HUNT

ROOTCON 11

Data Driven Web Hacking & Manual Testing

@jhaddix @swagnetow @FatihEgbatan @digitalwoot @_Sha128

@bugcrowd

Contribs

Motley crew at @bugcrowd

- Security Engineering & SecOps groups
- Bughunters, Pentesters, Code Analysis, ++
- Burp Suite fans

The Problem(z)

1. Increasingly large and complicated Web Applications. Need manual testing. Lots of params.

2. Applications Assessment Training lacks "tribal knowledge" of vulnerability location

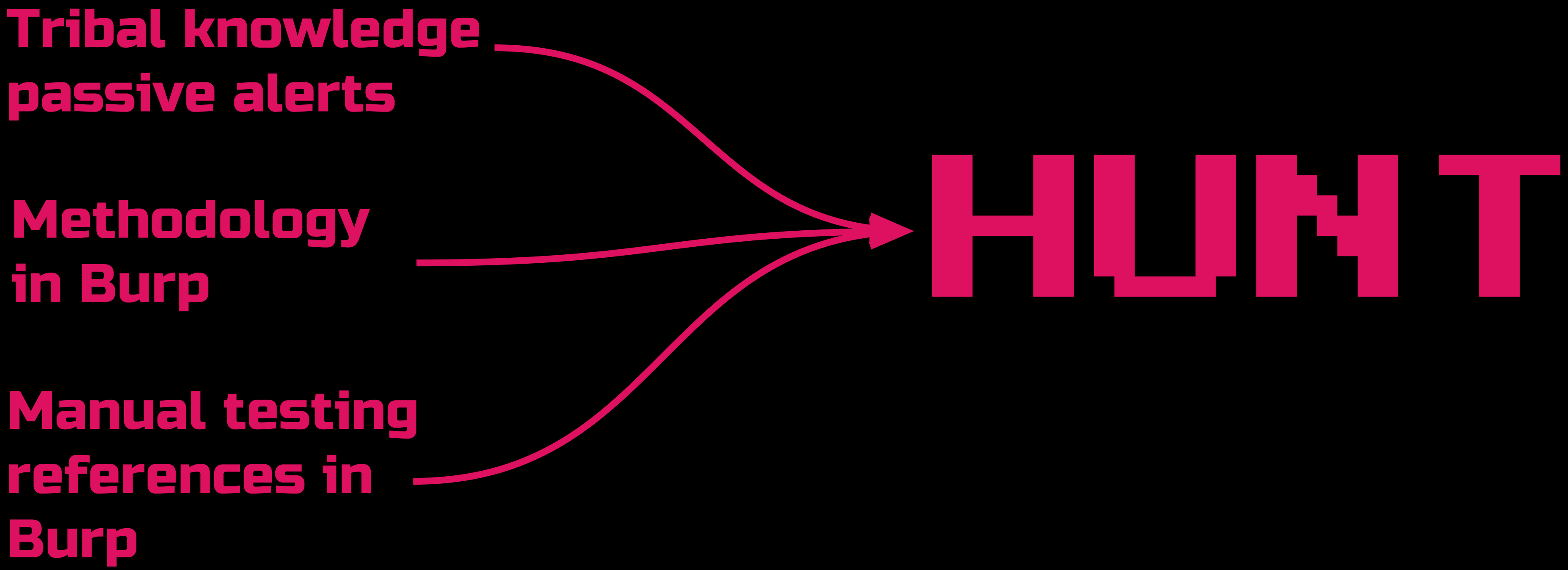
3. No in-tool workflow for web hacking methodologies

Current Solutions

1. Badass hacker who can eyeball and effectively find security bugs
    a. May or may not have a methodology
    b. Definitely has accrued "tribal knowledge"
    c. Bughunts and/or does consultant work

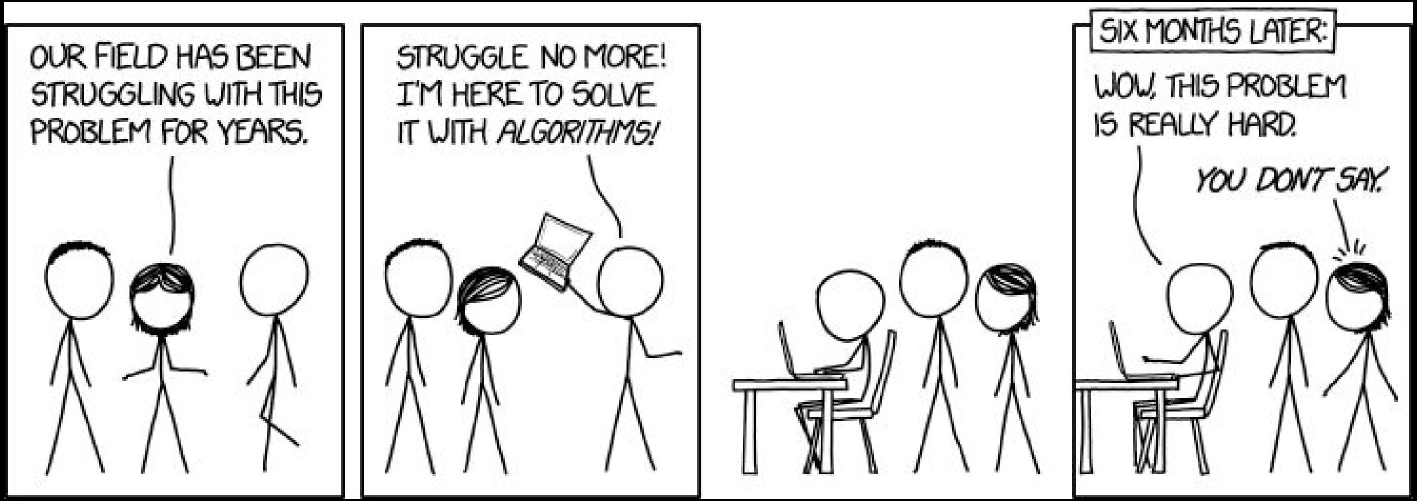
2. Dynamic Scanner
    a. Limited test cases (fuzzing)
    b. Cost prohibitive
    c. Limited in detection cases (dynamic pages, errors, etc)
    d. Complex sites are hard (auth)

NEW CHALLENGER APPROACHING
!


