Nginx App Protect UDP Lab Instructions

Version 1 8th June 2020 Pete White

# Introduction

The basic lab setup is complete – networking is configured and Nginx+ and App Protect are installed on nginx-1 with a basic nginx configuration.

This lab will run through the following exercises:

1. Enabling the App Protect module
2. Install the default policy
3. Configure remote logging
4. Enable various policy features
   1. enforcementMode
   2. VIOL\_HTTP\_PROTOCOL
   3. VIOL\_EVASION
   4. VIOL\_FILETYPE
5. Enable multiple policies
6. Perform troubleshooting of issues

# Lab Setup

Figure Lab Network Diagram

Client

10.1.1.4

Nginx-1

10.1.1.5

Server

10.1.1.6

External

10.1.10.0/24

Internal

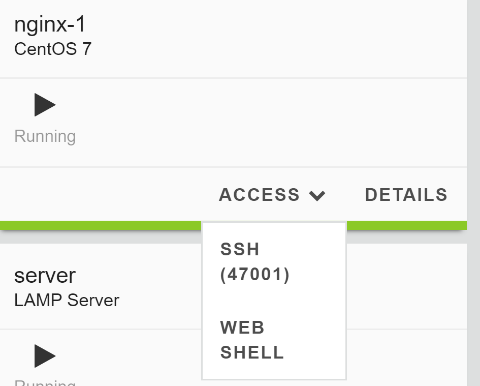
10.1.20.0/24

10 11

10 11

10.1.10.100:80

## An important note about SSH access

There are two methods by which you can access the devices – ssh or webshell. SSH is the most functional but requires some setup and web shell is the simplest but for instance doesn’t support copy and paste. See <https://help.udf.f5.com/en/articles/3347769-accessing-a-component-via-ssh> for more detailed information. **If you know how to do it, use SSH.**

# References

Use the following as references where you have issues or further questions

|  |  |
| --- | --- |
| Description | URL |
| App Protect Admin Guide | <https://docs.nginx.com/nginx-app-protect/admin-guide/> |
| App Protect Configuration Guide | <https://docs.nginx.com/nginx-app-protect/configuration/> |
| App Protect Declarative Policy Guide | <https://docs.nginx.com/nginx-app-protect/policy/> |
| App Protect Troubleshooting Guide | <https://docs.nginx.com/nginx-app-protect/troubleshooting/> |
| “Getting started with NGINX App-Protect”  F5 Internal Reference Pages | <https://docs.f5net.com/display/~melnik/Getting+started+with+NGINX+App-Protect> |

# Lab Exercises

## Lab 1 – Enable the App Protect Module

**This section demonstrates basic loadbalancing via nginx, tests the networking, and adds the App Protect module**

### Review and test basic connectivity

* Login to the client
* Run the command curl http://app.example.com and ensure that the web page is returned, as below:

ubuntu@ip-10-1-1-4:~$ curl http://app.example.com

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

100 3968 100 3968 0 0 361k 0 --:--:-- --:--:-- --:--:-- 387k

<html>

<head>

<TITLE>Using virtual server app\_example\_com and pool member 10.1.20.11 (Node #1)

</TITLE>

<meta http-equiv="Content-Type" content="text/html; charset=us-ascii" />

* Login to nginx-1 and check the nginx logs using the command tail /var/log/nginx/access.log, check the output is as per below:

[centos@ip-10-1-1-5 nginx]$ tail -5 access.log

10.1.10.10 - - [08/Jun/2020:17:34:55 +0000] "GET / HTTP/1.1" 200 3968 "-" "curl/7.47.0" "-"

### Enable the App Protect Module

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and add the load\_module command as the first line, as shown below:

load\_module modules/ngx\_http\_app\_protect\_module.so;

user nginx;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown
* Run the command curl http://app.example.com?a=%3Cscript%3E and ensure the page is shown as previously
* Check the nginx logs using the command tail /var/log/nginx/access.log, check the output is as per below:

10.1.10.10 - - [08/Jun/2020:18:50:29 +0000] "GET / HTTP/1.1" 200 3968 "-" "curl/7.47.0" "-"

10.1.10.10 - - [08/Jun/2020:18:50:32 +0000] "GET /?a=%3Cscript%3E HTTP/1.1" 200 247 "-" "curl/7.47.0" "-"

