



NVIDIA DOCA DPI Compiler

User Guide

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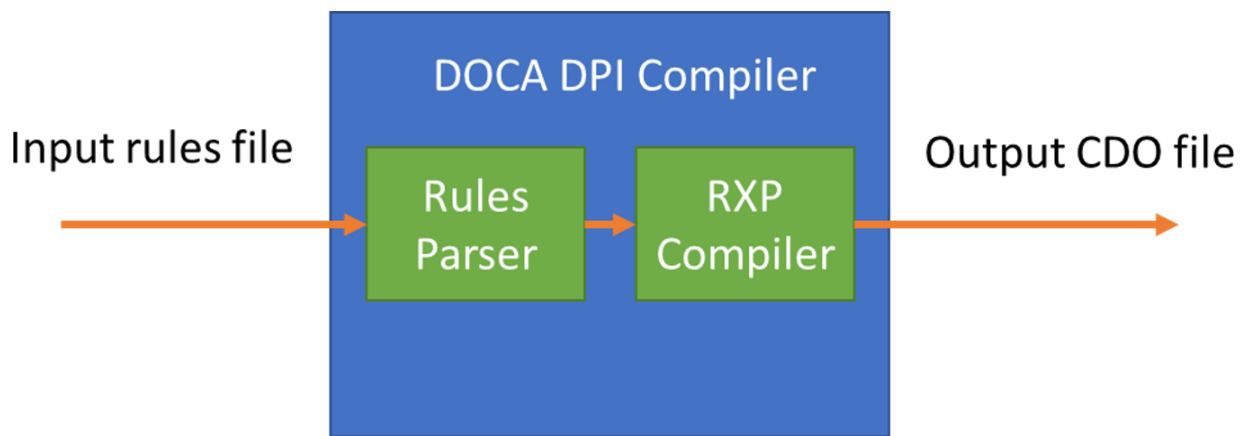
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Chapter 1. Introduction

DPI compiler is used to compile a signature file which will be loaded into the BlueField RegEx HW accelerator using a dedicated API (`doca_dpi_load_signatures(cdo_file)`). The output for the DPI compiler is a JSON-based CDO file.



This diagram contains the following elements:

- ▶ Input rules file – file containing a list of rules
 - Supported formats:
 - ▶ Suricata (limited support—see section "[Description](#)" for more information)
 - ▶ Third party signature files (for more information, please contact NVIDIA Support at: networking-support@nvidia.com).
- ▶ RXP compiler – regular expression compiler which is part of the DPI compiler
- ▶ Output CDO file – compiled signature output from compiler. File containing list of rules to be loaded to the RegEx engine.

Chapter 2. Description

The following is a Suricata syntax example:

```
alert udp any any -> any 53 (msg:"ET DOS DNS BIND 9 Dynamic Update DoS attempt";  
content:"|00 00 06|"; offset:8; content:"|c0 0c 00 ff|"; sid:2009701; )
```

Suricata rules are made of three parts – action, header, and options. Take the following rule for example:

```
drop tcp 1.1.1.1/11 8080 -> 2.2.2.2/22 9090 (msg:"ET TROJAN Likely Bot Nick in IRC  
(USA +..)"; flow: to_server; content:"NICK "; nocase; pcre:"/NICK .*USA.*[0-9]{3,}/  
iI"; sid:2008124;)
```

The following table breaks down the rule syntax:

| Part | Rule Element |
|---------|---|
| Action | drop |
| Header | tcp any any -> any any 1.1.1.1/11 8080 -> 2.2.2.2/22 9090 |
| Options | (msg:"ET TROJAN Likely Bot Nick in IRC (USA +..)"; flow: to_server; content:"NICK "; nocase; pcre:"/NICK .*USA.*[0-9]{3,}/i"; sid:2008124;) Detailed explanation can be found in Suricata's official documentation . |

