered open port 23/tcp on 192.168.1.7
Discovered open port 21/tcp on 192.168.1.7
Discovered open port 22/tcp on 192.168.1.7
Completed SYN Stealth Scan at 12:39, 0.02s elapsed (3 total port
Nmap scan report for 192.168.1.7
Host is up, received arp-response (0.00038s latency).
Scanned at 2024-02-26 12:39:04 EST for 0s

```

PORT	STATE	SERVICE	REASON
21/tcp	open	ftp	syn-ack ttl 64
22/tcp	open	ssh	syn-ack ttl 64
23/tcp	open	telnet	syn-ack ttl 64

MAC Address: 00:0C:29:55:9F:CF (VMware)

```

Read data files from: /usr/bin/../../share/nmap
Nmap done: 1 IP address (1 host up) scanned in 0.18 seconds
Raw packets sent: 4 (160B) | Rcvd: 4 (160B)

```

-r : To perform a range scan, specific range of ports will be scanned.

```
rustscan -a 192.168.1.7 -r 21-50
```

```
(root@kali)-[~]
# rustscan -a 192.168.1.7 -r 21-50
.....
| {} | {} | { _ { _ } { _ / _ } / { } \ | `| |
| .-. \ | { _ } | .-. } } | | .-. } \ _ } / ^ \ | \ |
|-----|-----|-----|-----|-----|-----|
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: http://discord.skerritt.blog :
: https://github.com/RustScan/RustScan :
-----
🐞 https://admin.tryhackme.com

[~] The config file is expected to be at "/root/.rustscan.toml"
[!] File limit is lower than default batch size. Consider upping with
[!] Your file limit is very small, which negatively impacts RustScan
Open 192.168.1.7:21
Open 192.168.1.7:22
Open 192.168.1.7:23
Open 192.168.1.7:25
[~] Starting Script(s)
[~] Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-02-26 12:39 EST
Initiating ARP Ping Scan at 12:39
Scanning 192.168.1.7 [1 port]
Completed ARP Ping Scan at 12:39, 0.06s elapsed (1 total hosts)
Initiating Parallel DNS resolution of 1 host. at 12:39
Completed Parallel DNS resolution of 1 host. at 12:39, 0.01s elapsed
DNS resolution of 1 IPs took 0.01s. Mode: Async [#: 3, OK: 0, NX: 1,
Initiating SYN Stealth Scan at 12:39
Scanning 192.168.1.7 [4 ports]
Discovered open port 21/tcp on 192.168.1.7
Discovered open port 22/tcp on 192.168.1.7
Discovered open port 23/tcp on 192.168.1.7
Discovered open port 25/tcp on 192.168.1.7
Completed SYN Stealth Scan at 12:39, 0.03s elapsed (4 total ports)
Nmap scan report for 192.168.1.7
Host is up, received arp-response (0.00059s latency).
Scanned at 2024-02-26 12:39:58 EST for 0s

PORT      STATE SERVICE REASON
21/tcp    open  ftp     syn-ack ttl 64
22/tcp    open  ssh     syn-ack ttl 64
23/tcp    open  telnet  syn-ack ttl 64
25/tcp    open  smtp    syn-ack ttl 64
MAC Address: 00:0C:29:55:9F:CF (VMware)

Read data files from: /usr/bin/../share/nmap
Nmap done: 1 IP address (1 host up) scanned in 0.21 seconds
Raw packets sent: 5 (204B) | Rcvd: 5 (204B)
```

**-sC -sV** : To perform default script scan and service version scan.

```
rustscan -a 192.168.1.7 -- -sC -sV
```

```
(root@kali)-[~]
# rustscan -a 192.168.1.7 -- -sC -sV
-----
| {} | {} | { { _ { _ _ } { { _ / _ _ } / { } \ | ^ | |
| .- . \ | { _ } | .- . _ } } | | .- . _ } } \   } / ^ \ | \ |
|_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _ |_ _
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-----
: http://discord.skerritt.blog :
: https://github.com/RustScan/RustScan :
-----
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[~] The config file is expected to be at "/root/.rustscan.toml"
[!] File limit is lower than default batch size. Consider upping
[!] Your file limit is very small, which negatively impacts Rust
Open 192.168.1.7:21
Open 192.168.1.7:22
Open 192.168.1.7:23
Open 192.168.1.7:25
Open 192.168.1.7:53
Open 192.168.1.7:80
```

Results of service version and default script scan can be seen below.

