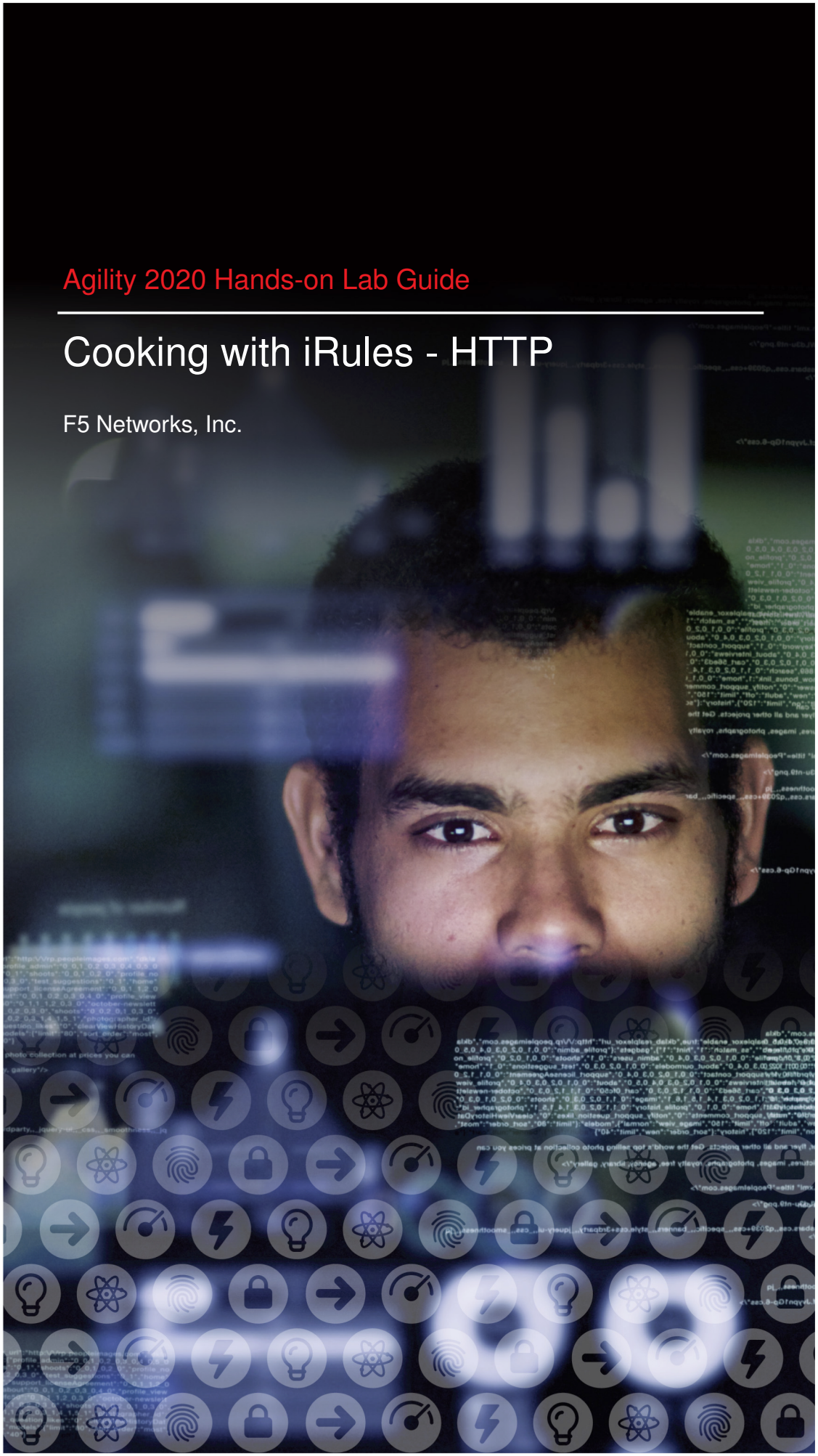


Agility 2020 Hands-on Lab Guide

Cooking with iRules - HTTP

F5 Networks, Inc.

Contents:

1 Getting Started **5**
1.1 Lab Topology 5

2 Cooking with iRules - HTTP **7**
2.1 Lab Components 7

1 Getting Started

Please follow the instructions provided by the instructor to start your lab and access your jump host.

Note: All work for this lab will be performed exclusively from the Windows jumphost. No installation or interaction with your local system is required.

1.1 Lab Topology

The following components have been included in your lab environment:

- 2 x F5 BIG-IP VE (v12.1)
- 1 x F5 iWorkflow VE (v2.1)
- 1 x Linux LAMP Webserver (xubuntu 14.04)
- 1 x Windows Jumphost

1.1.1 Lab Components

The following table lists VLANS, IP Addresses and Credentials for all components:

Component	VLAN/IP Address(es)	Credentials
Sample Host	• **Management:** 10.1.1.250 • **Internal:** 10.1.10.250 • **External:** 10.1.20.250	`admin`/`admin`

2 Cooking with iRules - HTTP

This class covers the following topics:

- HTTP Protocol Review
- HTTP Request Side Overview
- HTTP Response Side Overview
- HTTP Related Events
- HTTP Headers
- STREAM Command
- HTTP Payload Capture and Manipulation (If time permits)
- SSL::profile (If time permits)

Expected time to complete: **1.25 hours**

Note: All work for this lab will be performed exclusively from the Windows jumphost. No installation or interaction with your local system is required.

2.1 Lab Components

The following table lists the Credentials for all components:

Component	VLAN/IP Address(es)	Credentials
BigIP	**Management:** bigip1	`admin/admin.F5demo.com`
Jumphost	**Jumphost:** TBD	`external_user/P@ssw0rd!`

2.1.1 Cooking with iRules Labs

This is the collection of HTTP Labs. Here is where you get to prove you listened in class :)

Lab 1 - Create an iRule that Parses the URI to Route Traffic

Creating your first HTTP iRule that routes traffic based upon the value of the Host name.

The goal of this lab is to route incoming HTTP requests to a specfic pool based on the incoming http host name.

Please create an iRule that will route traffic based on the following table:

Host Name	Pool Name
dvwa.f5lab.com	**dvwa_pool_http**
peruggia.f5lab.com	**peruggia_http_pool**
wackopicko.f5lab.com	**wackopicko_http_pool**

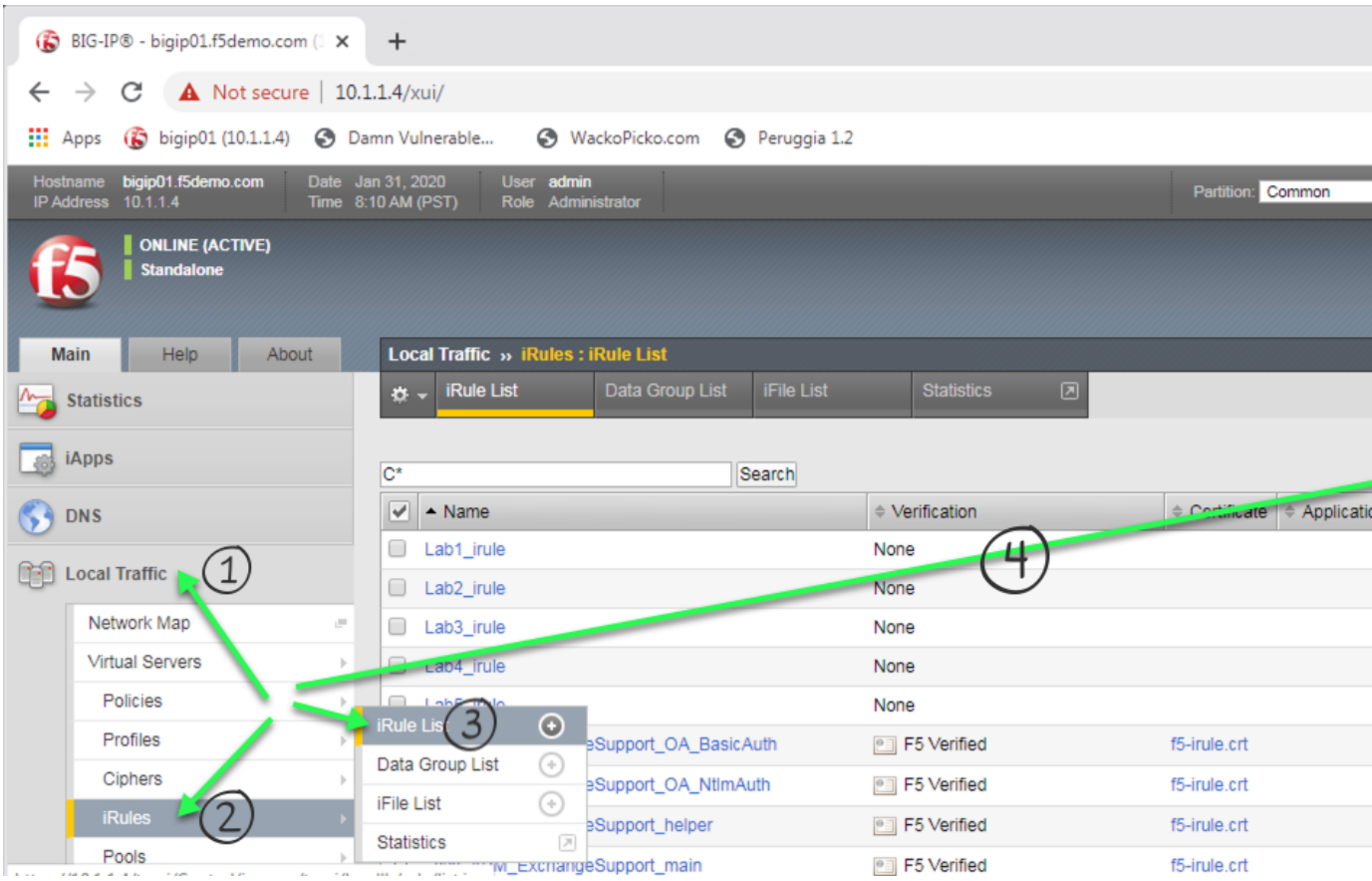
Important:

- Estimated completion time: 10 minutes

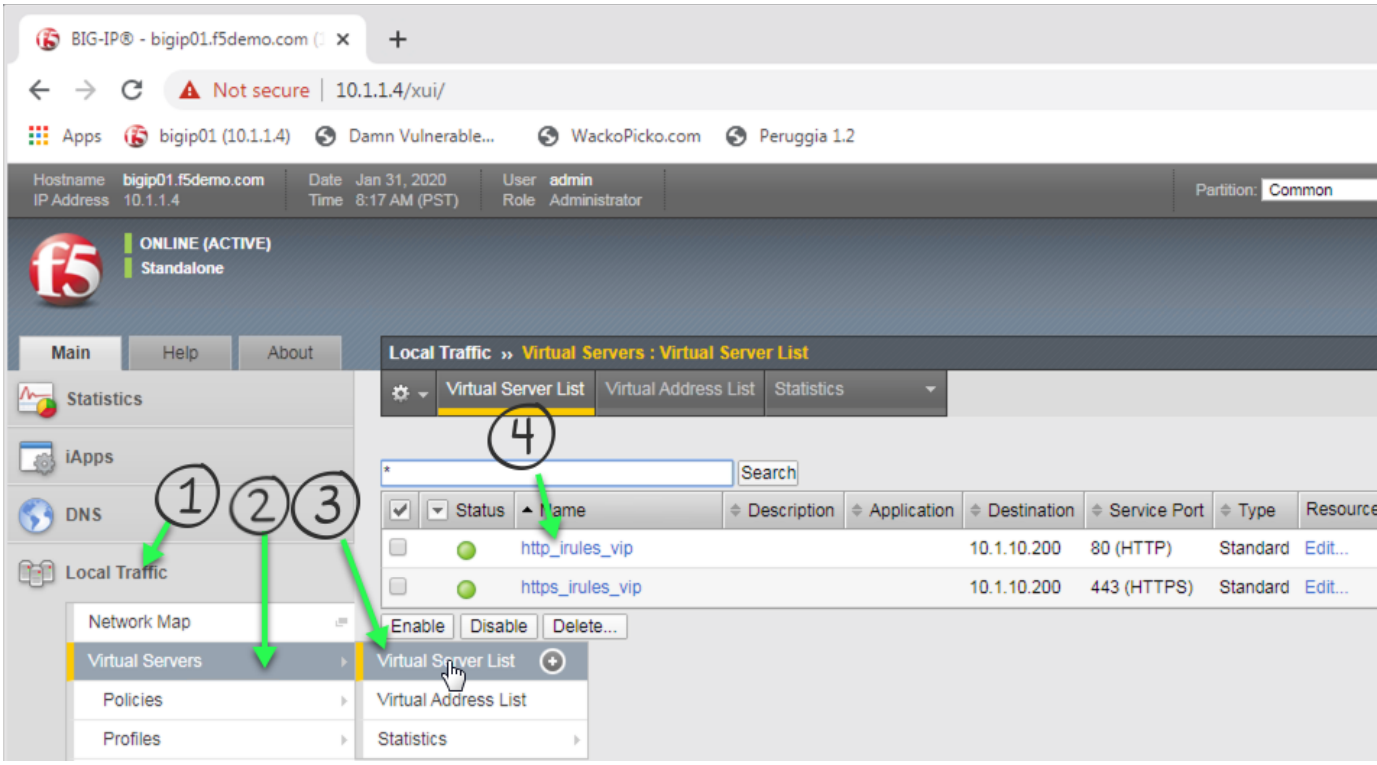
---

1. Open Chrome Browser
2. Enter https://bigip1 into the address bar and hit Enter

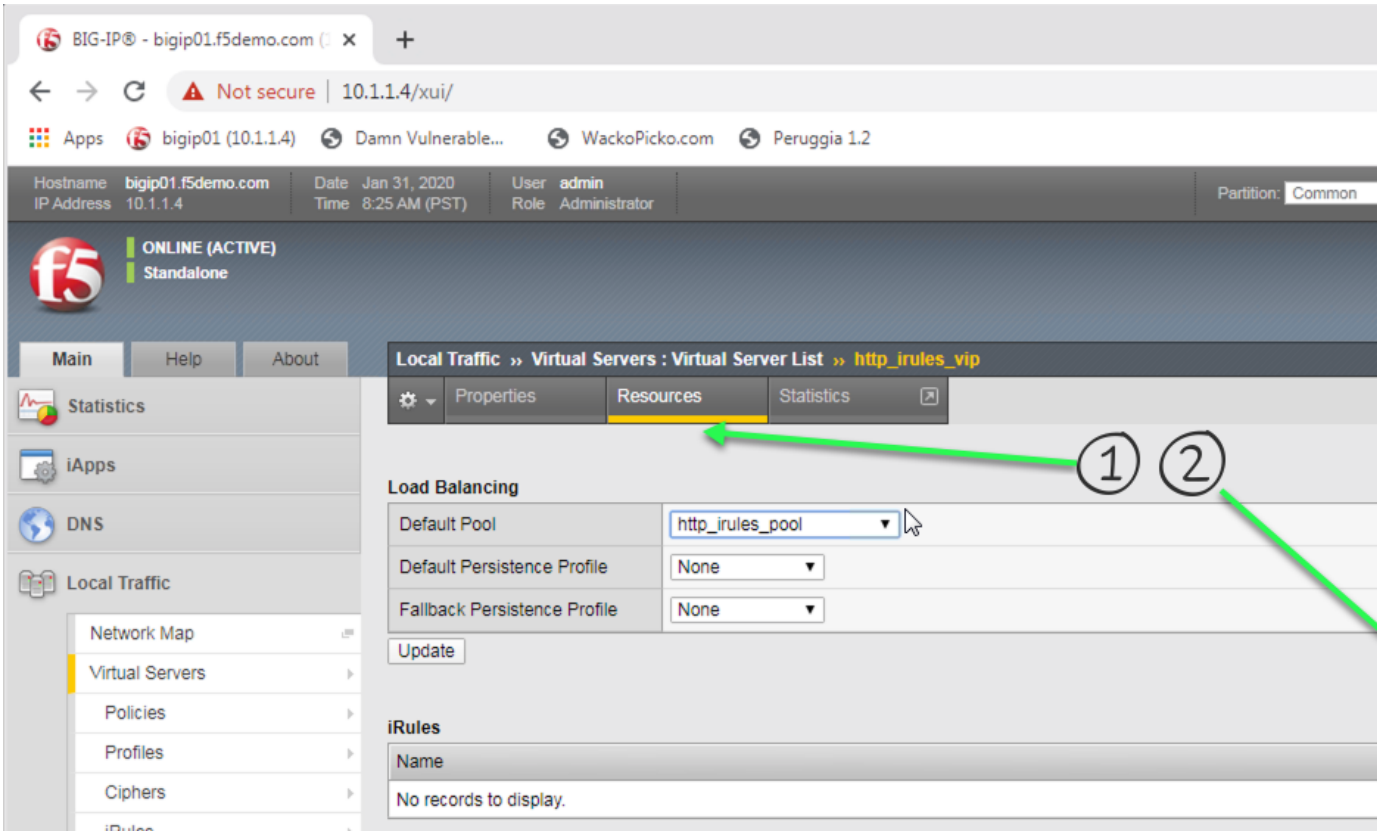
3. **Login with username: admin password**: **admin.F5demo.com**
4. Click Local Traffic -> iRules -> iRules List
5. Click **Create** button