Tribal knowledge passive alerts
Methodology in Burp
Manual testing references in Burp
HUNT

Level 1

Hunt Scanner


OUR FIELD HAS BEEN STRUGGLING WITH THIS PROBLEM FOR YEARS.
STRUGGLE NO MORE! I'M HERE TO SOLVE IT WITH *ALGORITHMS!*
SIX MONTHS LATER:
WOW, THIS PROBLEM IS REALLY HARD.
YOU DON'T SAY.

Tribal Knowledge & Bug Location

Coming up with bug location (tribal knowledge)

- Bugcrowd data contains over 600+ bounties and disclosure programs:
  - Programs x 2 web targets per bounty (average)
    - Ie. targets: www.defcon.org, forums.defcon.org, media.defcon.org
  - 15 (average) parameters per application

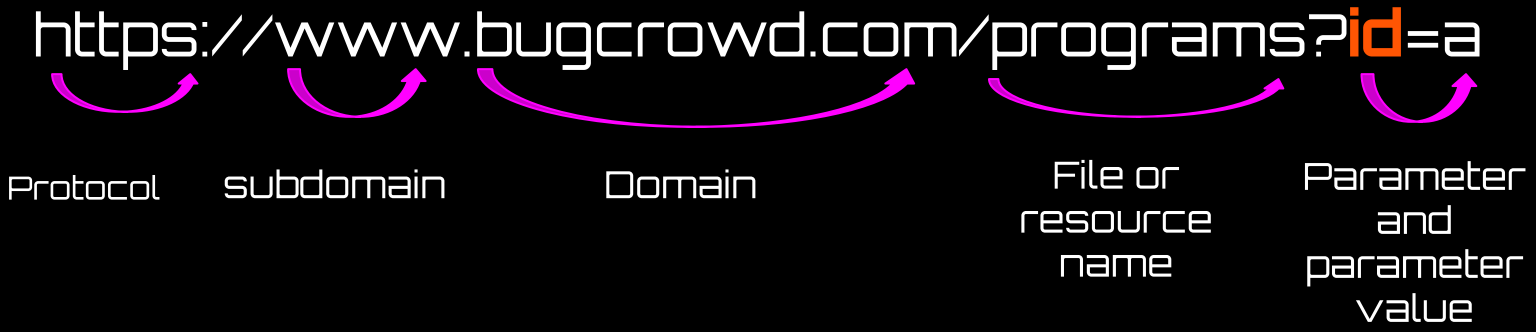
- **600 x 2 x 15 = ~18,000 parameters seen**

Coming up with vuln location (data) pt. 2

- ~18,000 parameters:
  - Reduce to params with vulns on them
  - Reduce to only Critical (P1's) and High (P2's) Severity bugs/vulns
  - Sort by recurring instances
  - Include top 5-10 reoccurring instances per vuln/bug category
  - Review top 100 for possible permutations manually and/or with regex
  - Manually add ancillary data (pentest/fuzzdb/seclists/++)