## Lab 2 - Enable the default App Protect security policy

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and add the *app\_protect\_enable on* command as the first line of the http stanza, as shown below:

http {

app\_protect\_enable on;

include /etc/nginx/mime.types;

* Run the command curl http://app.example.com?a=%3Cscript%3E and ensure that the request **IS** blocked as shown below:

ubuntu@ip-10-1-1-4:~$ curl http://app.example.com?a=%3Cscript%3E

<html><head><title>Request Rejected</title></head><body>The requested URL was rejected. Please consult with your administrator.<br><br>Your support ID is: 16094438418830557963<br><br><a href='javascript:history.back();'>[Go Back]</a></body></html>ubuntu@ip-10-1-1-4:~$

**Note that this request has been blocked by the default App Protect policy**

## Lab 3 – Configure Remote Logging

### Basic Setup

#### Nginx Configuration

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and add the *app\_protect\_security\_log\_enable* and *app\_protect\_security\_log* commands below the previous configuration, as shown below:

http {

app\_protect\_enable on;

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-default.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Viewing Log Messages

* Login to the server system and run the command tailf /var/log/syslog
* Run the command curl http://app.example.com?a=%3Cscript%3E and ensure that the request **IS** blocked as previously
* Ensure that the log arrives at the server such as below:

Jun 8 20:26:26 ip-10-1-1-5.us-west-2.compute.internal ASM: attack\_type="Non-browser Client,Abuse of Functionality,Cross Site Scripting (XSS)",blocking\_exception\_reason="N/A",date\_time="2020-06-08 20:26:26",dest\_port="80",ip\_client="10.1.10.10",is\_truncated="",method="GET",policy\_name="app\_protect\_default\_policy",protocol="HTTP",request\_status="blocked",response\_code="0",severity="Critical",sig\_cves="N/A",sig\_ids="200001475,200000098",sig\_names="XSS script tag end (Parameter) (2),XSS script tag (Parameter)",sig\_set\_names="{Cross Site Scripting Signatures;High Accuracy Signatures},{Cross Site Scripting Signatures;High Accuracy Signatures}",src\_port="59092",sub\_violations="N/A",support\_id="6955822085203780933",unit\_hostname="N/A",uri="/",violation\_rating="5",vs\_name="38-app.example.com:1-/",x\_forwarded\_for\_header\_value="N/A",outcome="REJECTED",outcome\_reason="SECURITY\_WAF\_VIOLATION",violations="Illegal meta character in value,Attack signature detected,Violation Rating Threat detected"

* Run the command curl http://app.example.com and ensure that the request **IS NOT** blocked
* Ensure that the log arrives at the server as below:

Jun 8 20:27:24 ip-10-1-1-5.us-west-2.compute.internal ASM: attack\_type="N/A",blocking\_exception\_reason="N/A",date\_time="2020-06-08 20:27:24",dest\_port="80",ip\_client="10.1.10.10",is\_truncated="",method="GET",policy\_name="app\_protect\_default\_policy",protocol="HTTP",request\_status="passed",response\_code="200",severity="Informational",sig\_cves="N/A",sig\_ids="N/A",sig\_names="N/A",sig\_set\_names="N/A",src\_port="59094",sub\_violations="N/A",support\_id="6955822085203781443",unit\_hostname="N/A",uri="/",violation\_rating="0",vs\_name="38-app.example.com:1-/",x\_forwarded\_for\_header\_value="N/A",outcome="PASSED",outcome\_reason="SECURITY\_WAF\_OK",violations="N/A",violation\_details="N/A",request="GET / HTTP/1.1\r\nHost: app.example.com\r\nUser-Agent: curl/7.47.0\r\nAccept: \*/\*\r\n"#015

### Log illegal requests only

#### Nginx Configuration

* Create a new file called log-illegal.json using the command sudo vi /etc/nginx/log-illegal.json with the content below:

{

"filter": {

"request\_type": "illegal"

},

"content": {

"format": "user-defined",

"format\_string": "Request ID %support\_id%: %method% %uri% received on %date\_time% from IP %ip\_client% had the following violations: %violations%",

"max\_request\_size": "any",

"max\_message\_size": "5k"

}

}

**Note that you can try different options here by referencing the documentation at** <https://docs.nginx.com/nginx-app-protect/troubleshooting/#app-protect-logging-overview>

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_security\_log* command to reference the new filename, as shown below:

http {

app\_protect\_enable on;

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Legal Requests

* Run the command curl http://app.example.com and ensure that the request **IS NOT** blocked
* Ensure that the log **DOES NOT** arrive at the server

#### Illegal Requests

* Run the command curl http://app.example.com?a=%3Cscript%3E and ensure that the request **IS** blocked as previously
* Ensure that the log arrives at the server as previously

## **Lab 4 – Enable Various Policy Features**

In this section we will create various policy files to demonstrate some of the policy features available.