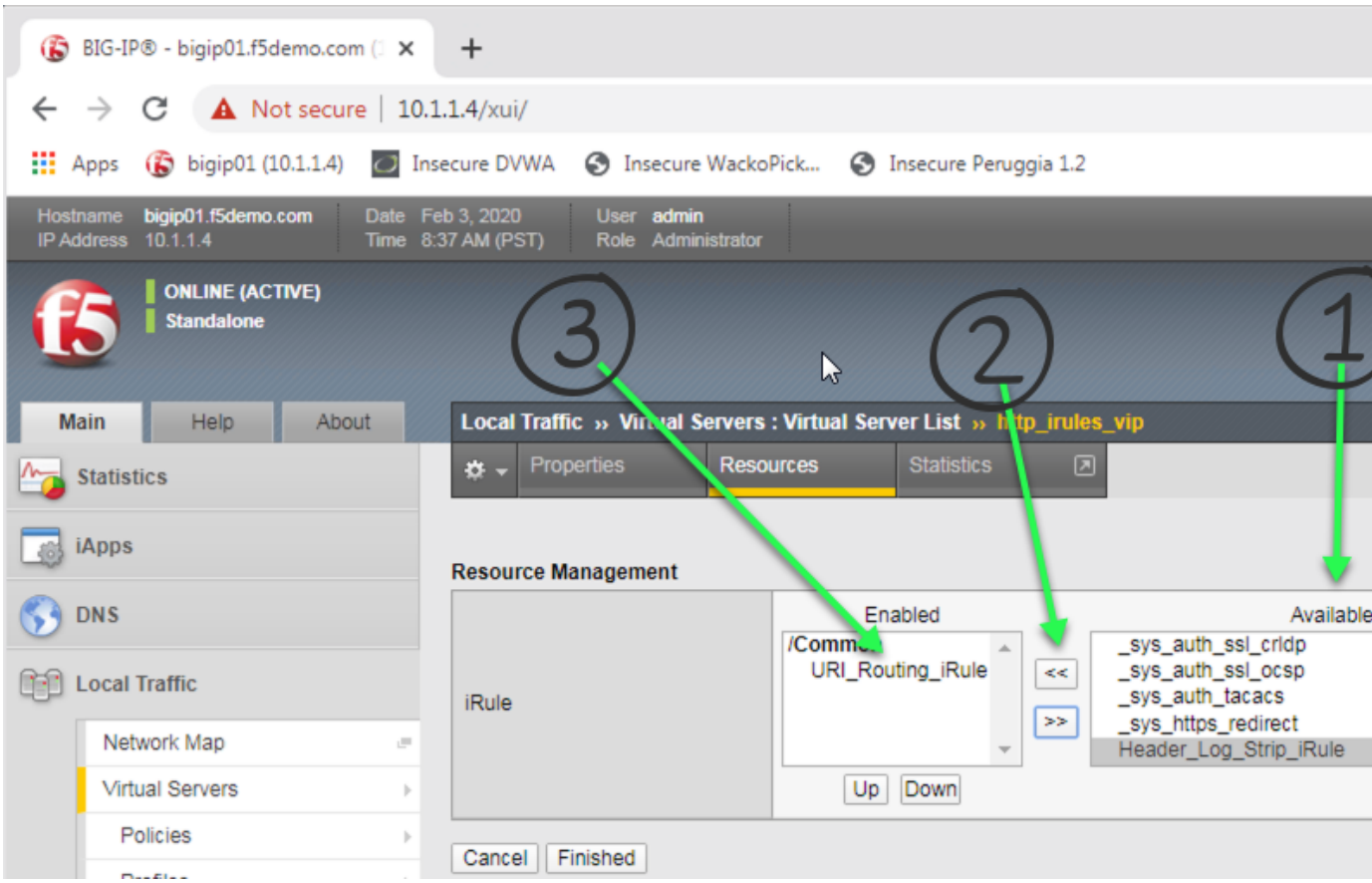
6. Enter Name of **URI_Routing_iRule**
7. Enter your code
8. Click **Finished**
9. Click Local Traffic -> Virtual Servers -> Virtual Server List
10. Click on **http_irules_vip**



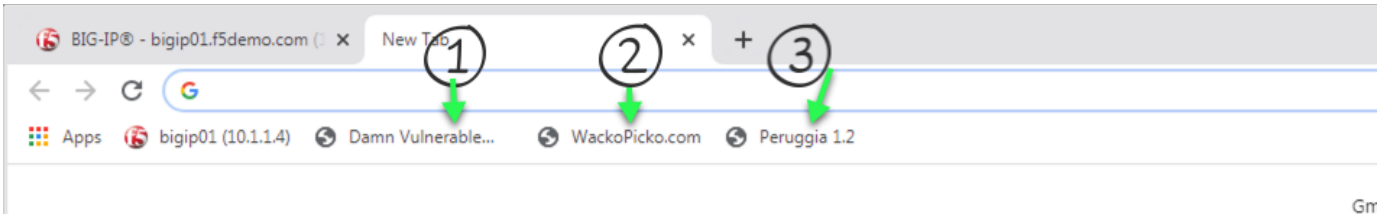
11. Click on the **Resources tab**
12. Click **Manage** button for the iRules section



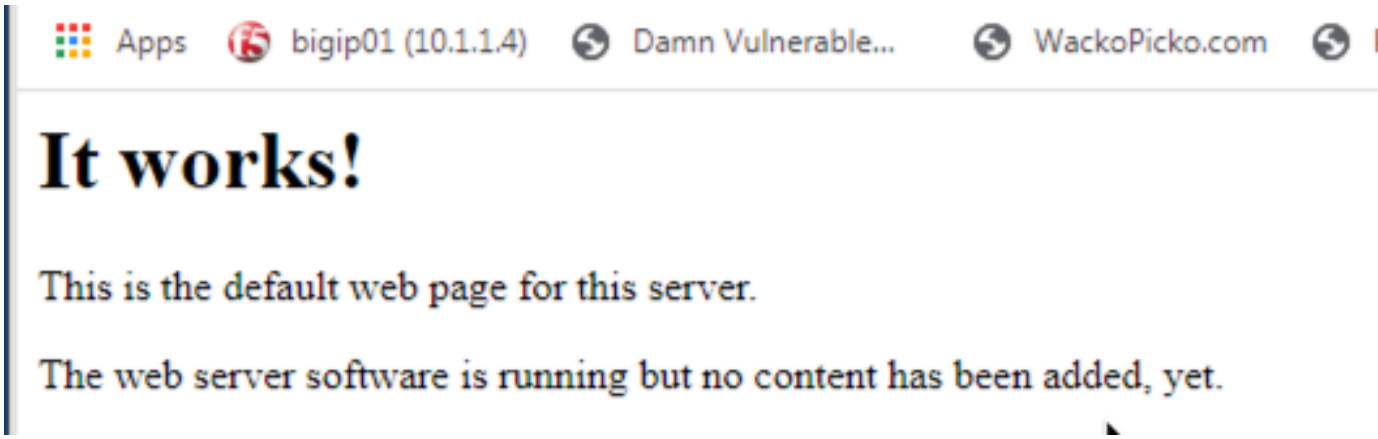
13. Click on **URI_Routing_iRule** from the Available box and click the << button, thus moving it to the Enabled box.



14. Click the **Finished** button
15. Open a new tab in Chrome
16. Enter http://dvwa.f5lab.com/ and ensure you get there
17. Now enter http://peruggia.f5lab.com/ and ensure you get to the app
18. Finally, enter http://wackopicko.f5lab.com/ and ensure you can get to that app



19. If you see this image below - it means your iRule did not work.



Hint: If you need a basic hint here is some example code:

Here is a link to DevCentral: https://clouddocs.f5.com/api/irules/HTTP__host.html

If you are really stuck, here is what we are looking for:

1. When HTTP_Request comes in
2. Evaluate the HTTP_host name
3. If it matches send it to the correct pool.
4. Loop through all the host names you want to match on and continue to direct to the correct pools.
5. Now you should have enough to understand and the majority of code needed to create the iRule. If not here is the complete iRule.

Lab 2 - Log and Change Headers

Your iRule should:

1. Log all HTTP **request** headers.
2. Log all HTTP **response** headers.
3. Remove the header named **Server** from all HTTP responses.

> **Attention:** OPTIONAL: Instead of removing the **Server** header in the response, change the value of the **Server** header to **Microsoft-IIS/7.0**.

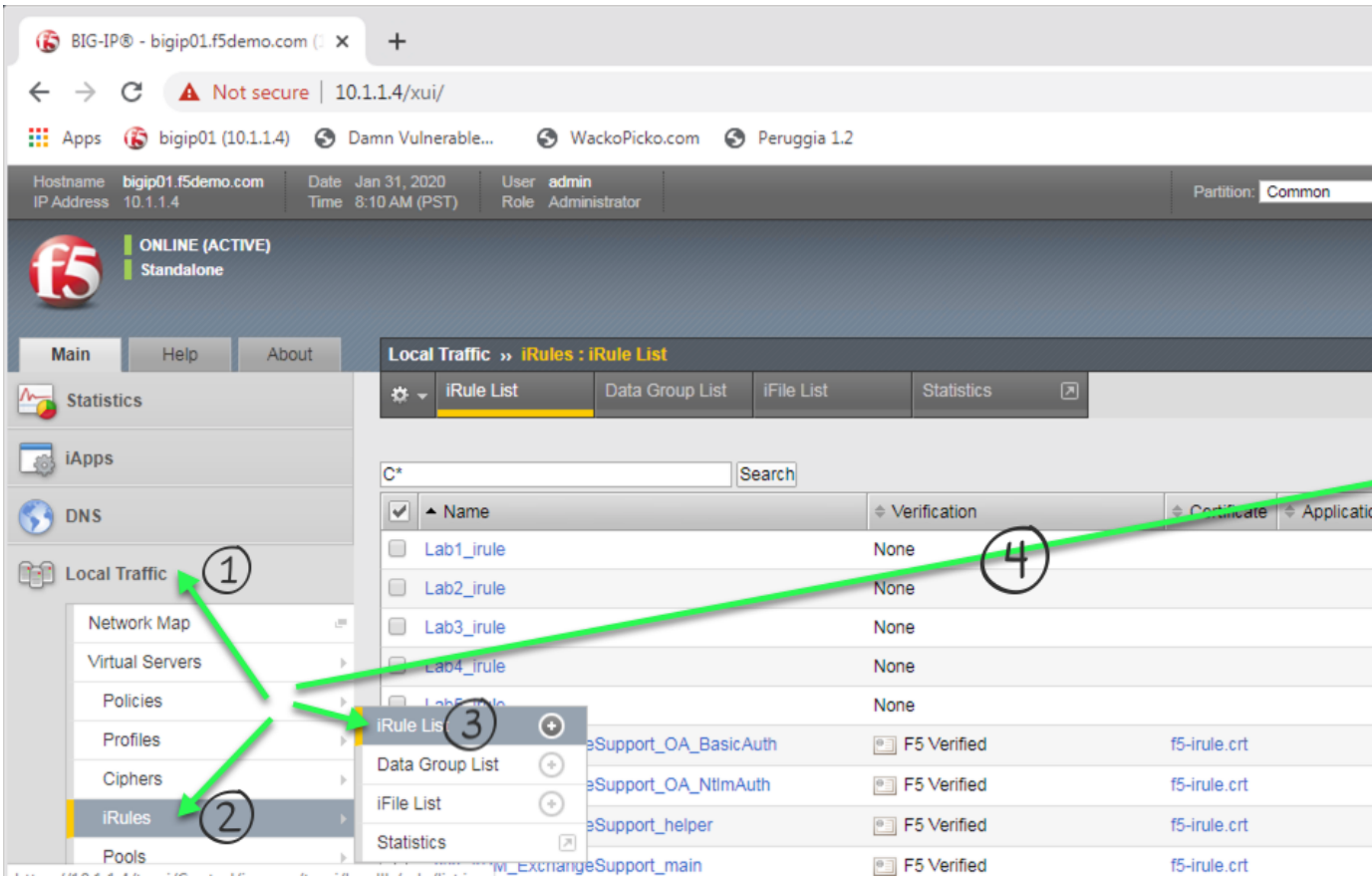
Important:

- Estimated completion time: 15 minutes

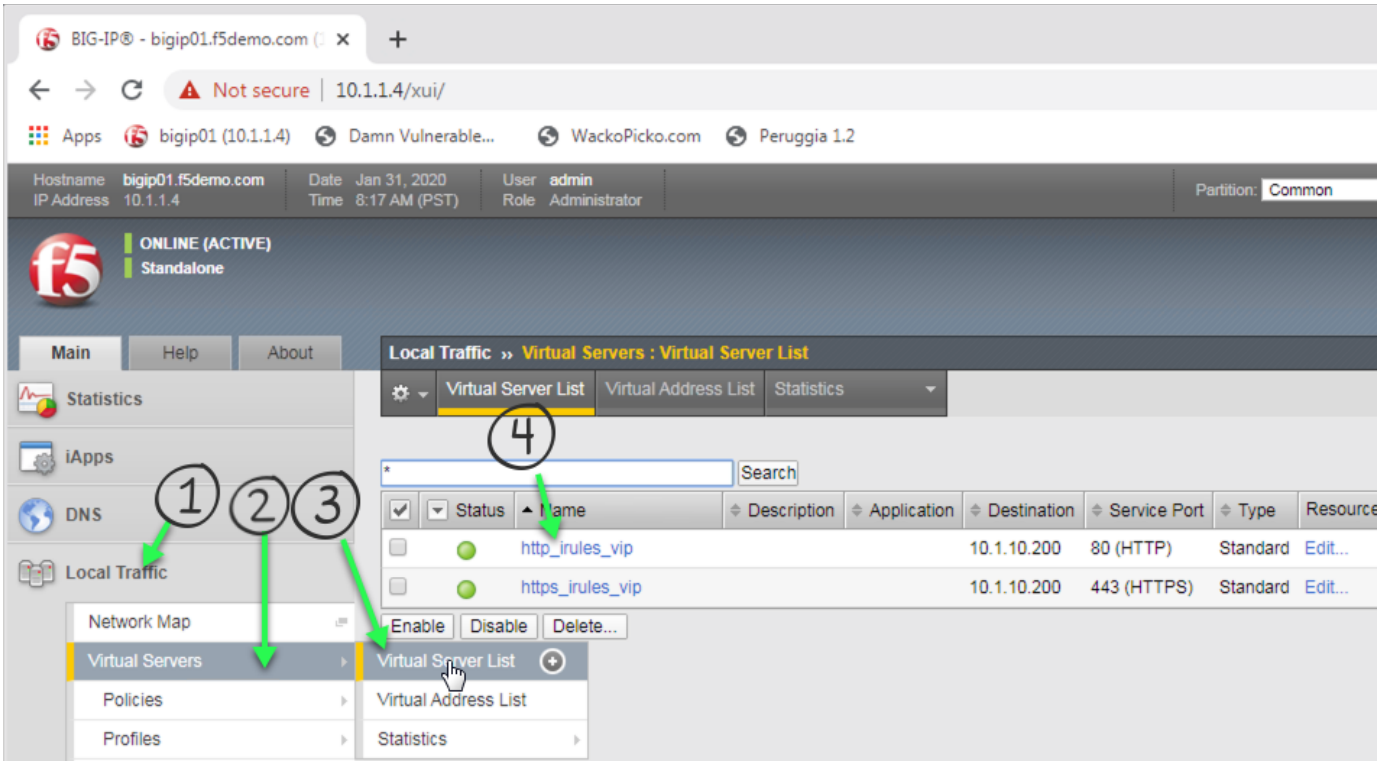
---

1. Open Chrome Browser
2. Enter https://bigip1 into the address bar and hit Enter

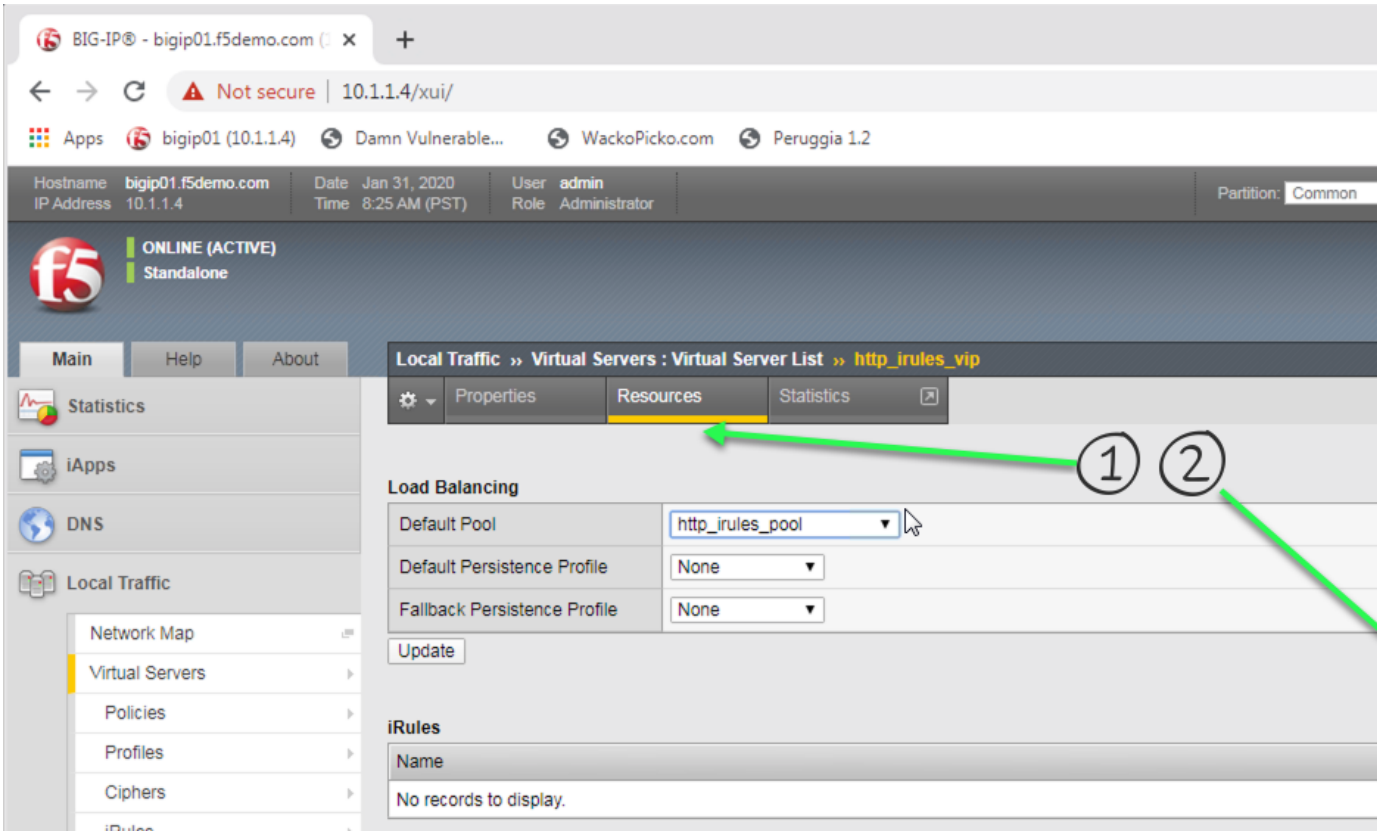
3. **Login with username: admin password**: **admin.F5demo.com**
4. Click Local Traffic -> iRules -> iRules List
5. Click **Create** button



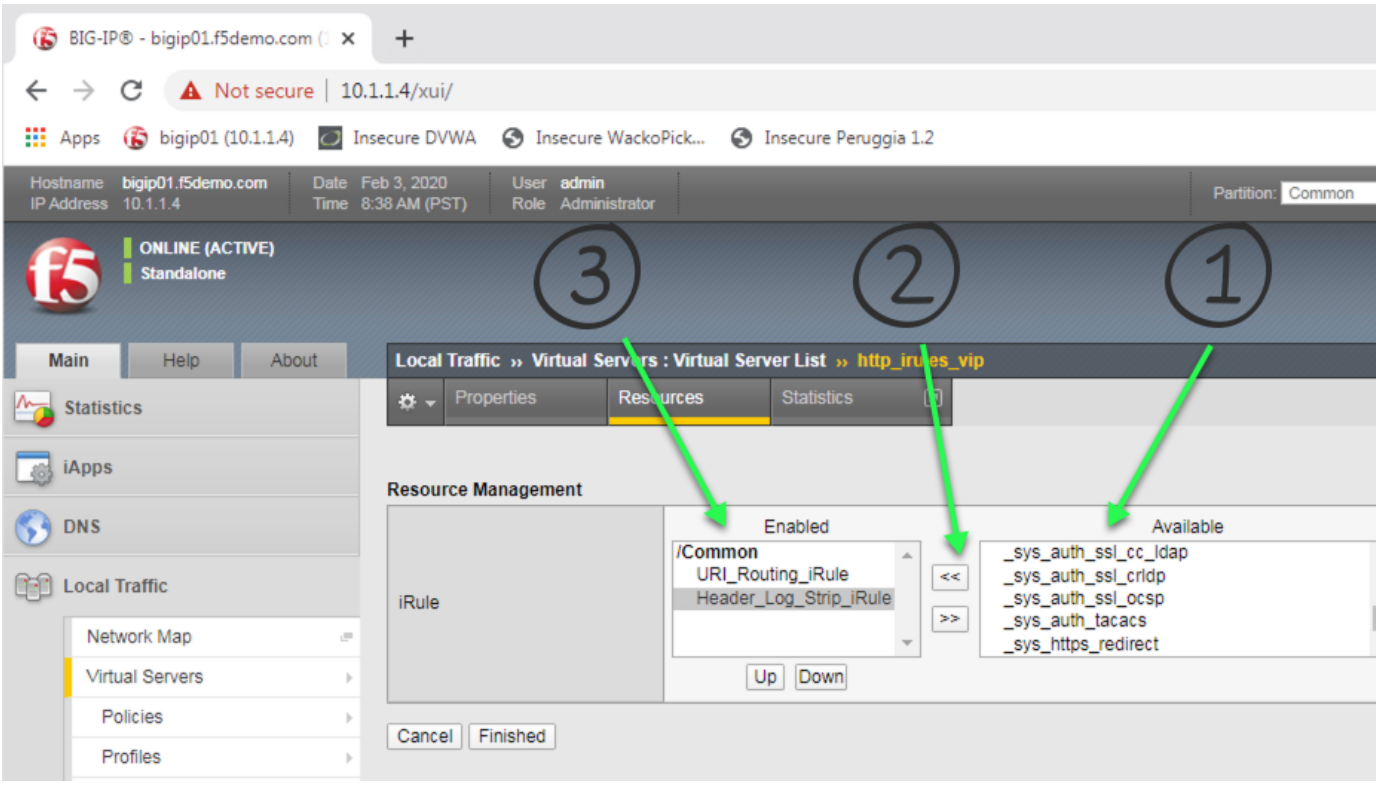
6. Enter Name of **Header_Log_Strip_iRule**
7. Enter Your Code
8. Click **Finished**
9. Click Local Traffic -> Virtual Servers -> Virtual Server List
10. Click on **http_irules_vip**



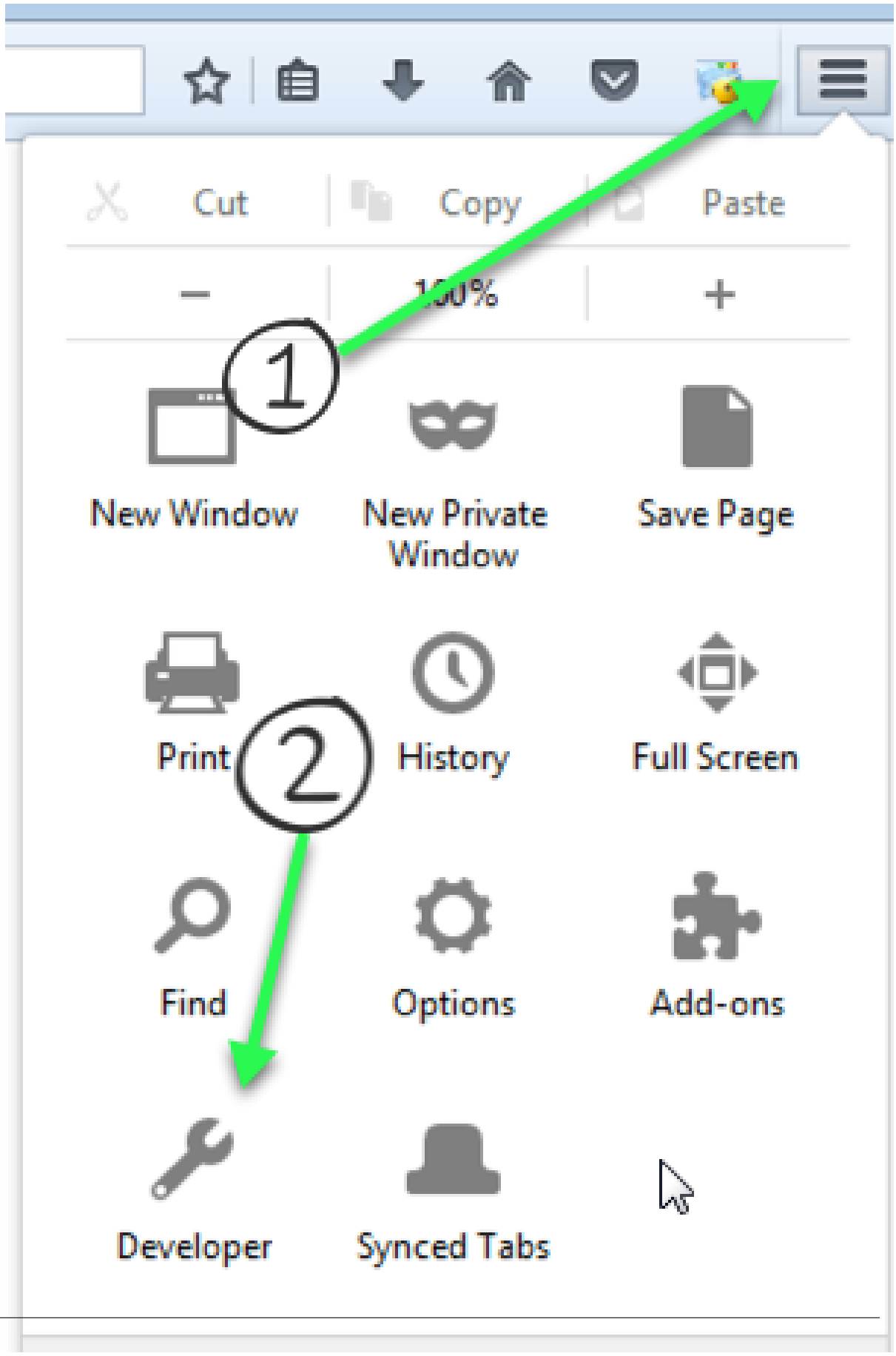
11. Click on the **Resources** tab
12. Click **Manage** button for the iRules section



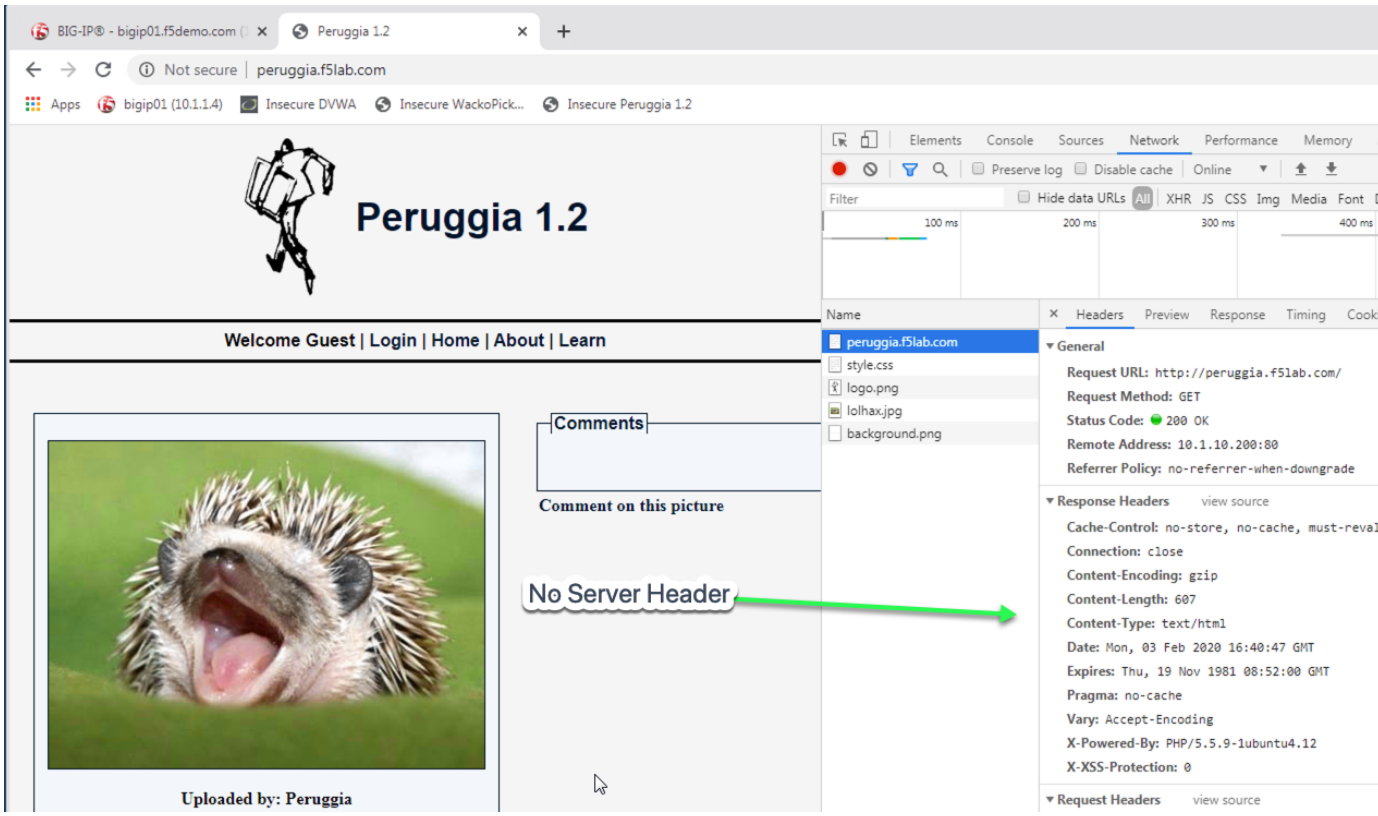
13. Click on Header_Log_Strip_iRule from the Available box and click the << button, thus moving it to the Enabled box, your first and now second iRule should be in the Enabled box.



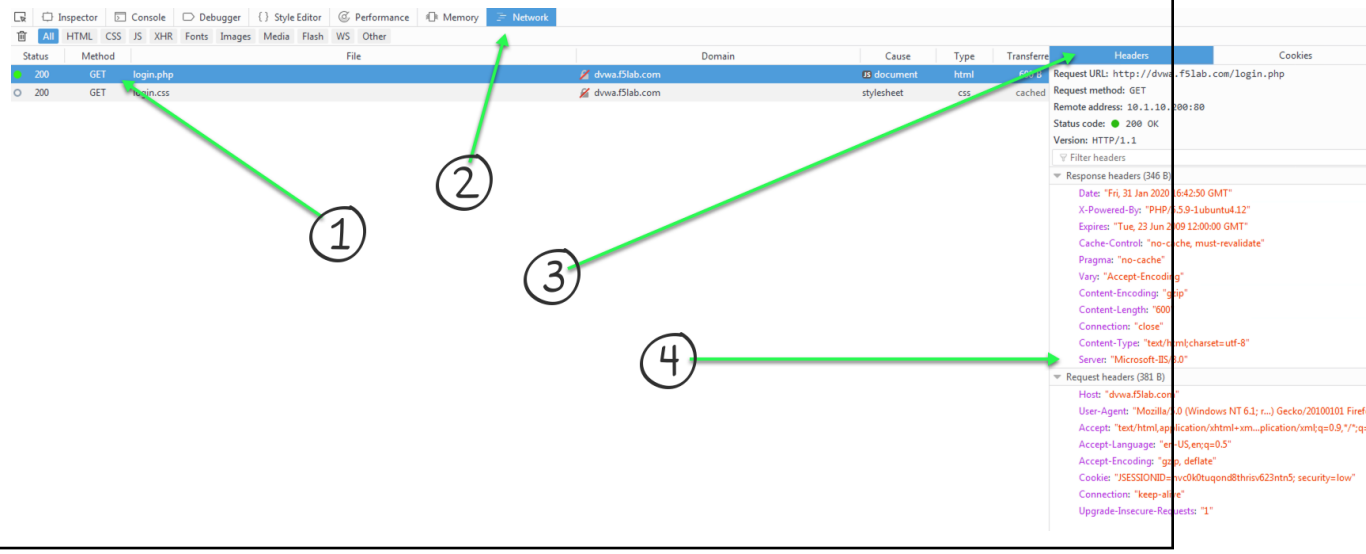
14. Click the **Finished** button
15. Open the Firefox browser
16. Click the 3 horizontal line button on the far right of the address bar
17. Use **developer tools** in Mozilla, or use Chrome to view headers


Cut
Copy
Paste
100%
1
New Window
New Private Window
Save Page
Print
2
History
Full Screen
Find
Options
Add-ons
Developer
Synced Tabs

18. Enter http://dvwa.f5lab.com/ and ensure you get there
19. Now enter http://wackopicko.f5lab.com/
20. Finally, enter http://peruggia.f5lab.com/ and ensure you can get to that app
21. Look at the headers for each of your requests. Did you log them all? What is the value of the Server header?