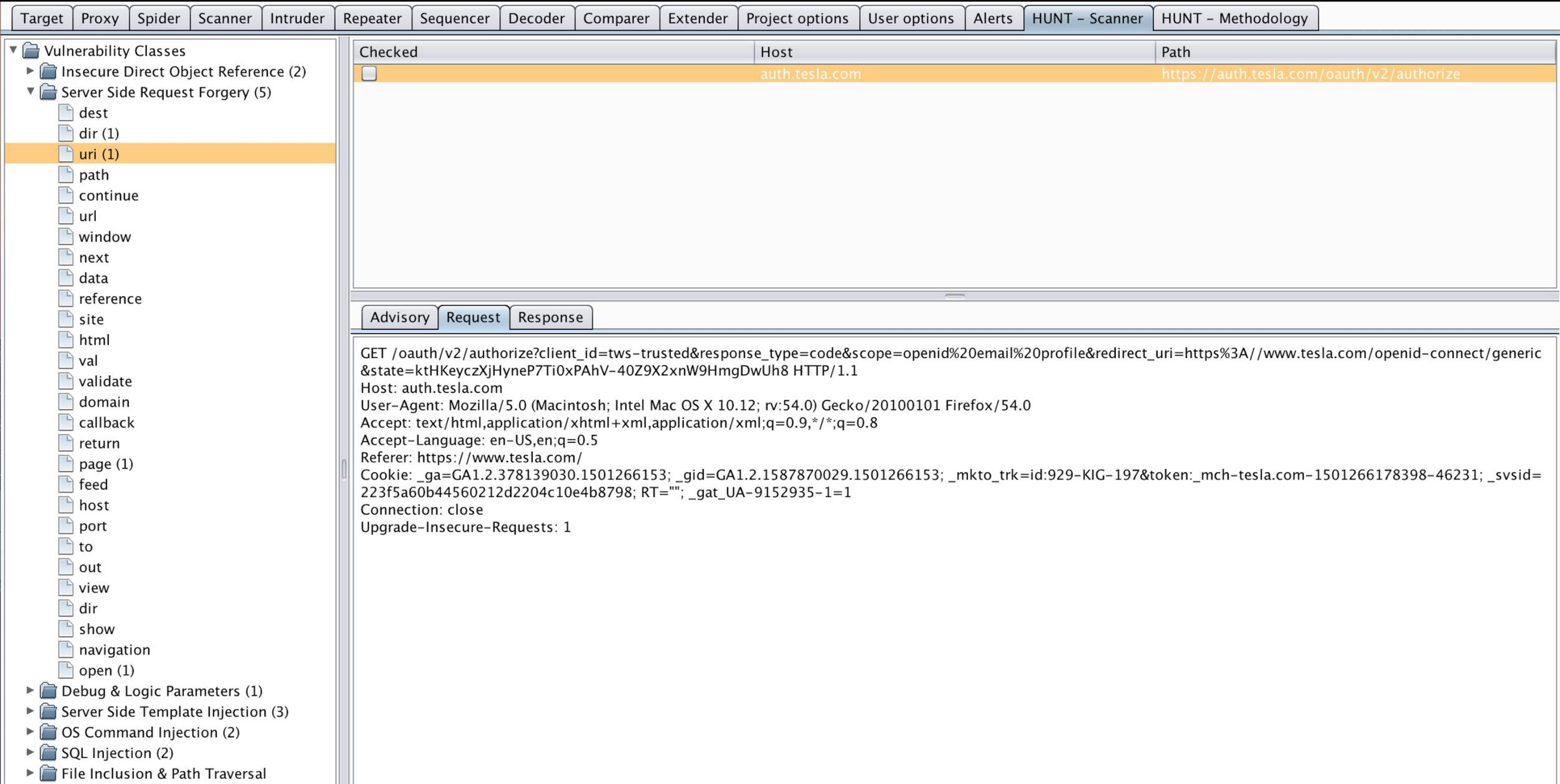
Exhibit A

HTTP GET Example


https://www.bugcrowd.com/programs?id=a
Protocol
subdomain
Domain
File or resource name
Parameter and parameter value

WHEN YOU SEE foo.php?id=1
'
'
'
'