```
PORT          STATE SERVICE          REASON          VERSION
21/tcp        open  ftp              syn-ack ttl 64  vsftpd 2.3.4
| ftp-syst:
|   STAT:
| FTP server status:
|   Connected to 192.168.1.5
|   Logged in as ftp
|   TYPE: ASCII
|   No session bandwidth limit
|   Session timeout in seconds is 300
|   Control connection is plain text
|   Data connections will be plain text
|   vsFTPD 2.3.4 - secure, fast, stable
|_End of status
|_ftp-anon: Anonymous FTP login allowed (FTP code 230)
22/tcp        open  ssh              syn-ack ttl 64  OpenSSH 4.7p1 Debian 8ubuntu1 (p
| ssh-hostkey:
|   1024 60:0f:cf:e1:c0:5f:6a:74:d6:90:24:fa:c4:d5:6c:cd (DSA)
| ssh-dss AAAAB3NzaC1kc3MAAACBALz4hsc8a2Srq4nLW960qV8xwBG0JC+jI7fWxm5METIjH
```



Rustscan can also be used to scan the entire subnet IP addresses by just adding a **/24** after the IP address.

```
rustscan -a 192.168.1.0/24
```

```
(root@kali)-[~]
# rustscan -a 192.168.1.0/24

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: http://discord.skerritt.blog           :
: https://github.com/RustScan/RustScan  :
-----

Nmap? More like slowmap.🐼

[~] The config file is expected to be at "/root/.rustscan.toml"
[!] File limit is lower than default batch size. Consider upping
[!] Your file limit is very small, which negatively impacts Rust
Open 192.168.1.7:21
Open 192.168.1.7:22
Open 192.168.1.7:23
Open 192.168.1.7:25
Open 192.168.1.7:53
Open 192.168.1.6:53
Open 192.168.1.1:53
Open 192.168.1.1:80
```

**-g** : To enable the "greppable" output format for easy parsing and analysis.

```
rustscan -a 192.168.1.7 -g
```

```
(root@kali)-[~]
# rustscan -a 192.168.1.7 -g
192.168.1.7 → [21,22,25,53,80,111,139,445,23,512,513,514,1099,1524,2049,2121]
```

**--accessible** : Turn on accessible mode, does not print ASCII art. Also does not print very large blocks of text, as this can cause some pain with screenreaders. This reduces the information you get.

```
rustscan -a 192.168.1.7 --accessible
```

```
(root@kali)-[~]  
# rustscan -a 192.168.1.7 --accessible  
File limit is lower than default batch size. Consider upper  
Your file limit is very small, which negatively impacts Ru  
Open 192.168.1.7:21  
Open 192.168.1.7:22  
Open 192.168.1.7:23  
Open 192.168.1.7:25  
Open 192.168.1.7:53  
Open 192.168.1.7:111  
Open 192.168.1.7:139  
Open 192.168.1.7:445  
Open 192.168.1.7:80  
Open 192.168.1.7:512  
Open 192.168.1.7:513  
Open 192.168.1.7:514  
Open 192.168.1.7:1099  
Open 192.168.1.7:1524  
Open 192.168.1.7:2049  
Open 192.168.1.7:2121  
Open 192.168.1.7:3306  
Open 192.168.1.7:3632  
Open 192.168.1.7:5432  
Open 192.168.1.7:5900  
Open 192.168.1.7:6000  
Open 192.168.1.7:6667  
Open 192.168.1.7:6697  
Open 192.168.1.7:8009  
Open 192.168.1.7:8180  
Open 192.168.1.7:8787  
Open 192.168.1.7:45165  
Open 192.168.1.7:45712  
Open 192.168.1.7:54505  
Open 192.168.1.7:57231  
Starting Script(s)
```

## Conclusion

Rustscan represents a significant advancement in network scanning technology. Its speed, efficiency, and versatility make it an invaluable tool for cybersecurity professionals. Whether conducting routine network audits or hunting for vulnerabilities, Rustscan is a must-have in your toolkit.

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