Attention: OPTIONAL: Instead of removing the **Server** header in the response, change the value of the **Server** header to **Microsoft-IIS/7.0**.



Hint: Basic Hint if you need a hint here is some example code:

Link to DevCentral: https://clouddocs.f5.com/api/irules/HTTP__header.html

If you are really stuck, here is what we are looking for:

1. When HTTP_Request comes in
2. Log the headers from the HTTP_REQUEST
3. When HTTP_RESPONSE comes back
4. Log the response headers
5. Now remove the HTTP::header named Server
6. Now you should have enough to understand and the majority of code to create the iRule. If not here is the complete iRule.

Lab 3 - HTTP to HTTPS Redirect

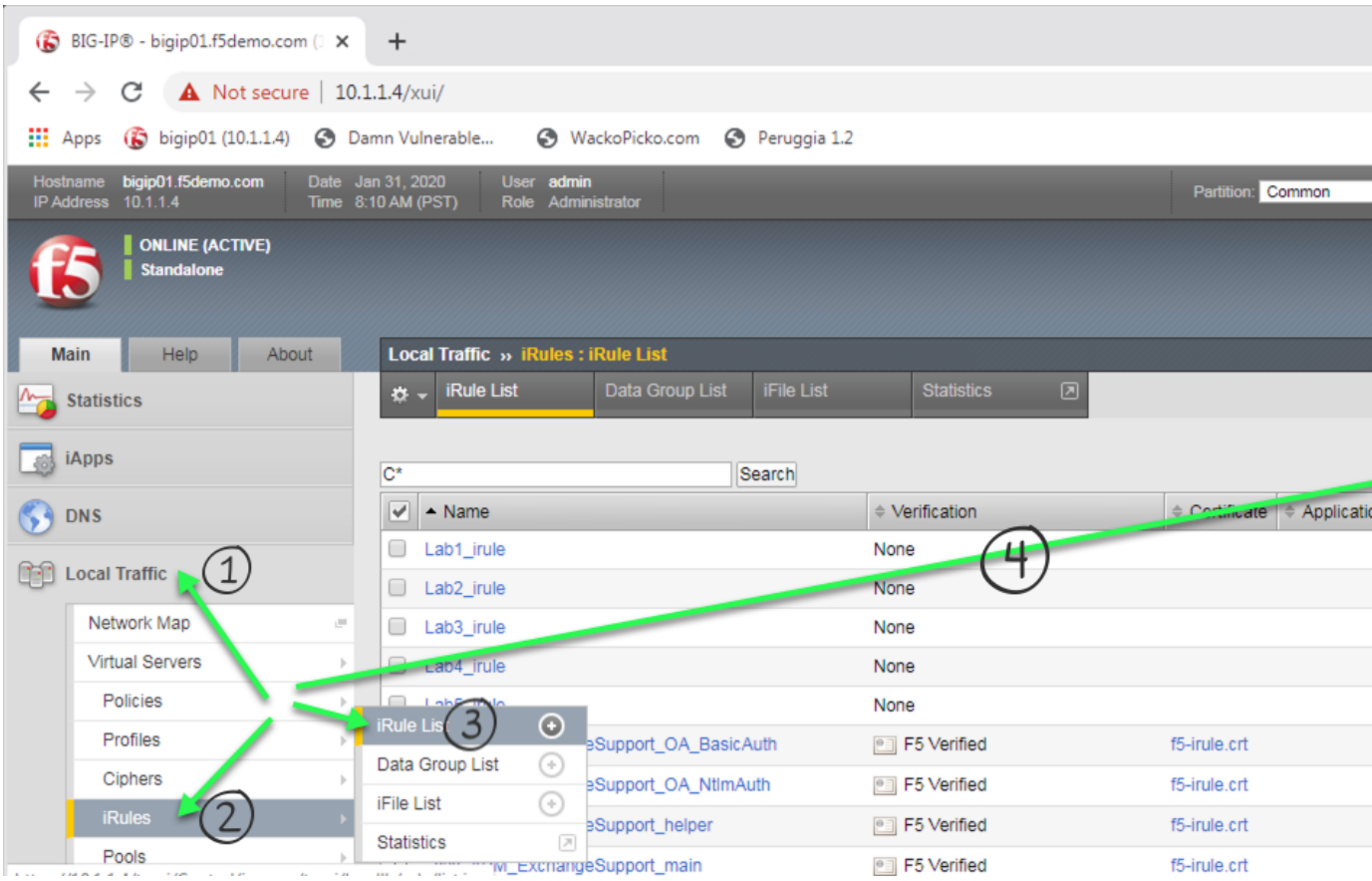
1. Create an iRule to redirect all traffic that arrives at an HTTP virtual server to be redirected to the same IP address but using an HTTPS port.
2. The full original HTTP request should be maintained when re-directing. Example http://my.domain.com/app1/index1.html should redirect to https://my.domain.com/app1/inex.html
3. Traffic goes to the HTTPS virtual server should still perform the pool selection and should still perform the header stripping from previous labs.

Important:

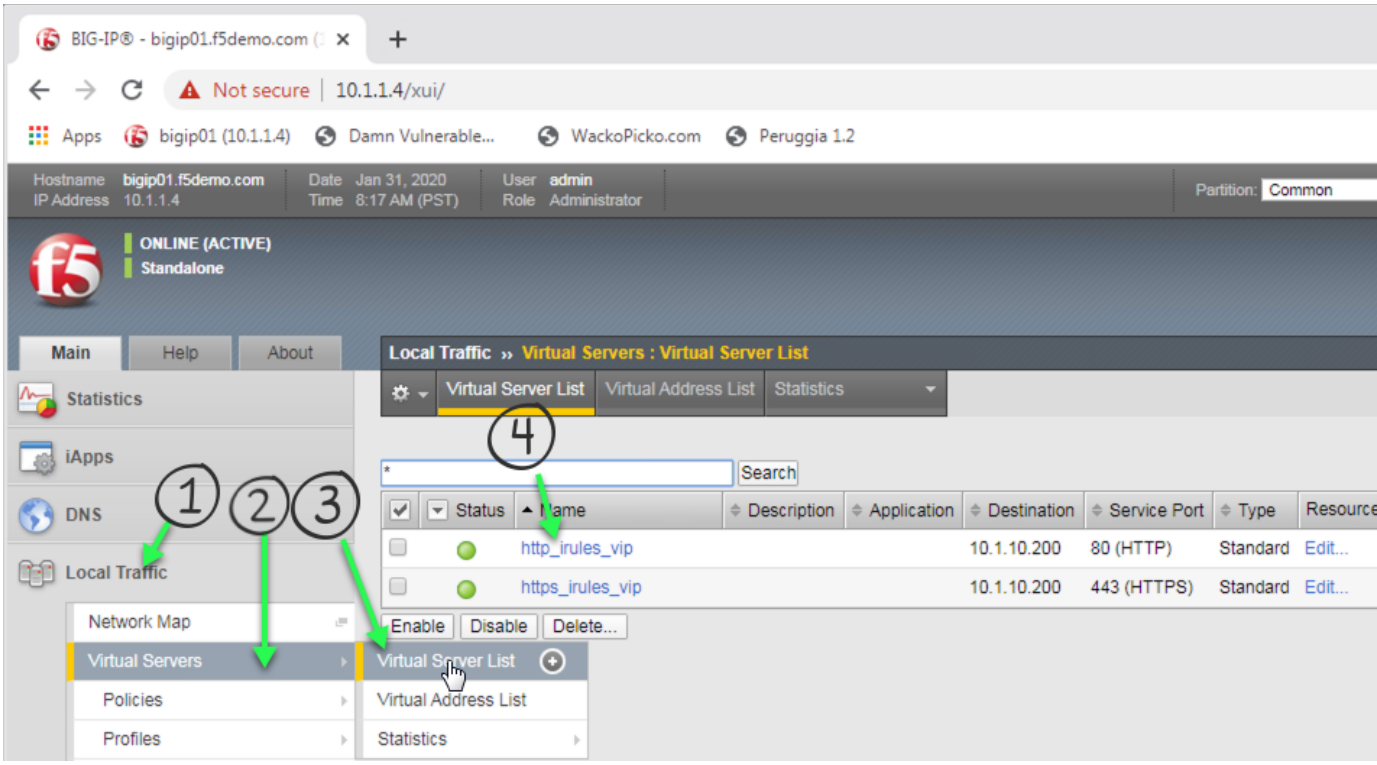
- Estimated completion time: 20 minutes

1. Open Chrome Browser
2. Enter https://bigip1 into the address bar and hit Enter

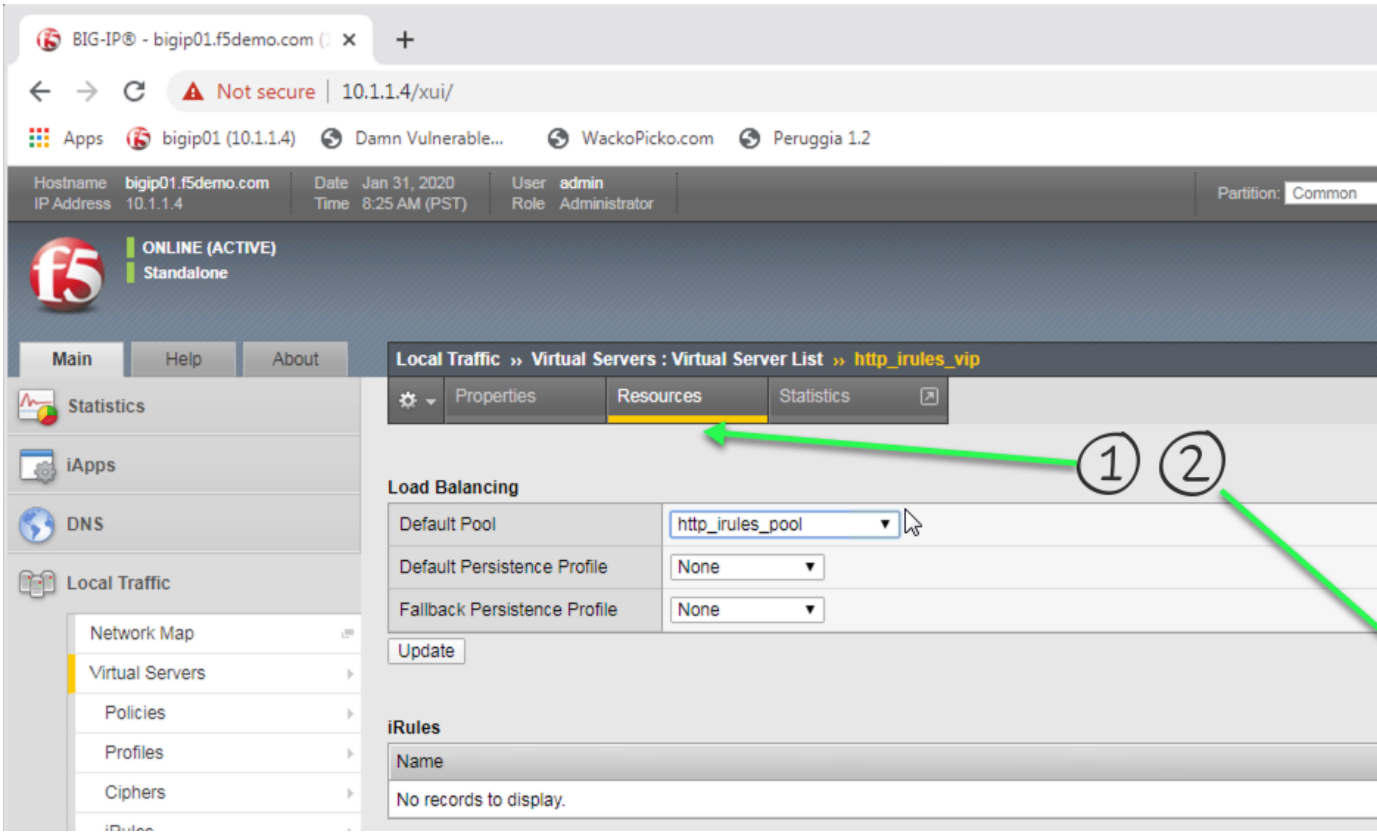
3. **Login with username: admin password**: **admin.F5demo.com**
4. Click Local Traffic -> iRules -> iRules List
5. Click **Create** button



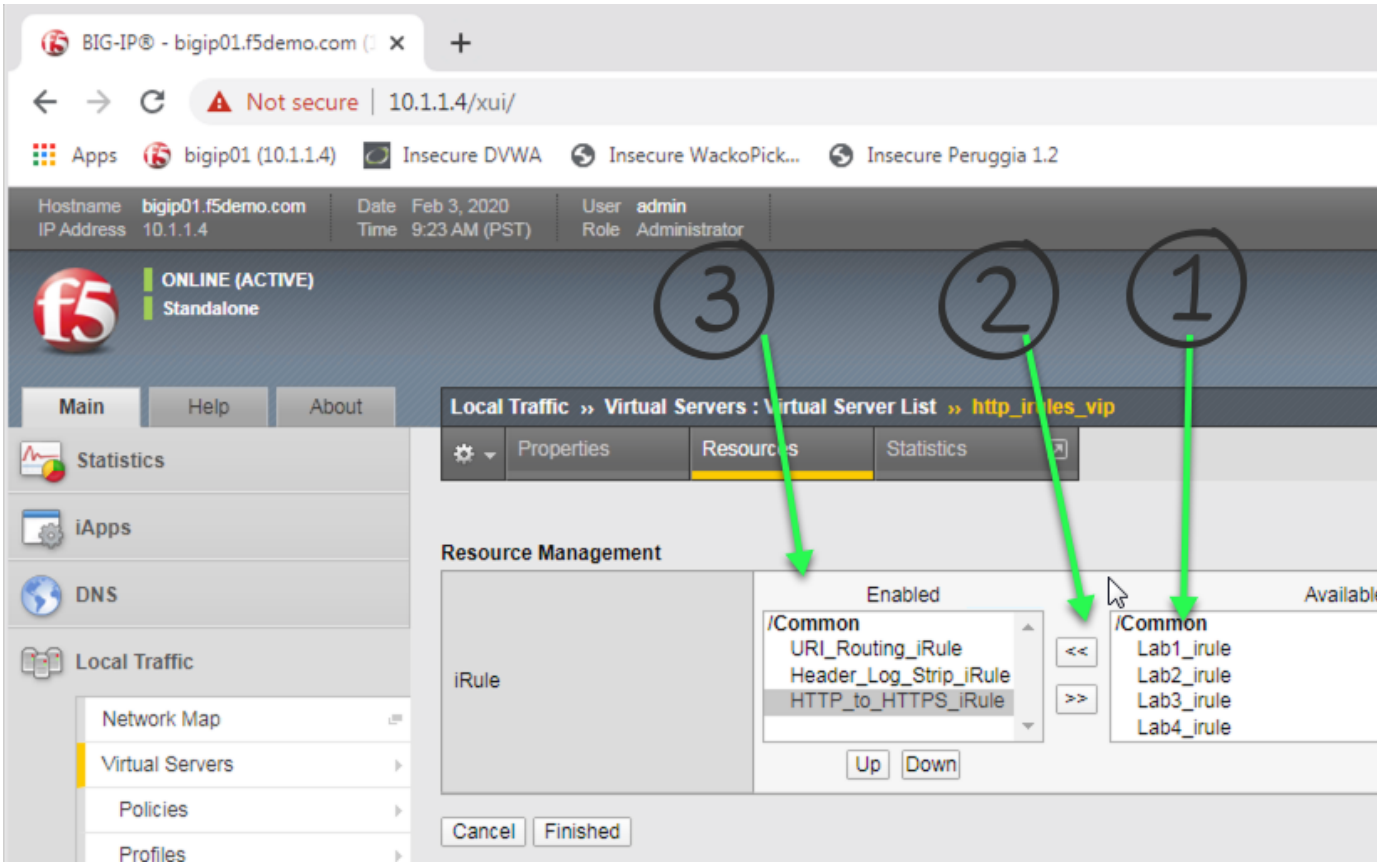
6. Enter Name of **HTTP_to_HTTPS_iRule**
7. Enter Your Code
8. Click **Finished**
9. Click Local Traffic -> Virtual Servers -> Virtual Server List
10. Click on **http_irules_vip**