Alerts

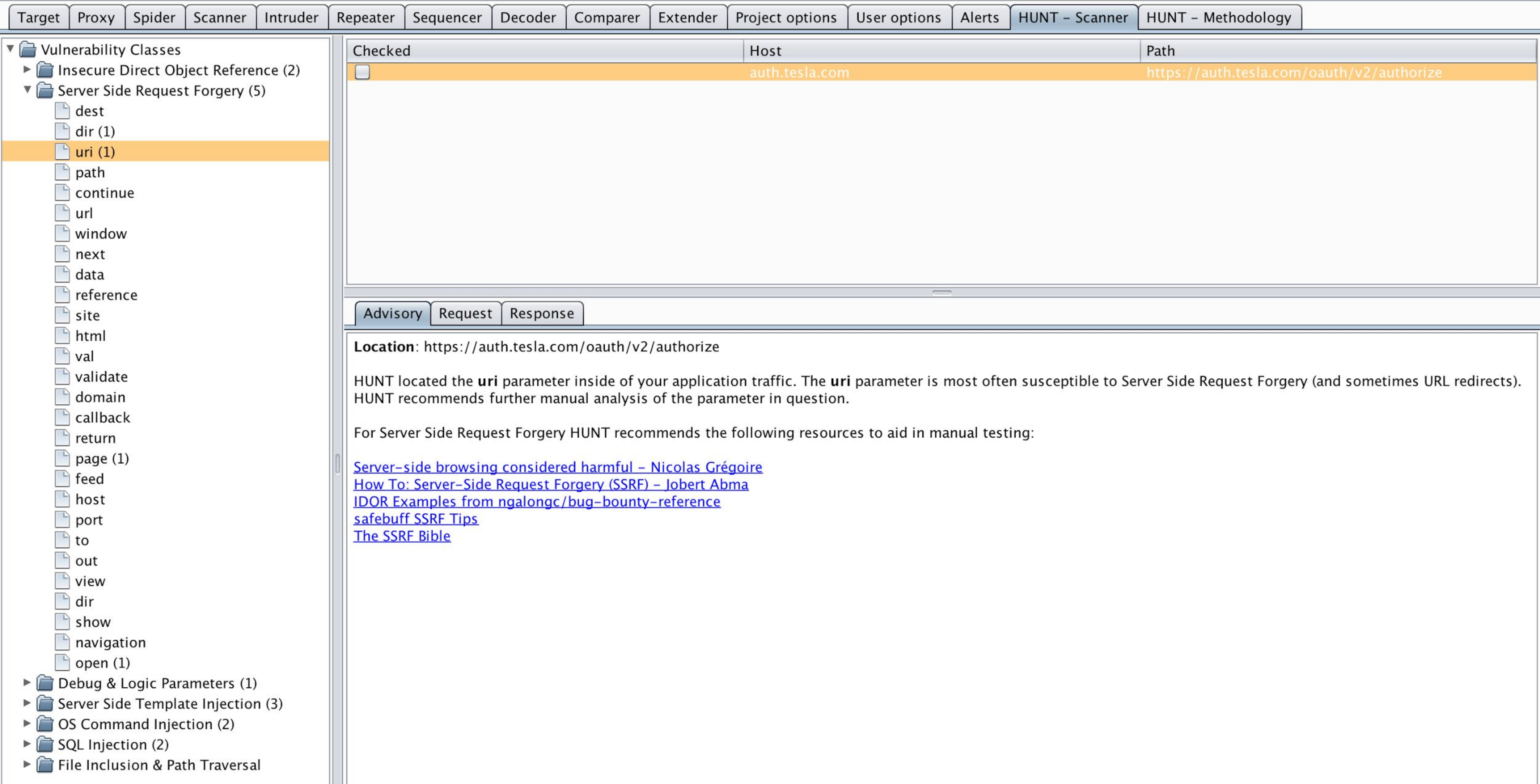


Vulnerability Classes
- Insecure Direct Object Reference (2)
- Server Side Request Forgery (5)
  - dest
  - dir (1)
  - uri (1)
  - path
  - continue
  - url
  - window
  - next
  - data
  - reference
  - site
  - html
  - val
  - validate
  - domain
  - callback
  - return
  - page (1)
  - feed
  - host
  - port
  - to
  - out
  - view
  - dir
  - show
  - navigation
  - open (1)
- Debug & Logic Parameters (1)
- Server Side Template Injection (3)
- OS Command Injection (2)
- SQL Injection (2)
- File Inclusion & Path Traversal

Checked	Host	Path
☐	auth.tesla.com	https://auth.tesla.com/oauth/v2/authorize

```
GET /oauth/v2/authorize?client_id=tws-trusted&response_type=code&scope=openid%20email%20profile&redirect_uri=https%3A//www.tesla.com/openid-connect/generic
&state=ktHKeyczXjHyneP7Ti0xPAhV-40Z9X2xnW9HmgDwUh8 HTTP/1.1
Host: auth.tesla.com
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.12; rv:54.0) Gecko/20100101 Firefox/54.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Referer: https://www.tesla.com/
Cookie: _ga=GA1.2.378139030.1501266153; _gid=GA1.2.1587870029.1501266153; _mkto_trk=id:929-KIG-197&token:_mch-tesla.com-1501266178398-46231; _svsid=
223f5a60b44560212d2204c10e4b8798; RT=""; _gat_UA-9152935-1=1
Connection: close
Upgrade-Insecure-Requests: 1
```

Advisory



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  - dest
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  - navigation
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- SQL Injection (2)
- File Inclusion & Path Traversal

Checked	Host	Path
☐	auth.tesla.com	https://auth.tesla.com/oauth/v2/authorize

Location: https://auth.tesla.com/oauth/v2/authorize

HUNT located the **uri** parameter inside of your application traffic. The **uri** parameter is most often susceptible to Server Side Request Forgery (and sometimes URL redirects). HUNT recommends further manual analysis of the parameter in question.

For Server Side Request Forgery HUNT recommends the following resources to aid in manual testing:

Server-side browsing considered harmful – Nicolas Grégoire
How To: Server-Side Request Forgery (SSRF) – Jobert Abma
IDOR Examples from ngalongc/bug-bounty-reference
safebuff SSRF Tips
The SSRF Bible

Bug Location by bug/vuln class

Here be dragons

SQL Injection - http://acme.com/script?id=1

{regex + perm} id	{regex} select	{regex} report	{regex} role
{regex} update	{regex} query	{regex + perm} user	{regex + perm} name
{regex} sort	{regex} where	{regex + perm} search	{regex} params
{regex} process	{regex + perm} row	{regex + perm} view	{regex} table
{regex + perm} from	{regex + perm} sel	{regex} results	{regex} sleep
{regex} fetch	{regex + perm} order	{regex} keyword	{regex} count
{regex + perm} column	{regex} input	{regex + perm} key	
{regex + perm} code	{regex + perm} field	{regex} delete	{*type*} Custom headers
{regex} string	{regex} number	{regex + perm} filter	{*type*} JSON and XML services

File Includes / Dir Traversal

{regex + perm} file	{regex} location	{regex} locale	{regex + perm} path
{regex} display	{regex} load	{regex + perm} read	{regex} retrieve
{regex + perm} folder	{regex} style	{regex + perm} doc	{regex} document
{regex} root	{regex} pdf	{regex} pg	{regex} include
{regex} list	{regex} view	{regex} img	{regex} image

http://acme.com/script?load=//file

Server Side Request Forgery 🔥🔥🔥

Many on the File Includes / Dir Traversal table			
{regex + perm} dest	{regex} redirect	{regex + perm} uri	{regex} path
{regex} continue	{regex + perm} url	{regex} window	{regex} next
{regex} data	{regex} reference	{regex + perm} site	{regex} html
{regex + perm} val	{regex} validate	{regex} domain	{regex} callback
{regex} return	{regex + perm} page	{regex} feed	{regex} host
{regex} port			

http://acme.com/script?uri=http://site

OS Command Injection

{regex} daemon	{regex + perm} upload	{regex + perm} dir
{regex} execute	{regex + perm} download	{regex + perm} log
{*type*} .cgi	{regex} ip	
{regex} cli	cmd	