DPI compiler has limited support for Suricata format. Field support is detailed in the following table:

| Part | Keyword | Support |
|--------|-----------|--|
| Action | Any | Accept any value. The application decides what to do with each action value. |
| Header | Protocol | tcp/udp |
| Header | Port | Single port number or range (ex. 100:150) |
| Header | Address | Single IP address and netmask (ex. 1.2.3.4/5) |
| Header | Direction | <ul style="list-style-type: none">➤ -> - unidirectional: client-to-server OR server-to-client (default is client-to-server)➤ <> - bidirectional: client to server and server to client |
| Option | msg | Any string – use to identify the rule in case of match on the DPI |

| Part | Keyword | Support |
|--------|---|---|
| Option | http. (must come before content option) | uri, cookie, user_agent, host, server, referer, content_type, location, request_body, response_body |
| Option | http_ (must come after content option) | uri, cookie, user_agent, host, referer, content_type, request_body, response_body |
| Option | content modifiers | nocase, startswith, endswith, offset Negation (!) for content is not supported |
| Option | PCRE modifiers | <ul style="list-style-type: none"> ▶ i – PCRE is case insensitive ▶ s – PCRE checks new line characters ▶ A – A pattern must match at the beginning of a buffer ▶ I – Makes PCRE match on the HTTP-raw-uri ▶ C – Makes PCRE match on the HTTP-cookie ▶ V – Makes PCRE match on the HTTP-User-Agent ▶ W – Makes PCRE match on the HTTP-Host ▶ P – Makes PCRE match on the HTTP-Content for CTS ▶ Q – Makes PCRE match on the HTTP-Content for STC |
| Option | ip_proto | Supported values: 1 (ICMP), 6 (TCP), 17 (UDP) |
| Option | flow | from_client, to_client, from_server, to_server |
| Option | tls. | sni – server name indication |
| Option | dns. | query |
| Option | sid | Any number |
| Option | gid | Group rules to have OR dependency for rules with the same sid. By default, every all gid are 0. |



Note: If content or PCRE are provided without a field (e.g., `http_uri`), content/PCRE is searched on TCP/UDP payload according to the header protocol.

Chapter 3. Execution

To execute the compiler:

```
Usage: doca_dpi_compiler [DOCA Flags] [Program Flags]
DOCA Flags:
  -h, --help            Print a help synopsis
  -v, --version          Print program version information
  -l, --log-level        Set the log level for the program <CRITICAL=0, DEBUG=4>
Program Flags:
  -i, --input            Full path to signature file
  -f, --format            Signature file format
  -o, --output            Full path to CDO file
  -c, --classtype        Path to the classtype file for priority in suricata
file
```

For example:

```
doca_dpi_compiler -i ./suricata_rules.rules -o compiler_output.cdo -f suricata
```

To run doca_dpi_compiler using a JSON file:


```
doca_dpi_compiler --json [json_file]
```

For example:

```
doca_dpi_compiler --json /tmp/doca_dpi_compiler.json
```

Chapter 4. Arg Parser DOCA Flags

Refer to [NVIDIA DOCA Arg Parser User Guide](#) for more information.

| Flag | Description | JSON Content |
|---|---|--|
| <code>-h / --help</code> | Print all information about the available options | N/A |
| <code>-i / --input</code> | Path to input files | <code>"input" : "/tmp/signatures.rules"</code> |
| <code>-o / --output</code> | Path to output file | <code>"output" : "/tmp/signatures.cdo"</code> |
| <code>-f / --format</code> | Signatures format | <code>"format" : "suricata"</code> |
| <code>-p / --print_rules-c / --classtype</code> | <div><p>Add the RegEx rules being passed to the RXPC to the CDO as well (useful for debug). Path to a classtype file containing information for priority in suricata format.</p><div> Note: Needed only for input files that contain a <code>classtype</code> field in the rules.</div></div> | <code>"classtype" : "/tmp/classtype_config.txt"</code> |
| <code>-v / --version</code> | Print the current DOCA version in use | N/A |

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