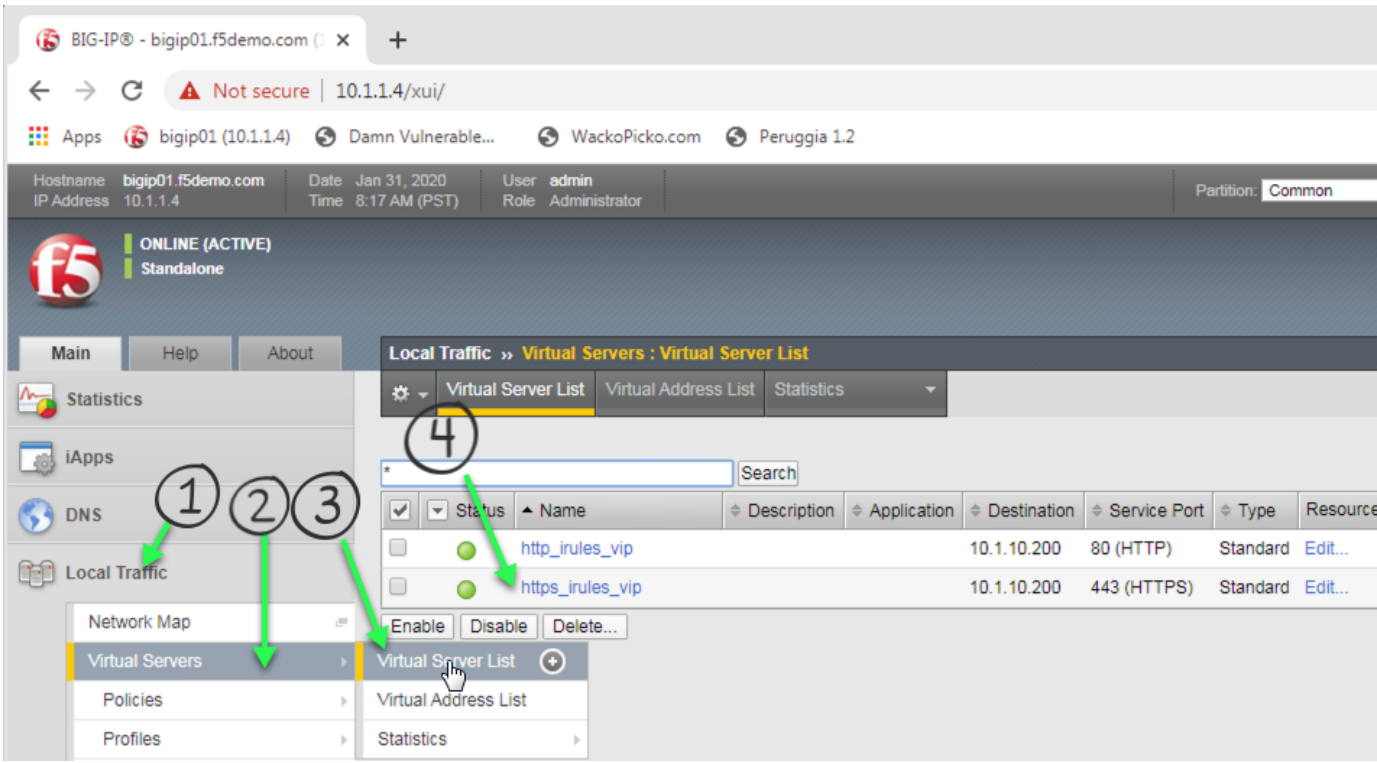
11. Click on the **Resources** tab.
12. Click **Manage** button for the iRules section.



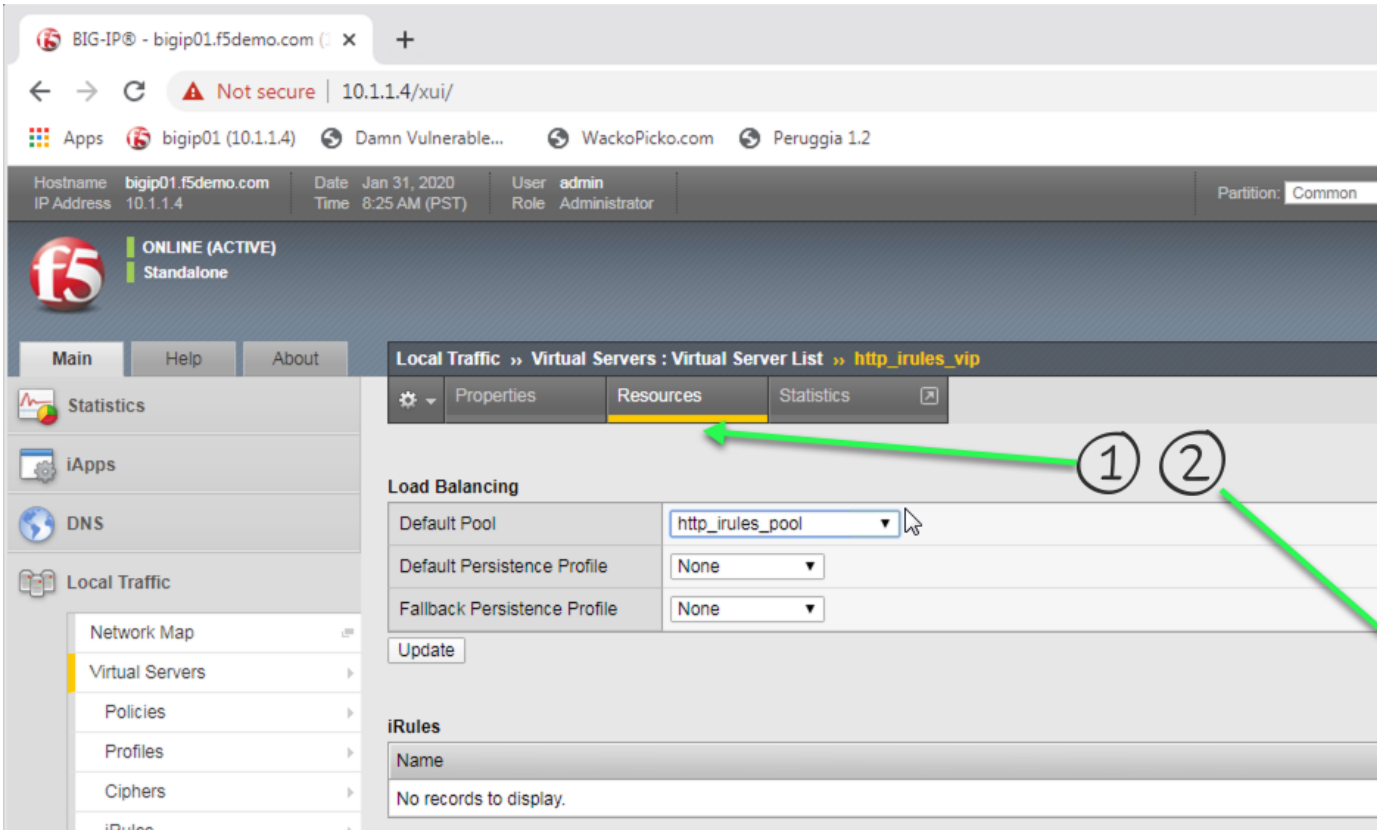
13. Click on HTTP_to_HTTPS_iRule from the Available box and click the << button, thus moving it to the Enabled box, your first, second, and now third iRule's should be in the Enabled box.



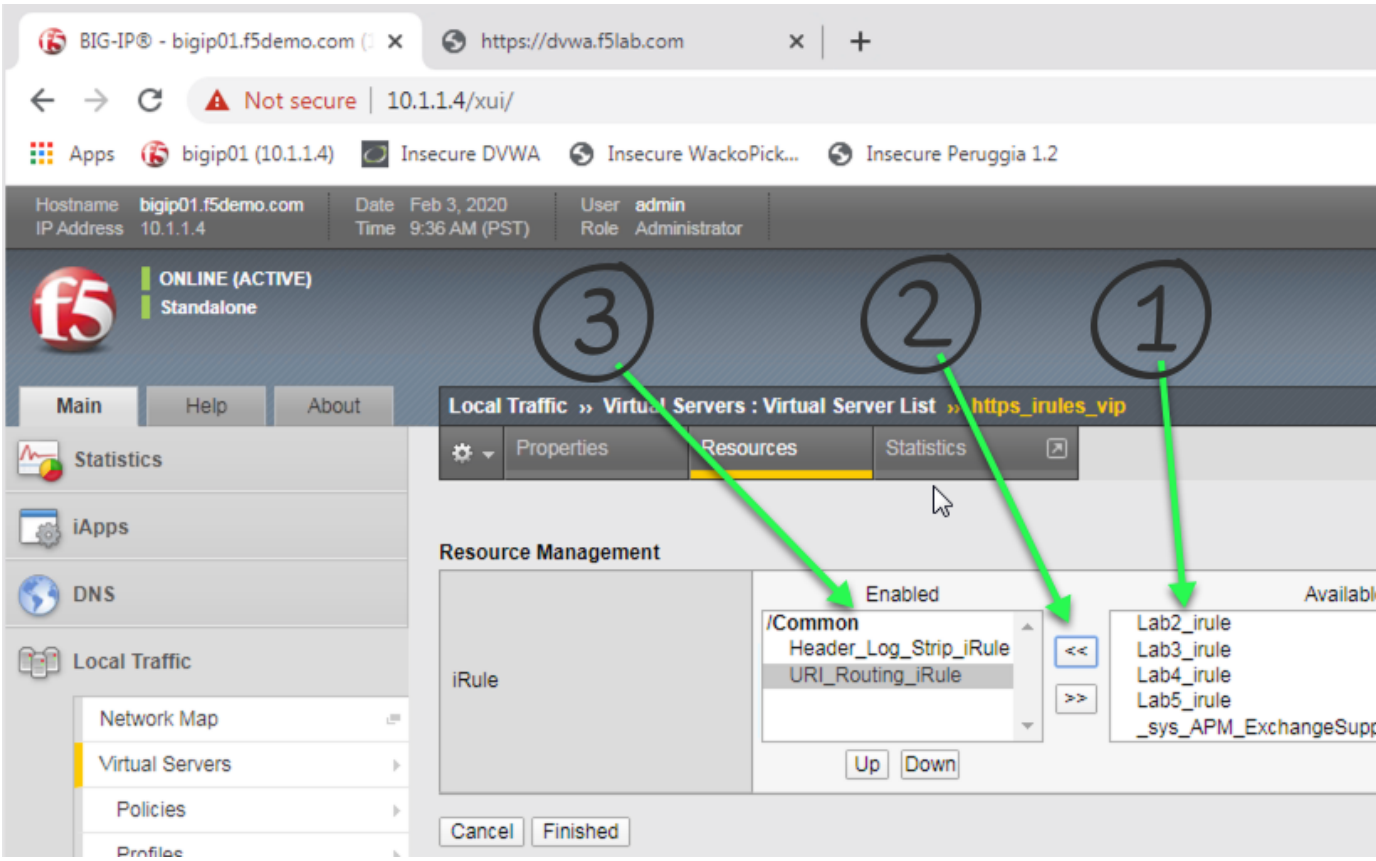
14. Click the **Finished** button.
15. Click Local Traffic -> Virtual Servers -> Virtual Server List.
16. Click on **https_irules_vip**



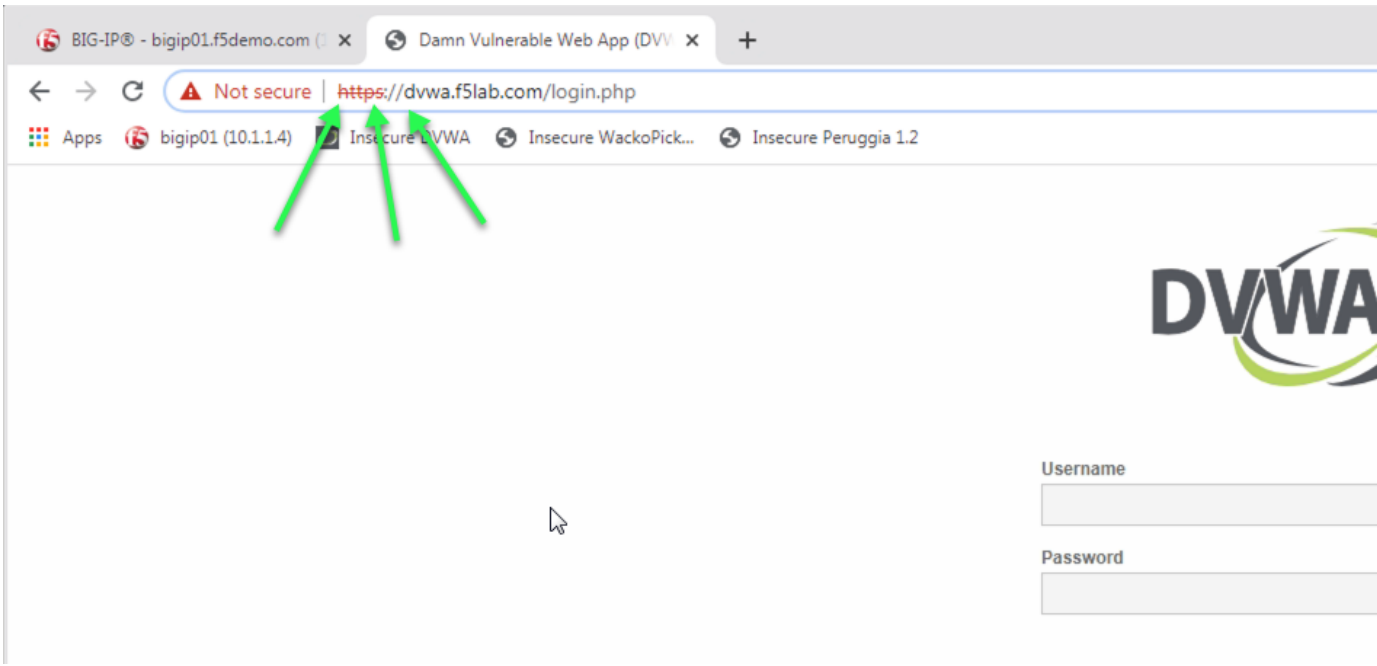
17. Click on the **Resources** tab
18. Click **Manage** button for the iRules section



19. Click on the **2 iRules** you require to enable **pool selection and Server header removal** from the previous labs from the Available box and click the << button, thus moving them to the Enabled box.

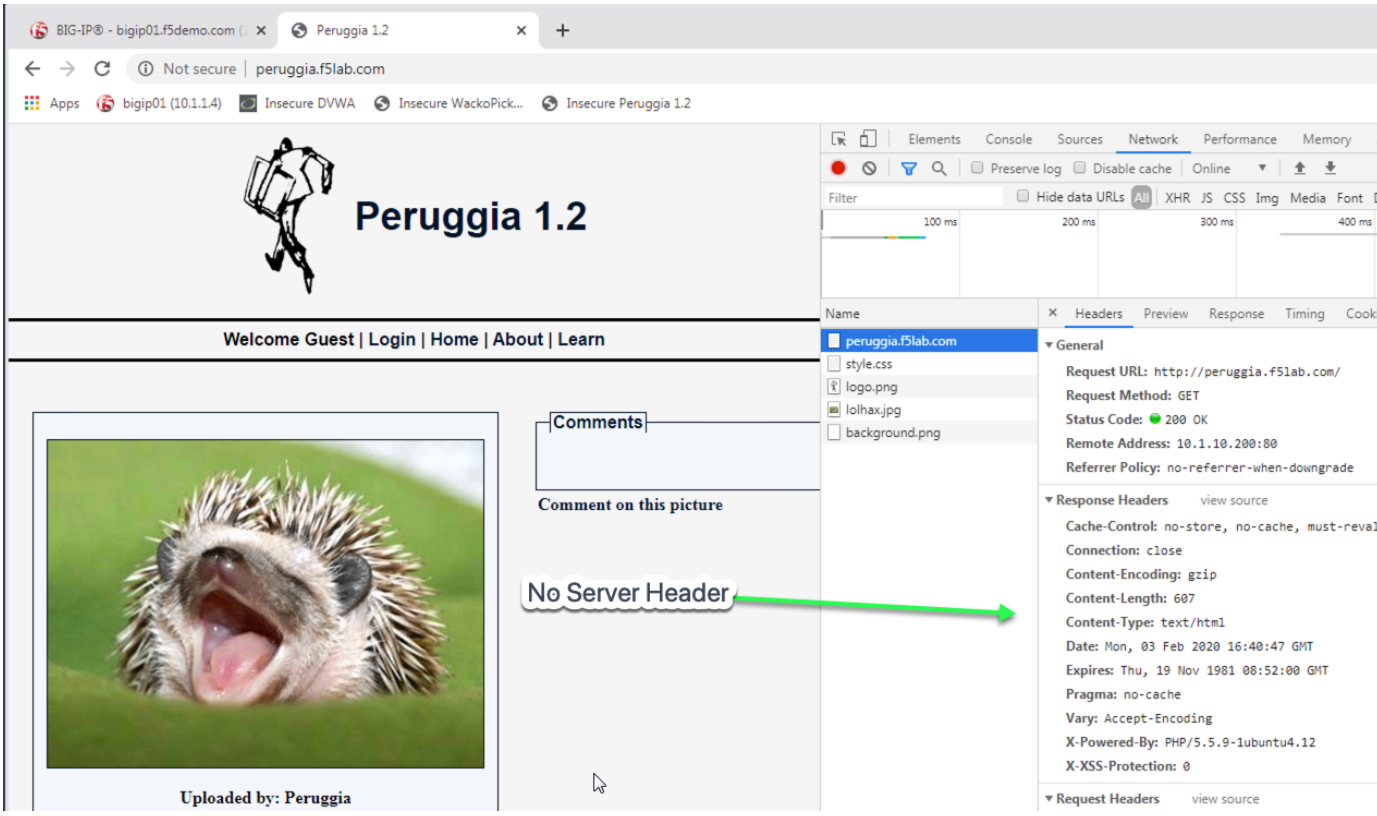


20. Enter http://dvwa.f5lab.com/ and ensure you get redirected to the HTTPS virtual server.
21. Now enter http://wackopicko.f5lab.com/ and ensure you get redirected to the HTTPS virtual server.
22. Finally, enter http://peruggia.f5lab.com/ ensure you get redirected to the HTTPS virtual server.