http://acme.com/script?cmd=ls;%20cat%20/etc/passwd

Insecure Direct Object Reference 🔥🔥

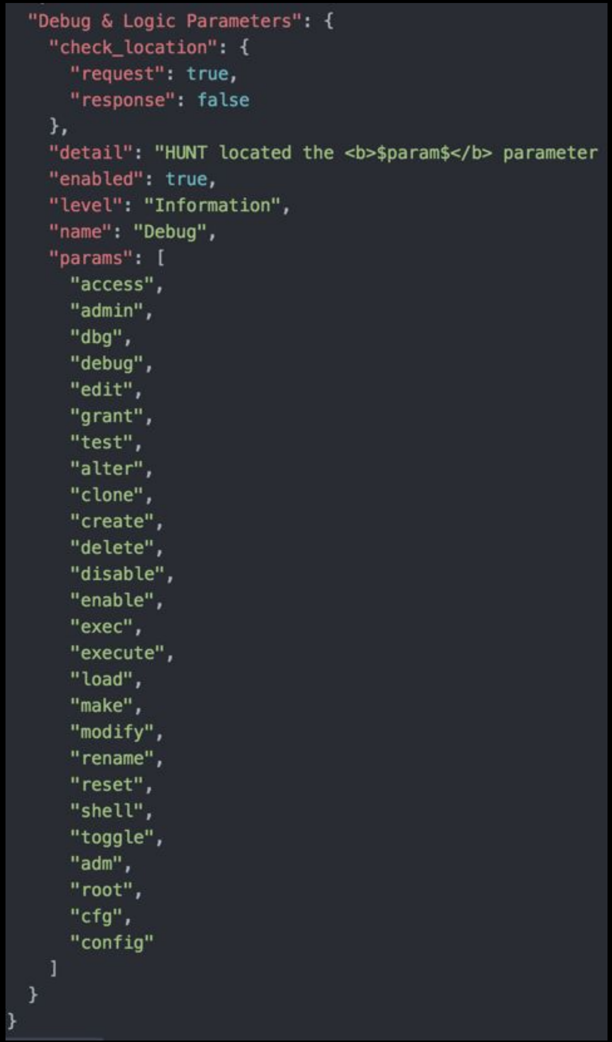
{regex + perm} id	{regex + perm} user	
{regex + perm} account	{regex + perm} number	
{regex + perm} order	{regex + perm} no	
{regex + perm} doc	{regex + perm} key	
{regex + perm} email	{regex + perm} group	
{regex + perm} profile	{regex + perm} edit	REST numeric paths

http://acme.com/script?user=21856

Server Side Template Injection & Logic / Debug

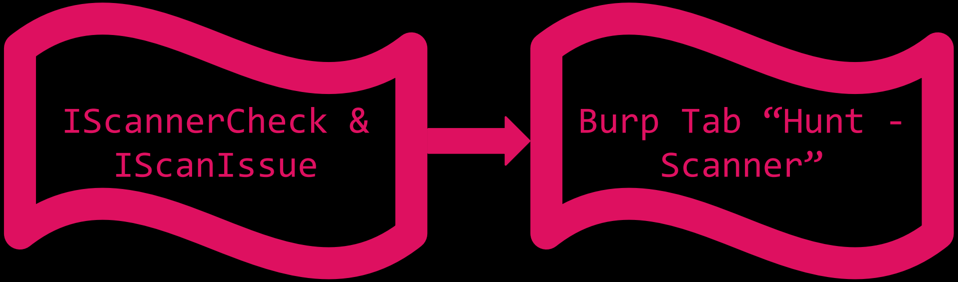
{regex + perm} template	content
preview	redirect
id	
view	
activity	
name	

http://acme.com/script?name={{2*3}}



```
  "Debug & Logic Parameters": {
    "check_location": {
      "request": true,
      "response": false
    },
    "detail": "HUNT located the <b>$param$</b> parameter
    "enabled": true,
    "level": "Information",
    "name": "Debug",
    "params": [
      "access",
      "admin",
      "dbg",
      "debug",
      "edit",
      "grant",
      "test",
      "alter",
      "clone",
      "create",
      "delete",
      "disable",
      "enable",
      "exec",
      "execute",
      "load",
      "make",
      "modify",
      "rename",
      "reset",
      "shell",
      "toggle",
      "adm",
      "root",
      "cfg",
      "config"
    ]
  }
}
```

Scanner Burp Implementation (Python)



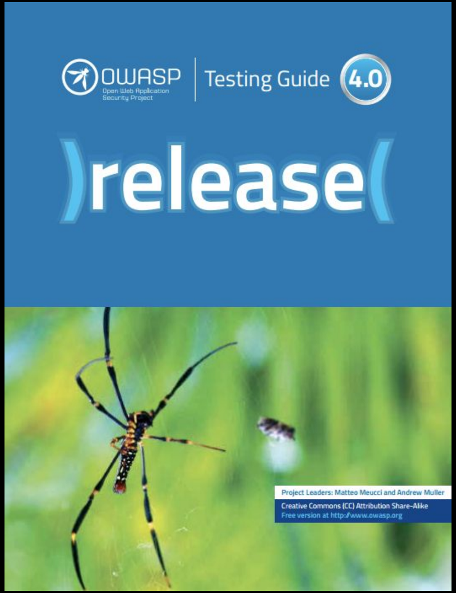
```
def doPassiveScan(self, request_response):
    raw_request = request_response.getRequest()
    raw_response = request_response.getResponse()
    request = self.helpers.analyzeRequest(raw_request)
    response = self.helpers.analyzeResponse(raw_response)

    parameters = request.getParameters()
    url = self.helpers.analyzeRequest(request_response).getUrl()
    vuln_parameters = self.issues.check_parameters(self.helpers,
parameters)

    is_not_empty = len(vuln_parameters) > 0

    if is_not_empty:
        self.issues.create_scanner_issues(self.view, self.callbacks,
self.helpers, vuln_parameters, request_response)

    # Do not show any Bugcrowd found issues in the Scanner window
    return []
```

DEMO

Level 2

GUI Methodology

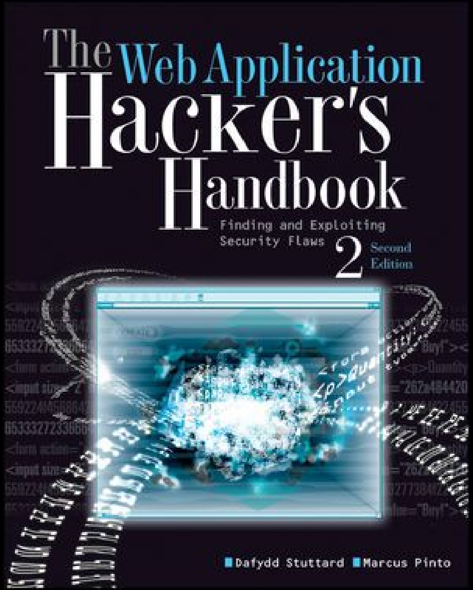
Methodologies


OWASP Open Web Application Security Project | Testing Guide 4.0

)release(

Project Leaders: Matteo Meucci and Andrew Muller

Creative Commons (CC) Attribution Share-Alike
Free version at http://www.owasp.org


