



# NVIDIA DOCA DPI Compiler

## User Guide

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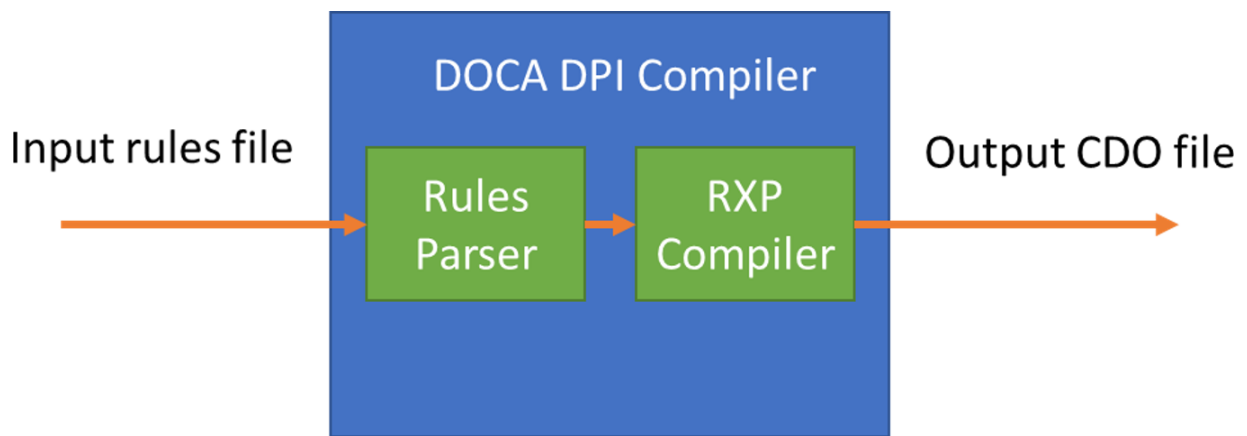
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# Chapter 1. Introduction

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](mailto: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 <a href="#">Suricata's official documentation</a> .

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"><li>➤ -&gt; - unidirectional: client-to-server OR server-to-client (default is client-to-server)</li><li>➤ &lt;&gt; - bidirectional: client to server and server to client</li></ul>
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"> <li>▶ i – PCRE is case insensitive</li> <li>▶ s – PCRE checks new line characters</li> <li>▶ A – A pattern must match at the beginning of a buffer</li> <li>▶ I – Makes PCRE match on the HTTP-raw-uri</li> <li>▶ C – Makes PCRE match on the HTTP-cookie</li> <li>▶ V – Makes PCRE match on the HTTP-User-Agent</li> <li>▶ W – Makes PCRE match on the HTTP-Host</li> <li>▶ P – Makes PCRE match on the HTTP-Content for CTS</li> <li>▶ Q – Makes PCRE match on the HTTP-Content for STC</li> </ul>
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.

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## 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> <b>Note:</b> 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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