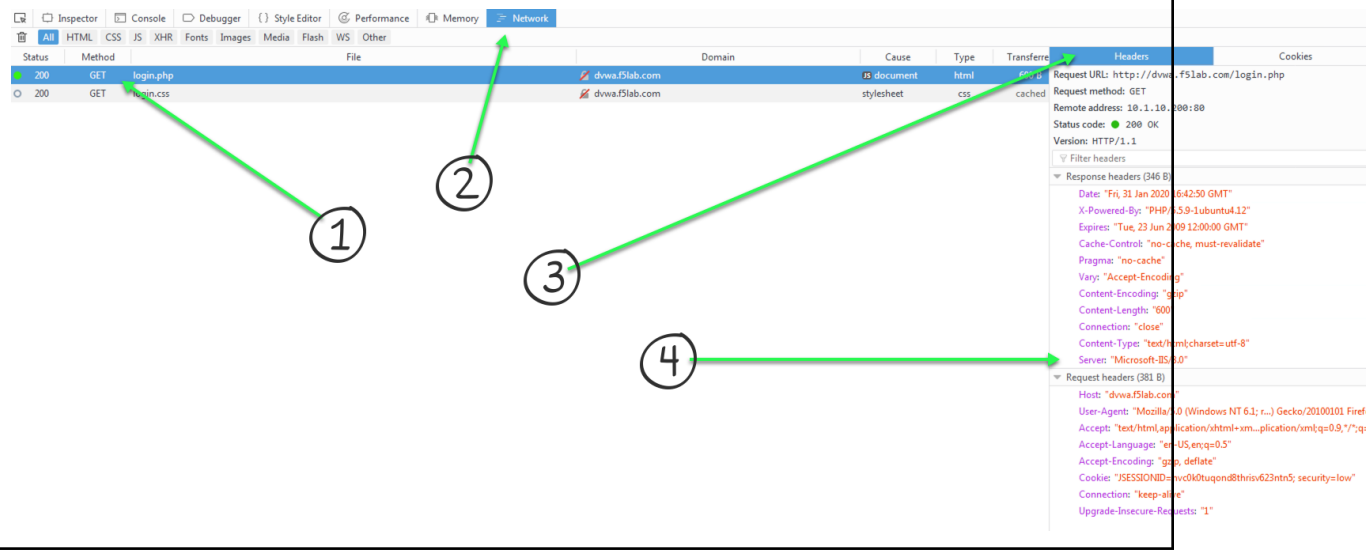


23. From the previous lab the next two tests should confirm everything is working as before, but using HTTPS.

24. Look at the headers for each of your requests. Did you log them all? What is the value of the Server header?



Attention: OPTIONAL: Instead of removing the **Server** header in the response, change the value of the **Server** header to **Microsoft-IIS/7.0**.



Hint: Basic Hint if you need a hint here is some example code:

Link to DevCentral: https://clouddocs.f5.com/api/irules/HTTP__redirect.html

If you are really stuck, here is what we are looking for:

1. When HTTP_Request comes in
2. Redirect from HTTP to HTTPS
3. Now you should have enough to understand and the majority of code to create the iRule. If not here is the complete iRule.

Lab 4 - Stream Profile

Create a Stream Profile to change the body of the DVWA site

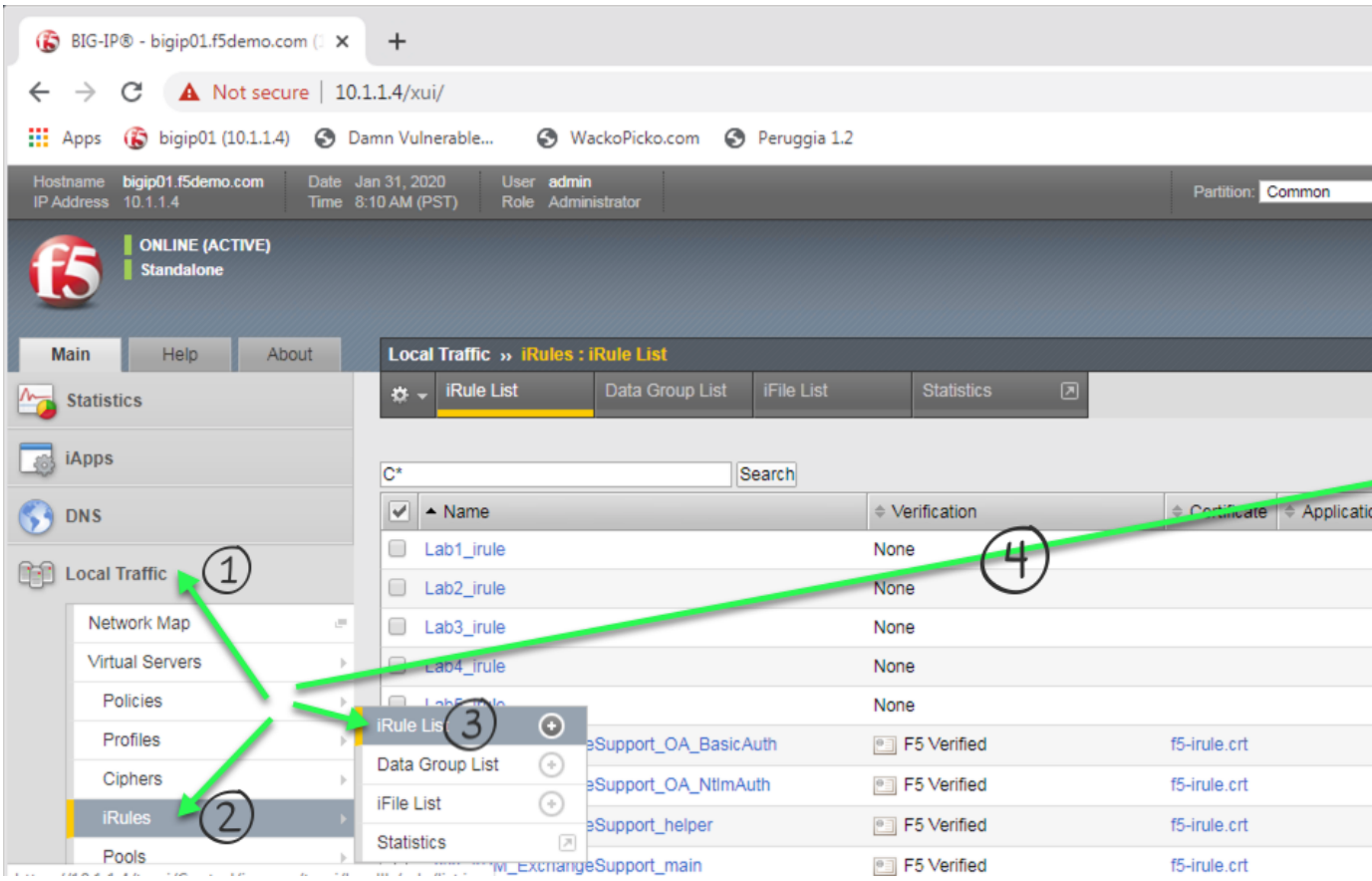
Important:

- Estimated completion time: 10 minutes

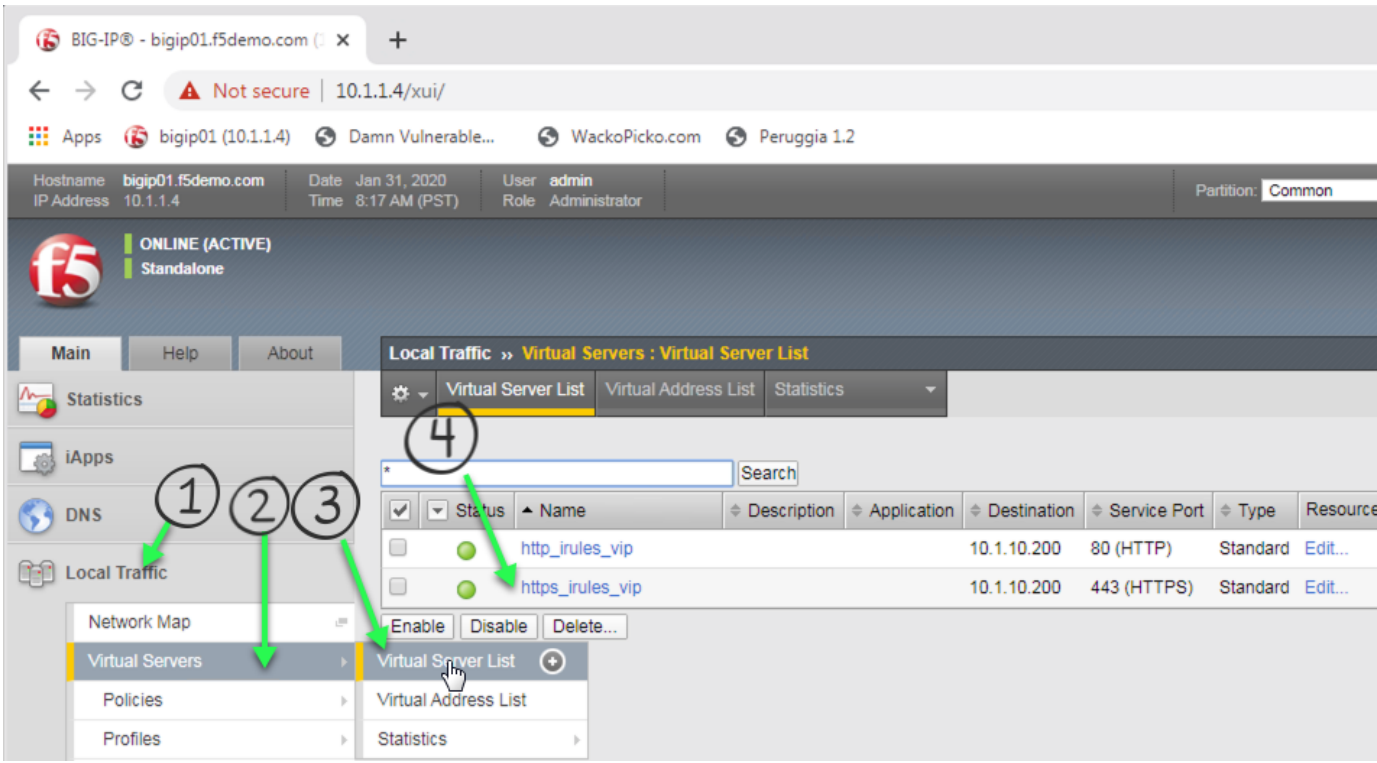
---

1. Open Chrome Browser
2. Enter https://bigip1 into the address bar and hit Enter

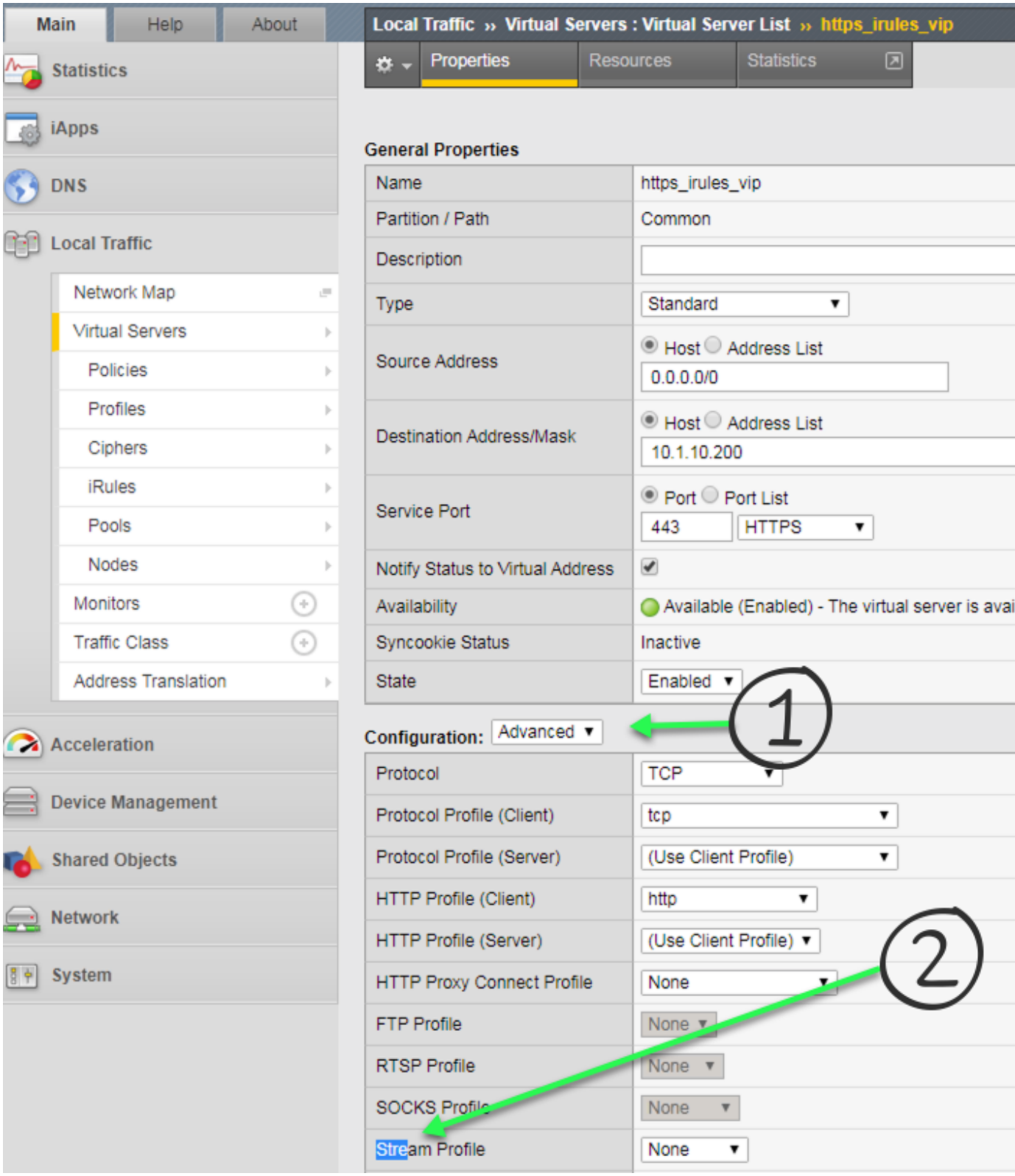
3. (a) **Login with username: admin password**: **admin.F5demo.com**
4. Click Local Traffic -> iRules -> iRules List
5. Click **Create** button



6. Enter Name of **Stream_iRule**
7. Enter Your Code
8. Click **Finished**
9. Click Local Traffic -> Virtual Servers -> Virtual Server List
10. Click on **https_irules_vip**