The Web Application Hacker's Handbook

Finding and Exploiting Security Flaws

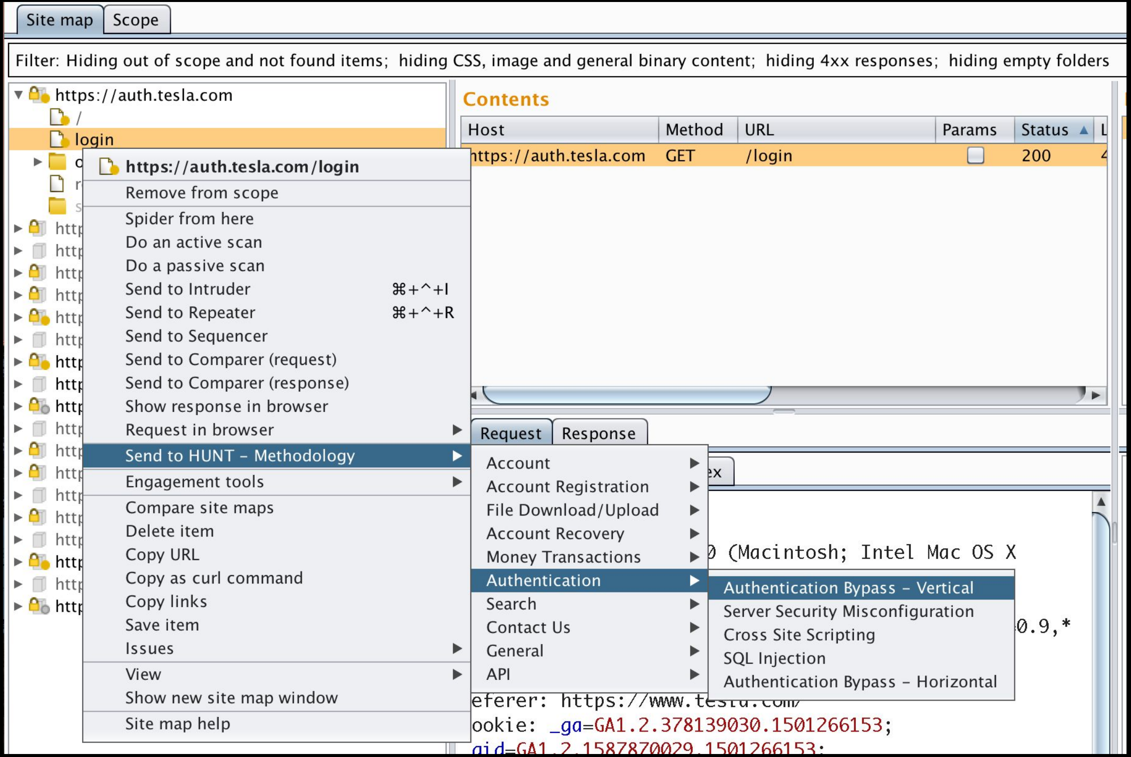
2 Second Edition

Dafydd Stuttard Marcus Pinto

HIPAA

Pci

Right Click -> Send-To Methodology Section

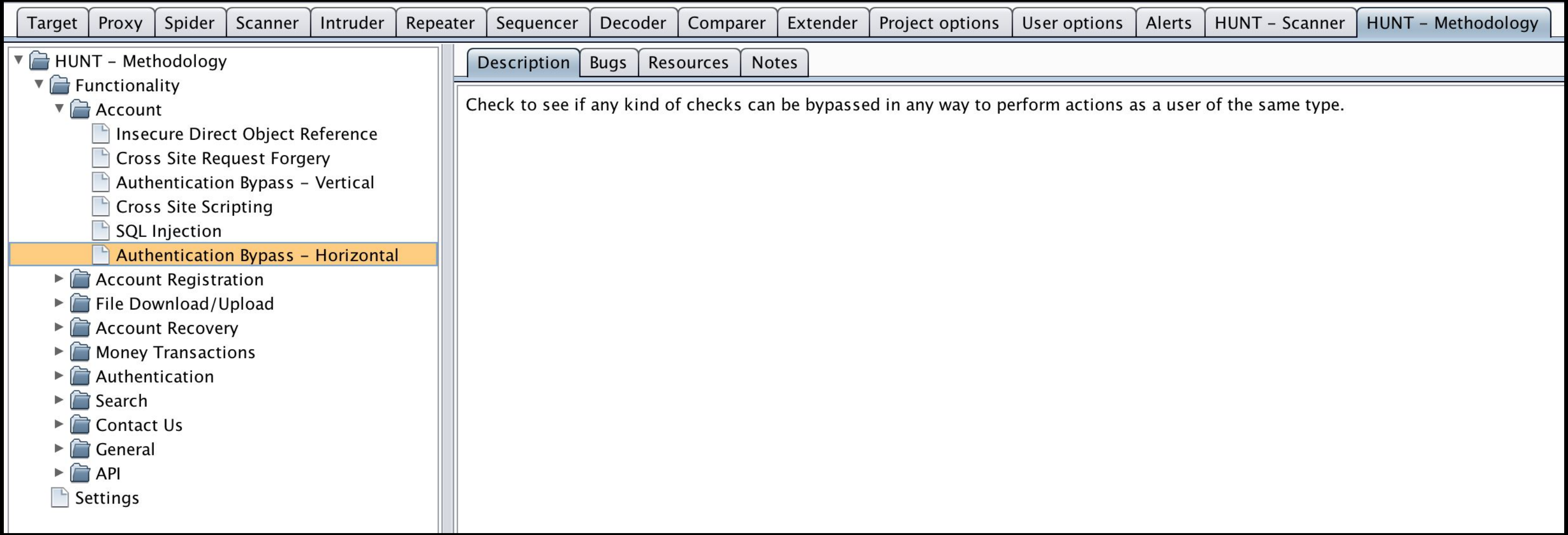


Filter: Hiding out of scope and not found items; hiding CSS, image and general binary content; hiding 4xx responses; hiding empty folders