Refer to the nginx documentation at <https://docs.nginx.com/nginx-app-protect/configuration/> where required.

### Enforcement Mode

#### Nginx Configuration

* Create a new file called policy-transparent.json using the command sudo vi /etc/nginx/policy-transparent.json with the content below:

{

"policy": {

"name": "policy-transparent",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "transparent"

}

}

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_policy\_file* command to reference the policy file, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/policy-transparent.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send Illegal Request

* Run the command curl http://app.example.com?a=%3Cscript%3E and ensure that the request **IS NOT** blocked
* Ensure that the log arrives at the server as previously

### VIOL\_HTTP\_PROTOCOL

In this lab we will enable the VIOL\_HTTP\_PROTOCOL violation globally in the Blocking Settings section and configure the alarm and block settings independently.

#### Nginx Configuration

* Create a new file called policy- viol\_http\_protocol.json using the command sudo vi /etc/nginx/policy-viol\_http\_protocol.json with the content below:

{

"policy": {

"name": "policy-viol\_http\_protocol",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "blocking",

"blocking-settings": {

"violations": [

{

"name": "VIOL\_HTTP\_PROTOCOL",

"alarm": true,

"block": true

}

]

}

}

}

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_policy\_file* command to reference the policy file, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/policy-viol\_http\_protocol.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send Illegal Request – blocked by WAF

* Run the command curl -H "Host: 1.2.3.4" http://app.example.com and ensure that the request **IS** blocked
* Ensure that the log arrives at the server as previously

#### Send Illegal Request – blocked by Nginx

* Run the command curl -H "Content-Length: -26" http://app.example.com and ensure that the request is rejected by NGINX which returns the 400 Bad Request
* Ensure that the log arrives at the server as previously

#### Turn Off Alarm

* Modify the policy file using the command sudo vi /etc/nginx/policy-viol\_http\_protocol.json to set the violation to block but not alarm as below:

"name": "VIOL\_HTTP\_PROTOCOL",

"alarm": false,

"block": true

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send Illegal Request – blocked but no log

* Run the command curl -H "Host: 1.2.3.4" http://app.example.com and ensure that the request **IS** blocked
* Ensure that the log **DOES NOT** arrive at the server

**Note: If the log still arrives at the server, you should check that the WAF is only logging illegal requests. For reference, see Lab 3**

#### Turn Off blocking

* Modify the policy file to set the violation to alarm but not block, as below:

"name": "VIOL\_HTTP\_PROTOCOL",

"alarm": true,

"block": false

* Restart the nginx daemon

#### Send Illegal Request – logged but no block

* Run the command curl -H "Host: 1.2.3.4" http://app.example.com and ensure that the request **IS** **NOT** blocked
* Ensure that the log **DOES** arrive at the server

### VIOL\_EVASION

In this lab we will enable the VIOL\_EVASION violation globally in the Blocking Settings section, and look at how to disable blocking for individual evasion techniques.

#### Nginx Configuration

* Create a new file called policy- viol\_evasion.json using the command sudo vi /etc/nginx/policy-viol\_evasion.json with the content below:

{

"policy": {

"name": "policy-viol\_evasion",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "blocking",

"blocking-settings": {

"violations": [

{

"name": "VIOL\_EVASION",

"alarm": true,

"block": true

}

]

}

}

}

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_policy\_file* command to reference the policy file, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/policy-viol\_evasion.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send Illegal Request – blocked by WAF

* Run the command curl http://app.example.com/%09 and ensure that the request **IS** blocked
* Ensure that the log arrives at the server as previously

#### Disable blocking for all violations

* Set the policy so that block is set to false for VIOL\_EVASION and restart the nginx daemon
* Run the curl command as above and ensure that the response is 404 Not Found ie **NOT BLOCKED** by WAF

**Note that this has disabled ALL evasion violations**

#### Enable blocking for all violations, disable Apache Whitespace violation

* Modify the policy file to disable the apache whitespace check as below, and restart the nginx daemon:

{

"policy": {

"name": "policy-viol\_evasion",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "blocking",

"blocking-settings": {

"violations": [

{

"name": "VIOL\_EVASION",

"alarm": true,

"block": true

}

],

"evasions": [

{

"description": "Apache whitespace",

"enabled": "false"

}

]

}

}

}

* Run the curl command again and ensure that the request **IS NOT** blocked by the WAF

**Note that we have enabled all violations and only disabled the one which gives us a problem. A much better solution**

### VIOL\_FILETYPE

In this lab we will enable the VIOL\_FILETYPE violation in Blocking Settings, and show the default negative policy ie all filetypes are accepted except for a specific list of disallowed file types. We will then change the default policy to block all filetypes except for the allowed type. ie positive policy.

#### Nginx Configuration

* Create a new file called policy- viol\_evasion.json using the command sudo vi /etc/nginx/policy-viol\_filetype.json with the content below:

{

"policy": {

"name": "policy-viol\_filetype",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "blocking",

"blocking-settings": {

"violations": [

{

"name": "VIOL\_FILETYPE",

"alarm": true,

"block": true

}

]

}

}

}

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_policy\_file* command to reference the policy file, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/policy-viol\_filetype.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send legal Request – allowed

* Run the command curl http://app.example.com/index.php and ensure that the request **IS NOT** blocked or logged

#### Send Illegal Request – blocked

* Run the command curl http://app.example.com/test.exe and ensure that the request **IS** blocked
* Ensure that the log arrives at the server as previously

**Note that .exe is on the list of disallowed filetypes which is the reason why this request is blocked**

#### Nginx Configurationto change the default policy

* Modify the file policy- viol\_evasion.json to match the content below, and reload nginx:

{

"policy": {

"name": "policy-viol\_filetype",

"template": { "name": "POLICY\_TEMPLATE\_NGINX\_BASE" },

"applicationLanguage": "utf-8",

"enforcementMode": "blocking",

"blocking-settings": {

"violations": [

{

"name": "VIOL\_FILETYPE",

"alarm": true,

"block": true

}

This part is adding html as an explicit allowed filetype

]

},

"filetypes": [

{

"name": "html",

"type": "explicit",

"allowed": true

}

]

},

This part is modifying the default policy to delete the wildcard filetype

"modifications": [

{

"entityChanges": {

"type": "wildcard"

},

"entity": {

"name": "\*"

},

"entityType": "filetype",

"action": "delete"

}

]

}

#### Send legal Request – allowed

* Run the command curl http://app.example.com/badlinks.html and ensure that the request **IS NOT** blocked or logged

#### Send Illegal Request – blocked

* Run the command curl http://app.example.com/index.php and ensure that the request **IS** blocked
* Ensure that the log arrives at the server as previously

## **Lab 5 – Enable multiple policies**

In this section we will demonstrate the use of two policies which are applied to two different URLs within location blocks.

#### Nginx Configuration

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and change the *app\_protect\_policy\_file* command to reference the default policy file, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/NginxDefaultPolicy.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Add a new location block as below:

server {

listen 10.1.10.100:80 default\_server;

server\_name app.example.com;

location / {

proxy\_pass http://app\_example\_com;

}

location /basic {

app\_protect\_policy\_file "/etc/nginx/policy-viol\_filetype.json";

proxy\_pass http://app\_example\_com;

}

}

* Restart the nginx daemon using the command sudo nginx -s reload and ensure there are no error messages shown

#### Send legal Request – allowed

* Run the command curl http://app.example.com/index.php and ensure that the request **IS NOT** blocked or logged

#### Send Illegal Request – blocked

* Run the command curl http://app.example.com/basic/index.php and ensure that the request **IS** blocked
* Ensure that the log arrives at the server as previously

## **Lab 6 – Troubleshooting**

In this section we will create various issues with the policy file and nginx.conf and show how to troubleshoot these.

### nginx.conf Issues

In this lab we will demonstrate an issue with the nginx configuration – an incorrect filename which prevents the policy being loaded.