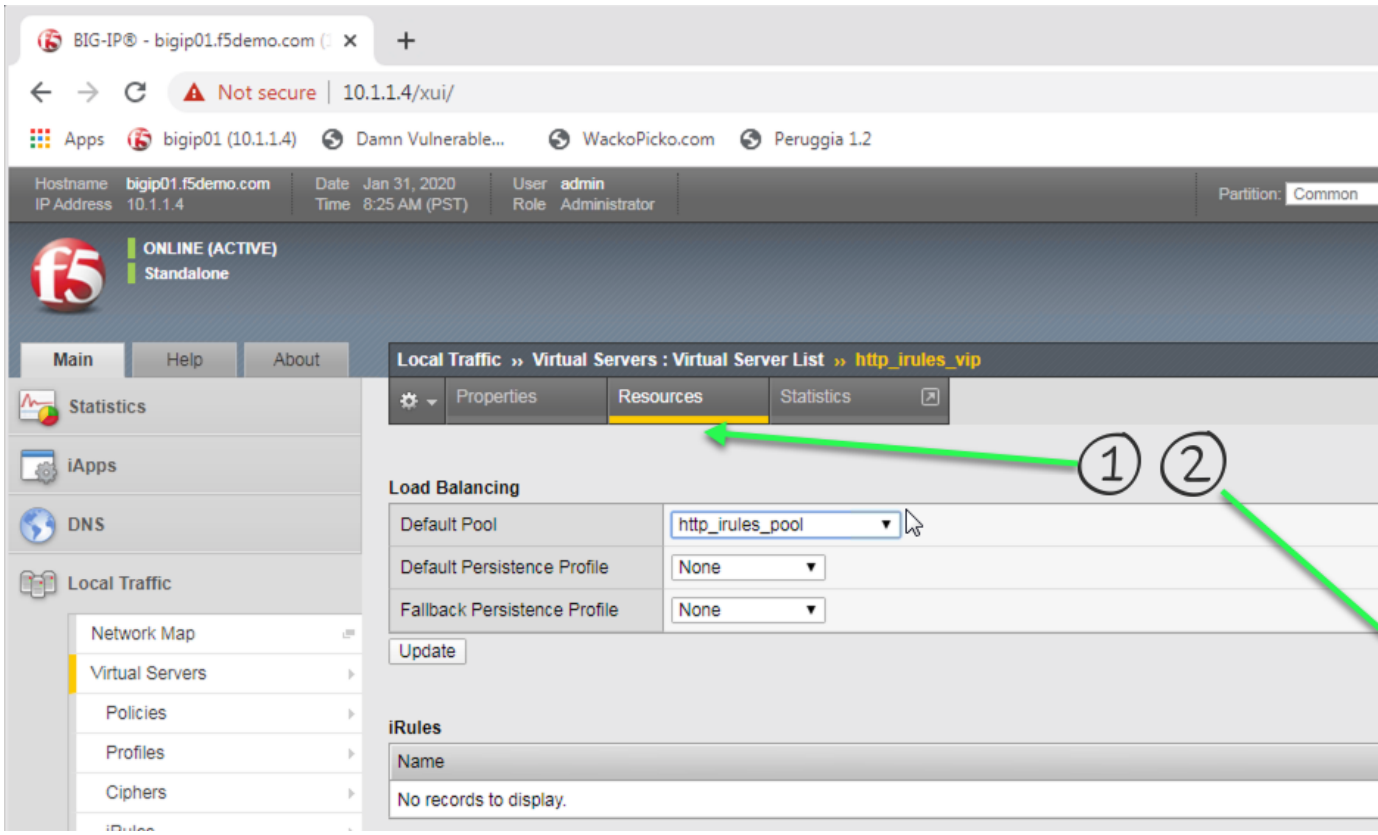


11. In the **Configuration** section ensure it says **Advanced** in the drop down
12. Go to the **Stream Profile** section and select **stream**

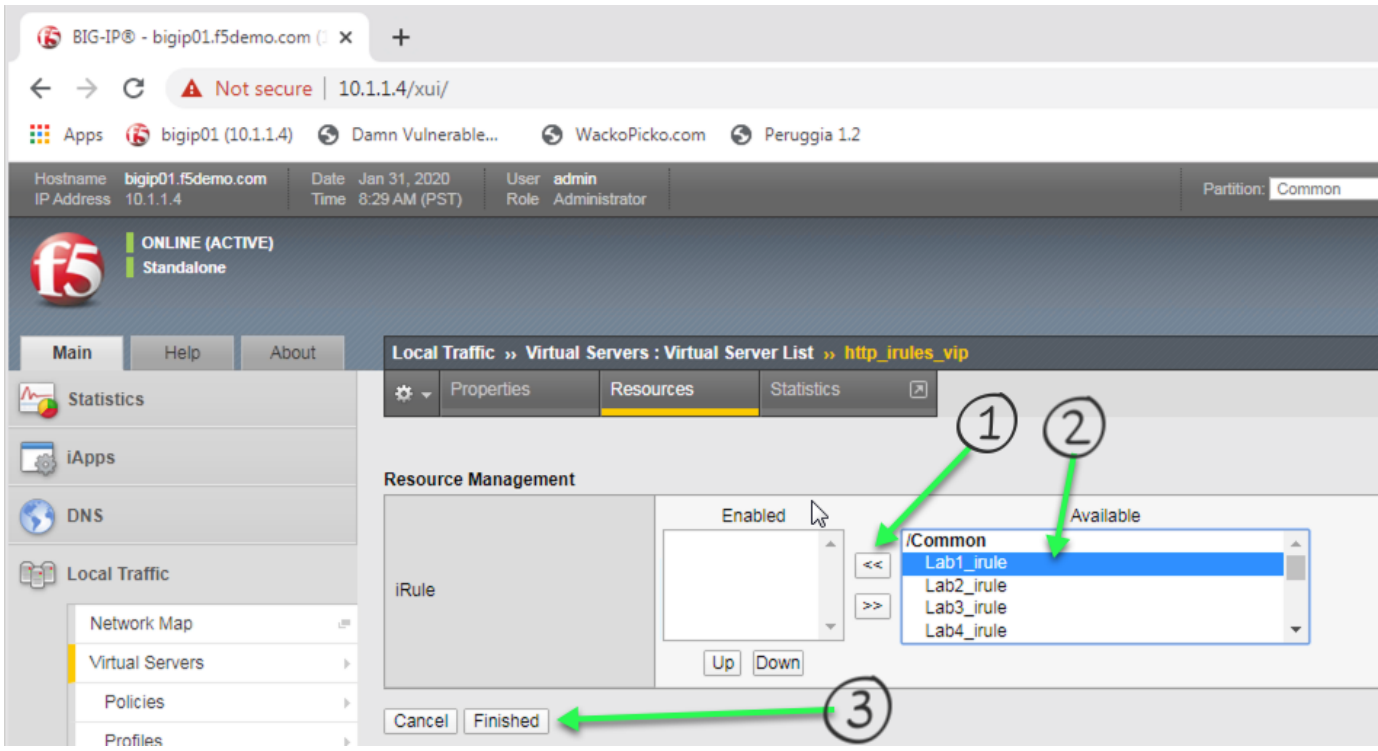


13. Scroll to the bottom and click the **Update** button
14. Click on the **Resources** tab at the top of the page.

15. Click **Manage** button for the iRules section



16. Click on Stream_iRule from the Available box and click the << button, thus moving it to the Enabled box, your first and now second iRule should be in the Enabled box.



17. Click the **Finished** button
18. Open the Firefox browser
19. Enter https://dvwa.f5lab.com and ensure you get there and it is HTTPS and that the word **Damn** is replaced with **Darn**

Hint: Basic Hint if you need a hint here is some example code:

Link to DevCentral: https://clouddocs.f5.com/api/irules/STREAM.html

If you are really stuck, here is what we are looking for:

1. When HTTP_Request comes in
2. Second we need to disable both encoding the stream profile for the request
3. When HTTP_RESPONSE comes back
4. Next we need to change our stream matching string and turn on the stream profile again.
5. Now you should have enough to understand and the majority of code to create the iRule. If not here is the complete iRule.

Lab 5 - HTTP Payload Manipulation

Collect an HTTP payload, change it, and release it to the client. As in the previous lab replace Damn with Darn, or get creative. We arent going to use a stream profile this time we are using an HTTP::payload command instead.

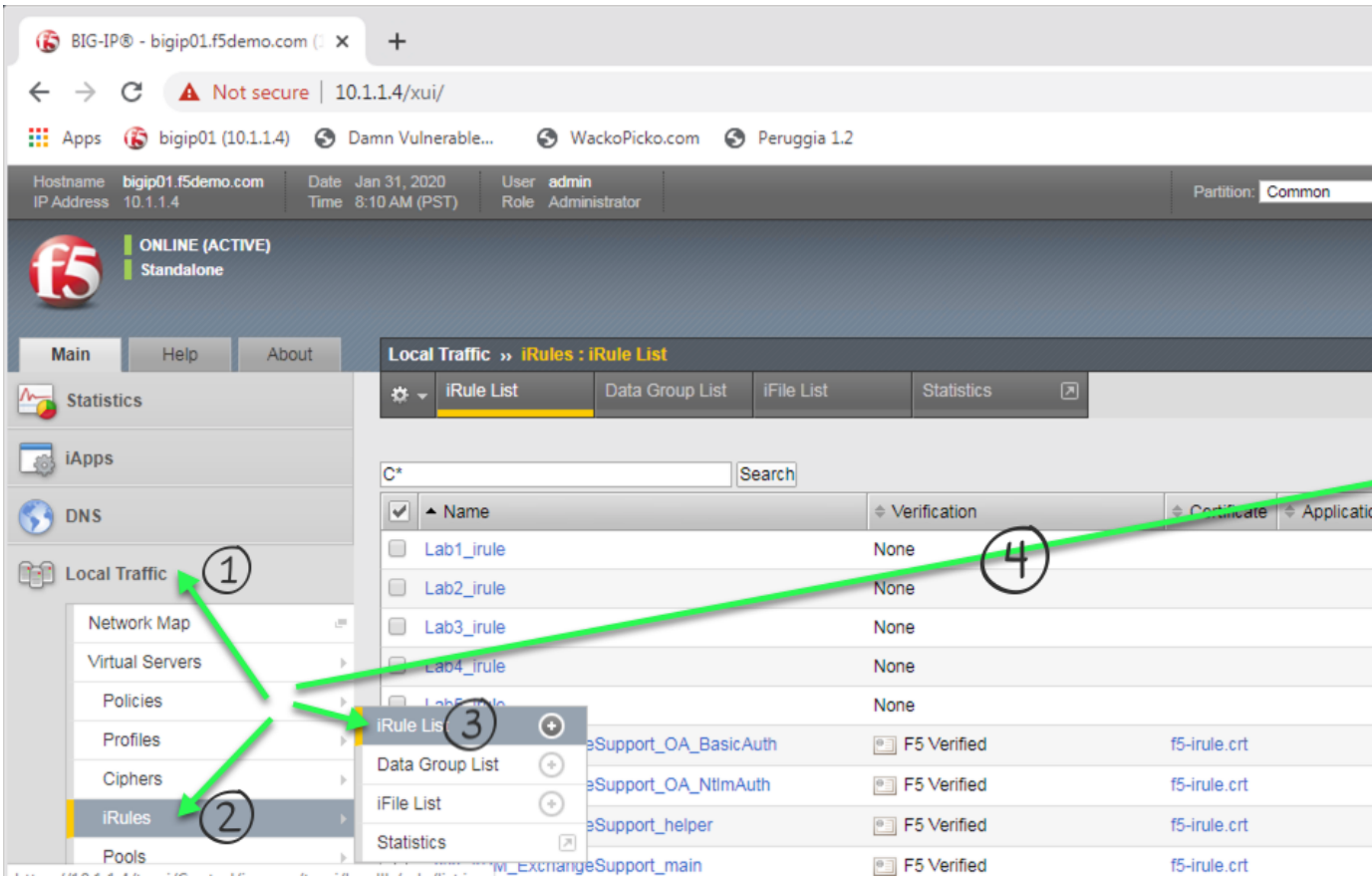
Important:

- Estimated completion time: 20 minutes

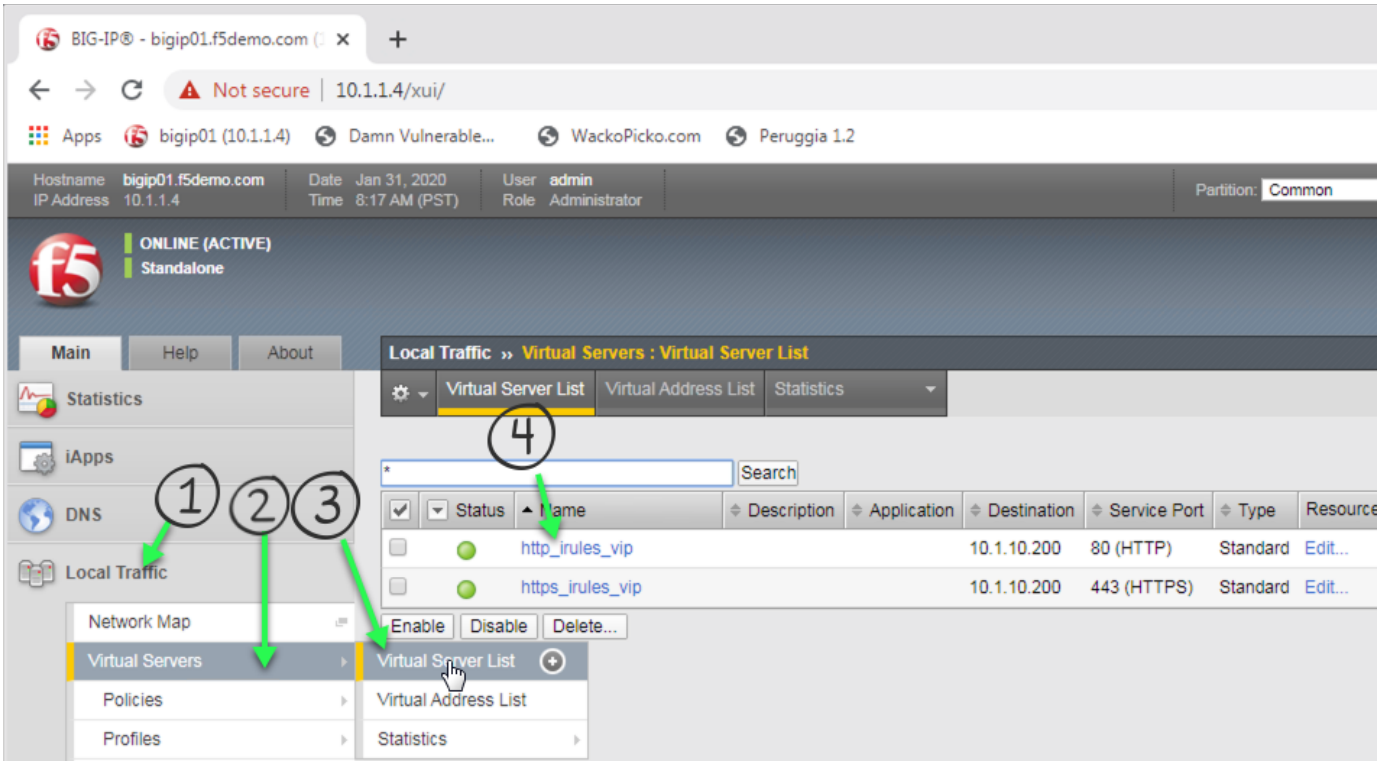
---

1. Open Chrome Browser
2. Enter https://bigip1 into the address bar and hit Enter

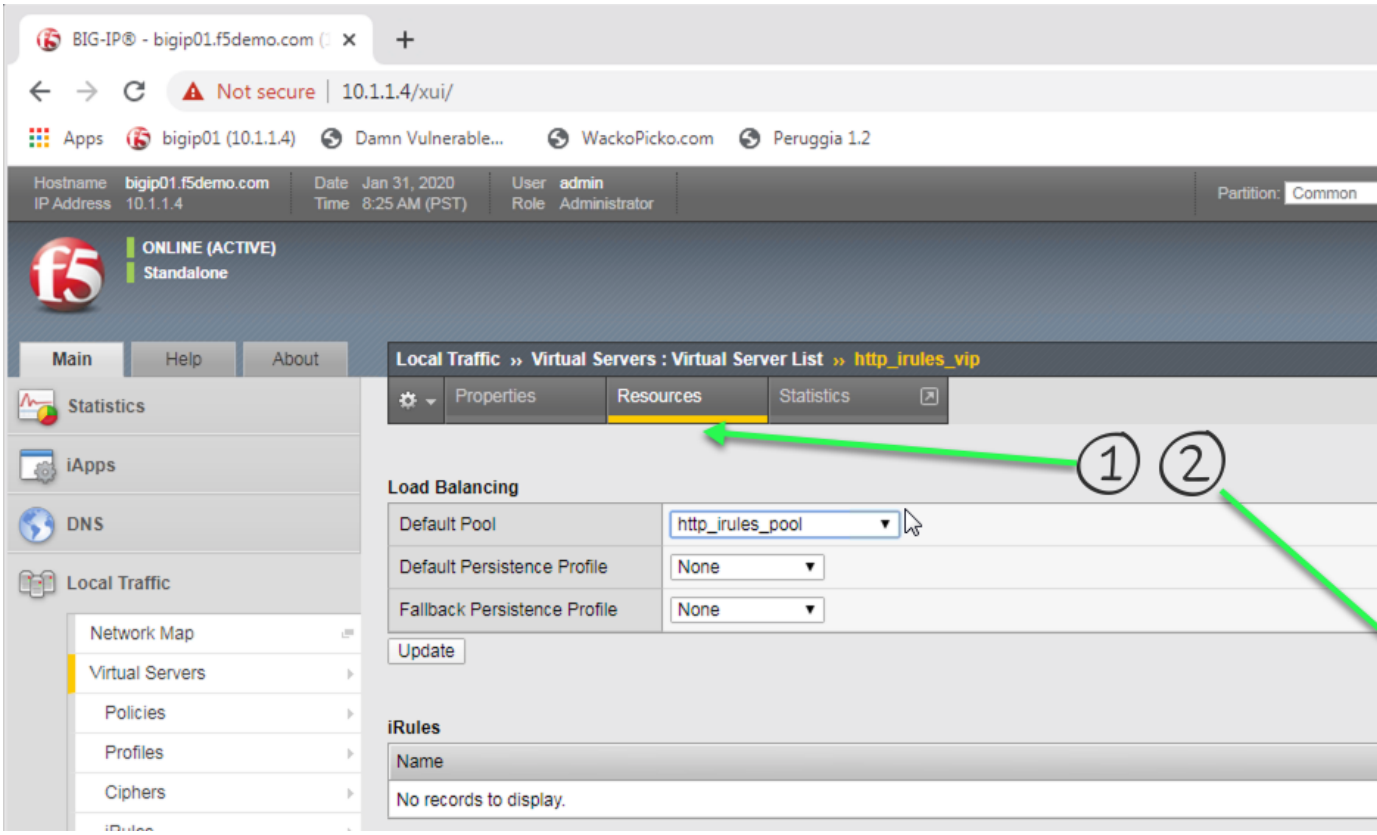
3. (a) **Login with username: admin password**: **admin.F5demo.com**
4. Click Local Traffic -> iRules -> iRules List
5. Click **Create** button