Host	Method	URL	Params	Status
https://auth.tesla.com	GET	/login	☐	200

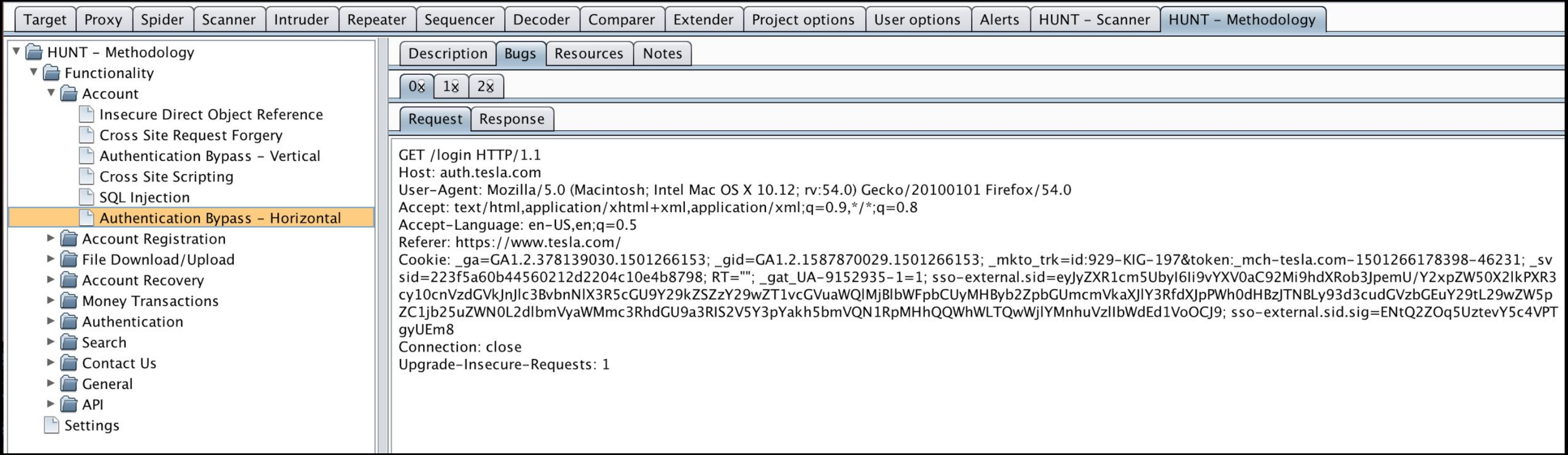
```
0 (Macintosh; Intel Mac OS X
0.9,*
eferer: https://www.tesla.com/
ookie: _ga=GA1.2.378139030.1501266153;
gid=GA1.2.1587870029.1501266153;
```

Description



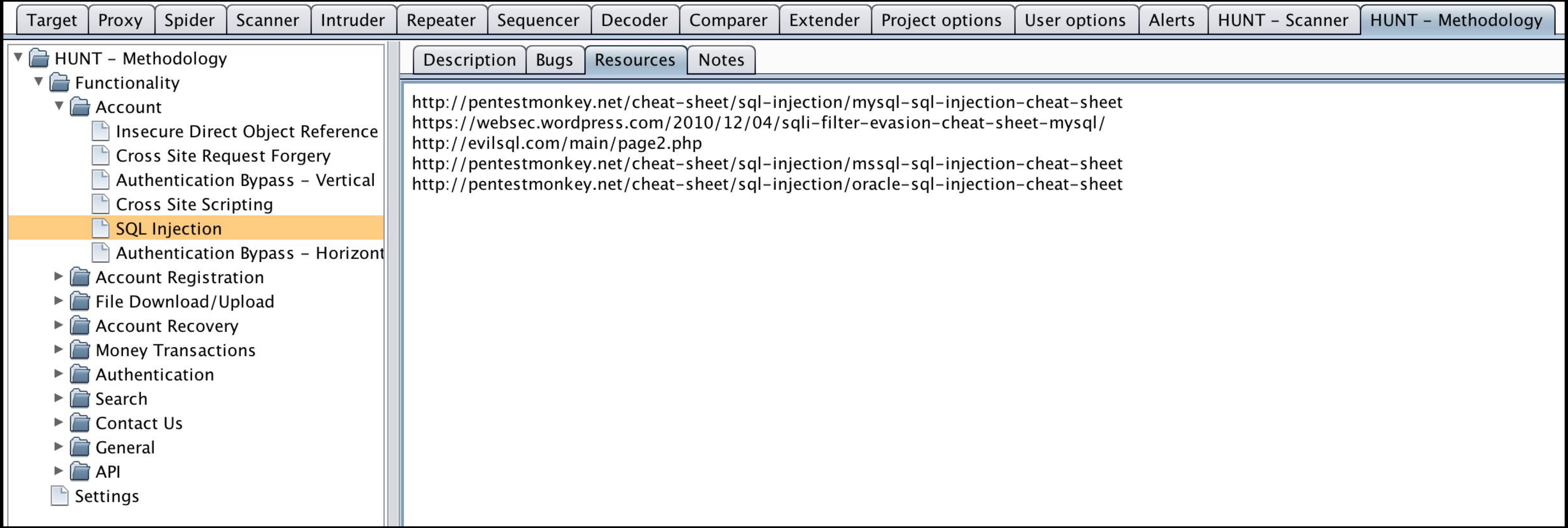
Check to see if any kind of checks can be bypassed in any way to perform actions as a user of the same type.