#### Nginx Configuration

* Using the command sudo vi /etc/nginx/nginx.conf, edit the nginx configuration file and remove the location /basic stanza created in lab 5 and also change the global policy filename to be incorrect, as shown below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/NginxDefaultPolicywrong.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Restart the nginx daemon using the command sudo nginx -s reload and view the error message as shown below:

[centos@ip-10-1-1-5 nginx]$ sudo nginx -s reload

{

"completed\_successfully" : false,

"error\_message" : "Failed to read '/etc/nginx/NginxDefaultPolicywrong.json'",

"error\_line\_number" : 19

}

nginx: [error] APP\_PROTECT { "event": "configuration\_load\_failure", "software\_version": "2.52.1", "error\_message":"Failed to read '/etc/nginx/NginxDefaultPolicywrong.json'","completed\_successfully":false,"error\_line\_number":19}

[centos@ip-10-1-1-5 nginx]$

**Note the error\_line\_number is the line on which the error is found and the error\_message is relevant to the error**

* View the error log using the command sudo tail /var/log/nginx/error.log, notice the error message such as below:

2020/06/26 11:59:19 [error] 2291#2291: APP\_PROTECT { "event": "configuration\_load\_failure", "software\_version": "2.52.1", "error\_message":"Failed to read ‘/etc/nginx/NginxDefaultPolicywrong.json’","completed\_successfully":false, "error\_line\_number":19}

**Note that the log level is [error] and is tagged with APP\_PROTECT. The content is in JSON format.**

* Correct the filename in nginx.conf and reload nginx, ensure the policy loads as expected

### Policy Issues

In this lab we will demonstrate issues with the policy – non-JSON format, and incorrect variable types

#### Policy Configuration

* Modify /etc/nginx/nginx.conf to use the policy as per Lab 4 - /etc/nginx/policy-viol\_filetype.json
* Modify the policy to remove the double-quote at the start of filetypes as per below:

filetypes": [

{

"name": "html",

"type": "explicit",

"allowed": true

}

]

* Restart the nginx daemon and note the failure message as below:

[centos@ip-10-1-1-5 nginx]$ sudo nginx -s reload

{

"completed\_successfully" : false,

"error\_message" : "Failed to import Policy '/etc/nginx/policy-viol\_filetype.json' from '/etc/nginx/policy-viol\_filetype.json': Fail parse JSON Policy: '\"' expected, at character offset 441 (before \"filetypes\": [\\n ...\") \n.",

"error\_line\_number" : 44

}

nginx: [error] APP\_PROTECT { "event": "configuration\_load\_failure", "software\_version": "2.52.1", "error\_message":"Failed to import Policy '/etc/nginx/policy-viol\_filetype.json' from '/etc/nginx/policy-viol\_filetype.json': Fail parse JSON Policy: '\"' expected, at character offset 441 (before \"filetypes\": [\\n ...\") \n.","completed\_successfully":false,"error\_line\_number":44}

**Note that the error indicates the error type ie ‘Fail parse JSON policy:** '**\**"' **expected’ and both the line number and the character offset**

* View the error log using the command sudo tail /var/log/nginx/error.log, notice the error message such as below:

2020/06/26 12:05:03 [error] 2358#2358: APP\_PROTECT { "event": "configuration\_load\_failure", "software\_version": "2.52.1", "error\_message":"Failed to import Policy '/etc/nginx/policy-viol\_filetype.json' from '/etc/nginx/policy-viol\_filetype.json': Fail parse JSON Policy: '\"' expected, at character offset 441 (before \"filetypes\": [\\n ...\") \n.","completed\_successfully":false,"error\_line\_number":44}

* To check the policy file for JSON errors, run the command cat /etc/nginx/policy-viol\_filetype.json | python -m json.tool and note the output showing the error in more detail as below:

[centos@ip-10-1-1-5 nginx]$ cat /etc/nginx/policy-viol\_filetype.json | python -m json.tool

Expecting property name: line 44 column 9 (char 441)

[centos@ip-10-1-1-5 nginx]$

* To find the error in the file, open the policy using the command sudo vi /etc/nginx/policy-viol\_filetype.json and use the command :16 to jump to the relevant line, use :goto 441 to jump to the character offset
* Fix the error by replacing the double-quote in the policy file and reloading nginx
* Re-check the file JSON format is correct as below ie no errors:

[centos@ip-10-1-1-5 nginx]$ cat /etc/nginx/policy-viol\_evasion.json|python -m json.tool

{

"policy": {

"applicationLanguage": "utf-8",

"blocking-settings": {

"evasions": [

{

…

* Modify the policy and change “allowed”: true to “allowed”: 12 ie change from Boolean type to integer, as per below:

"filetypes": [

{

"name": "html",

"type": "explicit",

"allowed": 12

}

]

* Reload nginx and view error as below:

[centos@ip-10-1-1-5 nginx]$ sudo nginx -s reload

{

"completed\_successfully" : false,

"error\_message" : "Failed to import Policy 'policy-viol\_filetype' from '/etc/nginx/policy-viol\_filetype.json': Could not parse/validate the File Type. Invalid value '12' for field 'allowed'.",

"error\_line\_number" : 44

}

nginx: [error] APP\_PROTECT { "event": "configuration\_load\_failure", "software\_version": "2.52.1", "error\_message":"Failed to import Policy 'policy-viol\_filetype' from '/etc/nginx/policy-viol\_filetype.json': Could not parse/validate the File Type. Invalid value '12' for field 'allowed'.","completed\_successfully":false,"error\_line\_number":44}

[centos@ip-10-1-1-5 nginx]$

* Fix the error and reload nginx

### Debugging App Protect

In this lab we will demonstrate how to turn on debugging of App Protect such as where a specific area of functionality is not working as expected.

#### Nginx Configuration

* Modify /etc/nginx/nginx.conf to use the HTTP protocol policy file from Lab 4, as below:

http {

app\_protect\_enable on;

app\_protect\_policy\_file "/etc/nginx/policy-viol\_http\_protocol.json";

app\_protect\_security\_log\_enable on;

app\_protect\_security\_log "/etc/nginx/log-illegal.json" syslog:server=10.1.20.11:514;

* Reload nginx

#### Logger Configuration File

* Modify /etc/app\_protect/bd/logger.cfg ( the default logging configuration file ) using the command sudo vi /etc/app\_protect/bd/logger.cfg
* Note the names of the modules which can be configured for debugging:

################################################################################################

#

# Logger configuration file

#

# Existing modules:

#

# IO\_PLUGIN (Requests & Responses) FTP\_PLUGIN (ftp) SMTP\_PLUGIN (smtp)

# BEM (Accumulation Responses), ECARD (Tables),

# ECARD\_POLICY (Enforcer), BD\_SSL (Communications), UMU (Memory),

# IMF (Sockets), BD\_MISC (Config and miscs),COOKIE\_MGR (Cookies), REG\_EXP (Regular expressions),

# RESP\_PARAMS (Extractions), ATTACK\_SIG (Attack Signatures), BD\_XML(XML Enforcer),

# ATTACK\_ENGINE (BF & BOT detect monitor), XML\_PARSER (all xml engine), ACY (pattern match engine),

# BD\_PB (policy builder), BD\_PB\_SAMPLING (sampling decisions for pb), LEGAL\_HASH (internal cache tables),

# CLIENT\_SIDE (Client Side infrastructre), STATS (policy builder statistics), ICAP (content inspection),

# CLUSTER\_ANOMALY (the anomaly distributed channel), PIPE (shmem channel bd-pbng, bd-lrn),

# MPP\_PARSER (Multipart parser), SA\_PLUGIN (Session awareness), DATA\_PROTECT (Data Protection Library),

# GDM (Guardium DB security), ASM\_IRULE (ASM iRule commands), LIBDATASYNC (Data Sync Library),

# BD\_CONF (BD MCP configuration), MPI\_CHANNEL (BD initiated MPI events),

# BD\_FLUSH\_TBLS(flush BD conf tables), CSRF (CSRF feature), BRUTE\_FORCE\_ENFORCER (Brute Force feature),

# LONG\_REQUEST (Long request), HTML\_PARSER (HTML parser)

* Add the following lines at the end of the file:

MODULE = IO\_PLUGIN;

LOG\_LEVEL = TS\_DEBUG;

FILE = 2;

* Run the following command to begin debugging: sudo /bin/bash -c '/opt/app\_protect/bin/set\_active.pl -g' nginx
* Capture the debug file output using the command tail -f /var/log/app\_protect/bd-socket-plugin.log
* On the client, run the command curl -H "Host: 1.2.3.4" http://app.example.com and view the debug output
* Remove the added lines from /etc/app\_protect/bd/logger.cfg and run the command sudo /bin/bash -c '/opt/app\_protect/bin/set\_active.pl -g' nginx to disable the debug logging

**Well Done! This lab is complete**