6. Click **Create** button
7. Enter Name of **HTTP_Payload_iRule**
8. Enter Your Code
9. Click **Finished**
10. Click Local Traffic -> Virtual Servers -> Virtual Server List
11. Click on **http_irules_vip**



12. Click on the **Resources** tab.
13. Click **Manage** button for the iRules section.



14. What should you do here? (Hint: Remove Stream_iRule and replace with HTTP_Payload_iRule)
15. Click the Finished button
16. Open the Firefox browser
17. Enter https://dvwa.f5lab.com and ensure you get there and it is HTTPS

Hint: Basic Hint

if you need a hint here is some example code:

Link to DevCentral: https://clouddocs.f5.com/api/irules/HTTP__collect.html

Link to DevCentral: https://clouddocs.f5.com/api/irules/HTTP__release.html

If you are really stuck, here is what we are looking for:

1. When HTTP_Request comes in
2. Second change the version of HTTP and disable compression for the request
3. When HTTP_RESPONSE comes back
4. Next we need to collect some HTTP::collect some data.
5. Now when we get HTTP_RESPONSE_DATA
6. Now we will set some find and replace strings.
7. Finally we will perform a regsub on the payload and replace with new text.
8. Now you should have enough to understand and the majority of code to create the iRule. If not here is the complete iRule.

---

iRules Summary

Here is a summary of all the irules used in this lab

Lab 1 - Complete iRule

Completed iRule

```
# if / elseif version

when HTTP_REQUEST {
        if {[HTTP::host] equals "dvwa.f5lab.com"} {
                pool dvwa_pool_http
        } elseif {[HTTP::host] equals "peruggia.f5lab.com"} {
                pool peruggia_http_pool
        } elseif {[HTTP::host] equals "wackopicko.f5lab.com"} {
                pool wackopicko_http_pool
        }
}

# switch version

when HTTP_REQUEST {
        switch [HTTP::host] {
                dvwa.f5lab.com { pool dvwa_pool_http }
                peruggia.f5lab.com { pool peruggia_http_pool }
                wackopicko.f5lab.com { pool wackopicko_http_pool }
        }
}


# Advanced, data group lookup version!

when HTTP_REQUEST {
        if { [class match [HTTP::host] equals "hostnames_dg"] } {
                pool [class lookup [HTTP::host] "hostnames_dg"]
        }
}
```

Lab 2 - Complete iRule

Completed iRule

```
# Header_Strip_Log_iRule

when HTTP_REQUEST {
        log local0. "Request Headers: [HTTP::header names]"
}

when HTTP_RESPONSE {
        log local0. "Response Headers: [HTTP::header names]"
```

```
        HTTP::header remove Server
}

# Advanced - Bonus and prettier

when HTTP_REQUEST {
        foreach header [HTTP::header names] {
                log local0. "Request Header $header: [HTTP::header $header]"
        }
}

when HTTP_RESPONSE {
        foreach header [HTTP::header names] {
                log local0. "Response Header $header: [HTTP::header $header]"
                if {$header equals "Server"} {
                        HTTP::header remove $header
                }
        }
        HTTP::header insert Server "Microsoft-IIS/8.0"
}
```

Lab 3 - Complete iRule

Completed iRule

```
# HTTP_to_HTTPS_iRule

when HTTP_REQUEST {
        HTTP::redirect "https://[HTTP::host][HTTP::uri]"
}

# Factory F5 https redirect iRule

when HTTP_REQUEST {
        HTTP::redirect https://[getfield [HTTP::host] ":" 1][HTTP::uri]
}
```

Lab 4 - Complete iRule

Completed iRule

```
# Stream_iRule

when HTTP_REQUEST {
        HTTP::header remove Accept-Encoding
        STREAM::disable
}

when HTTP_RESPONSE {
        STREAM::expression @Damn@Darn@
        STREAM::enable
}
```

Lab 5 - Complete iRule

Completed iRule

```
# HTTP_Payload_iRule

when HTTP_REQUEST {
        HTTP::version 1.0
        HTTP::header remove Accept-Encoding
}

when HTTP_RESPONSE {
        HTTP::collect [expr 1024*1024]
}

when HTTP_RESPONSE_DATA {
  set find "Damn"
  set replace "***"

  if {[regsub -all $find [HTTP::payload] $replace new_response] > 0} {
    HTTP::payload replace 0 [HTTP::payload length] $new_response
  }
}
```

iRules Events

Here is the link to the iRule Events

Complete listing of events - https://clouddocs.f5.com/api/irules/Events.html

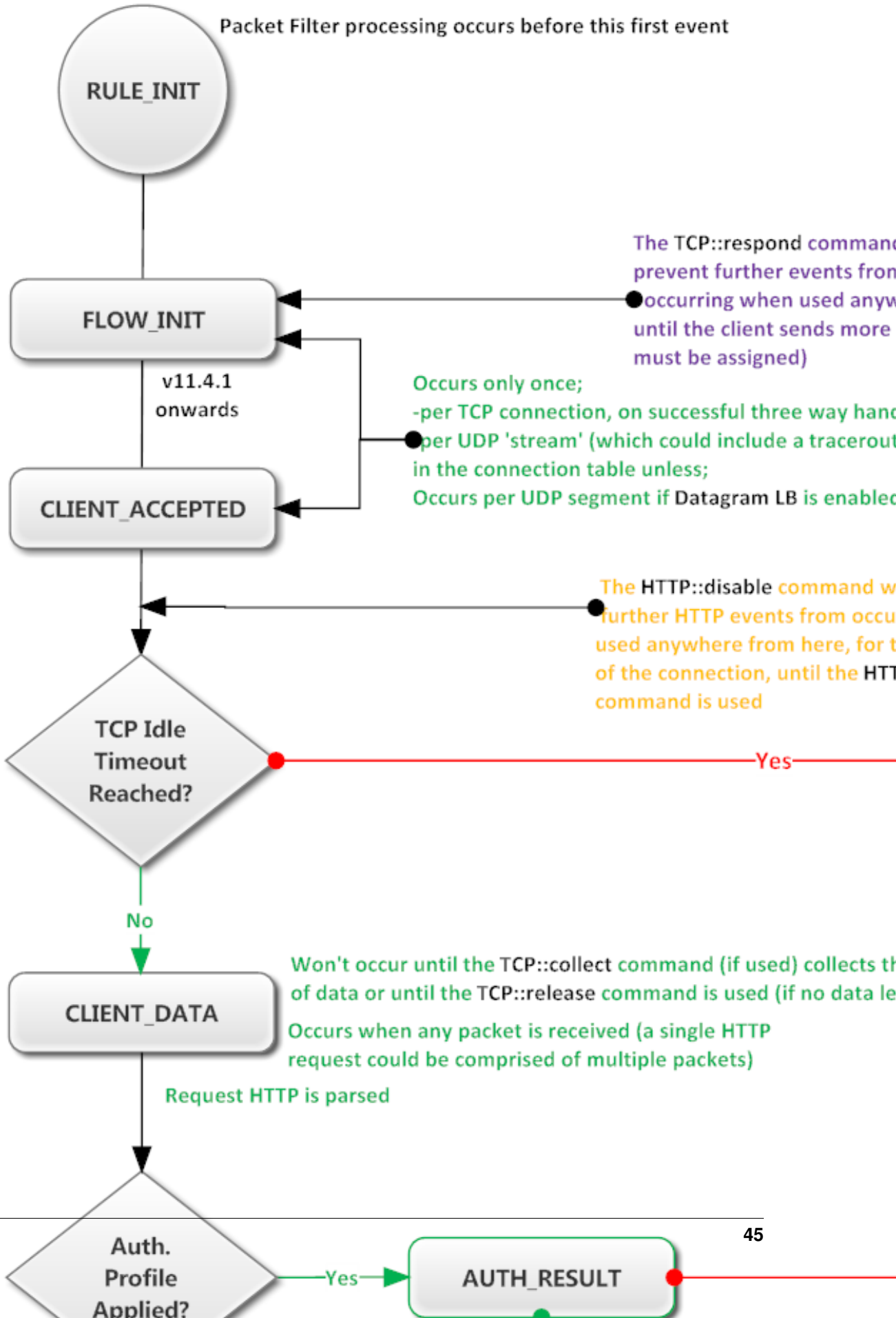
Master list of iRule Commands - https://clouddocs.f5.com/api/irules/Commands.html

BIG-IP Commands and Events by Version - https://clouddocs.f5.com/api/irules/BIGIP_Commands_by_Version.html

iRules HTTP Events

Here is the link to the iRule Events flow order

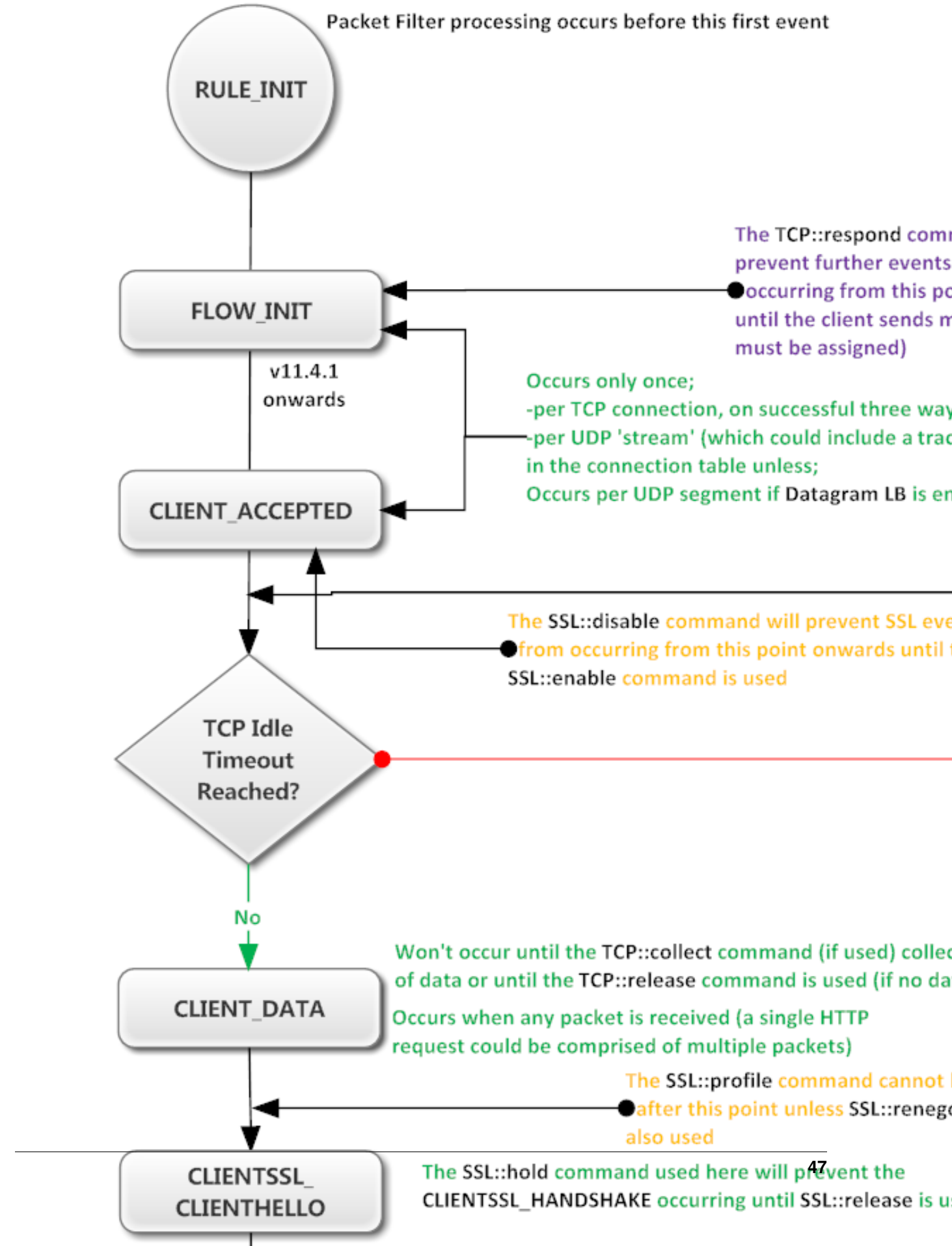
HTTP Flow Order grabbed form here - https://devcentral.f5.com/s/contentdocument/0691T000005oRxAQAU


Packet Filter processing occurs before this first event
RULE_INIT
The TCP::respond command
prevent further events from
occurring when used anyw
until the client sends more
must be assigned)
FLOW_INIT
v11.4.1
onwards
Occurs only once;
-per TCP connection, on successful three way hand
per UDP 'stream' (which could include a tracerout
in the connection table unless;
Occurs per UDP segment if Datagram LB is enable
CLIENT_ACCEPTED
The HTTP::disable command w
further HTTP events from occu
used anywhere from here, for t
of the connection, until the HTT
command is used
TCP Idle
Timeout
Reached?
Yes
No
CLIENT_DATA
Won't occur until the TCP::collect command (if used) collects th
of data or until the TCP::release command is used (if no data le
Occurs when any packet is received (a single HTTP
request could be comprised of multiple packets)
Request HTTP is parsed
Auth.
Profile
Applied?
Yes
AUTH_RESULT

iRules HTTPS Events

Here is the link to the iRule Events flow order

HTTPS Flow Order grabbed from here - https://devcentral.f5.com/s/contentdocument/0691T000005nCt6QAE


Packet Filter processing occurs before this first event
RULE_INIT
The TCP::respond comm
prevent further events
occurring from this po
until the client sends m
must be assigned)
FLOW_INIT
v11.4.1
onwards
Occurs only once;
-per TCP connection, on successful three way
-per UDP 'stream' (which could include a trac
in the connection table unless;
Occurs per UDP segment if Datagram LB is en
CLIENT_ACCEPTED
The SSL::disable command will prevent SSL eve
from occurring from this point onwards until
SSL::enable command is used
TCP Idle
Timeout
Reached?
No
Won't occur until the TCP::collect command (if used) collec
of data or until the TCP::release command is used (if no da
CLIENT_DATA
Occurs when any packet is received (a single HTTP
request could be comprised of multiple packets)
The SSL::profile command cannot
after this point unless SSL::renego
also used
CLIENTSSL_
CLIENTHELLO
The SSL::hold command used here will prevent the
CLIENTSSL_HANDSHAKE occurring until SSL::release is u

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