



NVIDIA DOCA DPI Compiler

User Guide

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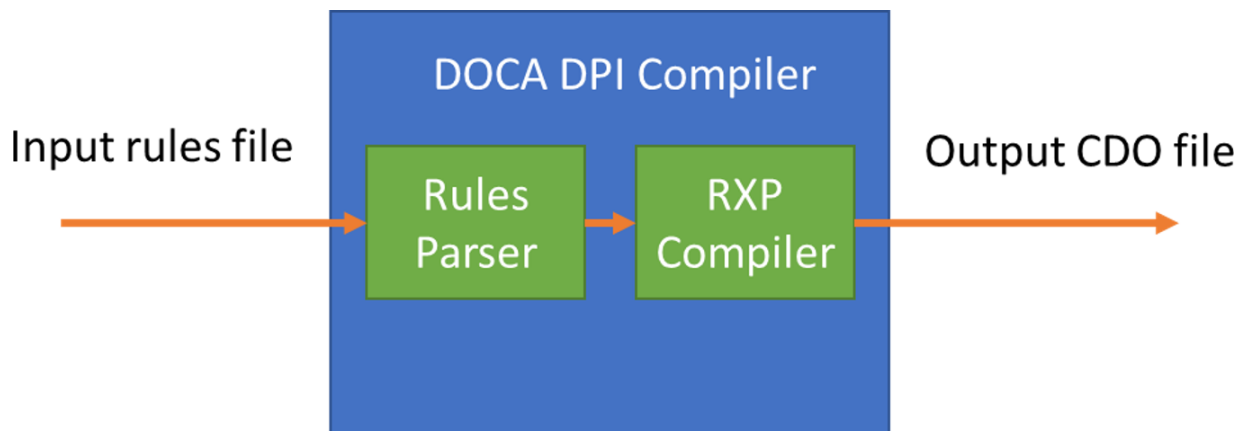
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Chapter 1. Introduction



Important: No updates were made to the DOCA DPI Compiler tool in DOCA 2.2. Please refer to DOCA 2.5 for a note regarding future updates.

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	Possible values: 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

Part	Keyword	Support
Option	msg	Any string – use to identify the rule in case of match on the DPI
Option	http. (must come before content option)	uri, cookie, user_agent, host, referer, content_type, 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 – signature's ID
Option	gid	Any number – group ID that can further differentiate signatures according to Suricata rules



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      <CRITICAL=20, ERROR=30, WARNING=40, INFO=50, DEBUG=60>

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
  -F, --force_compile Ignore any rules containing regex not compatible with
                      hardware. Skipped rules and reasons are output to a
                      .uncompiled.log 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 Programming 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>	<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> <p> Note: Needed only for input files that contain a <code>classtype</code> field in the rules.</p>	<code>"classtype" : "/tmp/classtype_config.txt"</code>
<code>-v / --version</code>	Print the current DOCA version in use	N/A

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