Multiple Request/Response Tracking


Target | Proxy | Spider | Scanner | Intruder | Repeater | Sequencer | Decoder | Comparer | Extender | Project options | User options | Alerts | HUNT - Scanner | HUNT - Methodology
HUNT - Methodology
Functionality
Account
Insecure Direct Object Reference
Cross Site Request Forgery
Authentication Bypass - Vertical
Cross Site Scripting
SQL Injection
Authentication Bypass - Horizontal
Account Registration
File Download/Upload
Account Recovery
Money Transactions
Authentication
Search
Contact Us
General
API
Settings
Description | Bugs | Resources | Notes
0x | 1x | 2x
Request | Response

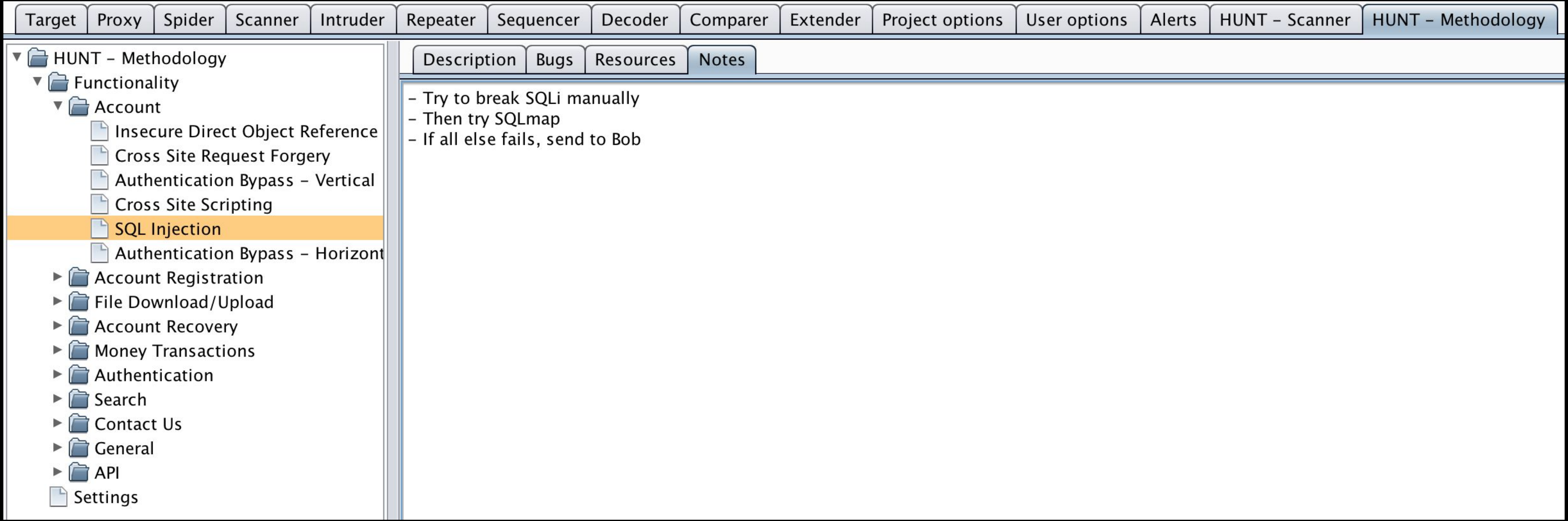
```
GET /login HTTP/1.1
Host: auth.tesla.com
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.12; rv:54.0) Gecko/20100101 Firefox/54.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Referer: https://www.tesla.com/
Cookie: _ga=GA1.2.378139030.1501266153; _gid=GA1.2.1587870029.1501266153; _mkto_trk=id:929-KIG-197&token:_mch-tesla.com-1501266178398-46231; _sv
sid=223f5a60b44560212d2204c10e4b8798; RT=""; _gat_UA-9152935-1=1; sso-external.sid=eyJyZXR1cm5UbyI6Ii9vYXV0aC92Mi9hdXRob3JpemU/Y2xpZW50X2lkPXR3
cy10cnVzdGVkJnJlc3BvbnNlX3R5cGU9Y29kZSZzY29wZT1vcGVuaWQlMjBlbWFpbCUyMHByb2ZpbGUmcmVkaXJlY3RfdXJpPWh0dHBzJTNBLy93d3cudGVzbGEuY29tL29wZW5p
ZC1jb25uZWN0L2dlbmVyaWMmc3RhdGU9a3RIS2V5Y3pYakh5bmVQN1RpMHhQQWhWLTQwWjlYMnhuVzlIbWdEd1VoOCJ9; sso-external.sid.sig=ENtQ2ZOq5UztevY5c4VPT
gyUEm8
Connection: close
Upgrade-Insecure-Requests: 1
```

Resources



```
http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet
https://websec.wordpress.com/2010/12/04/sqli-filter-evasion-cheat-sheet-mysql/
http://evilsql.com/main/page2.php
http://pentestmonkey.net/cheat-sheet/sql-injection/mssql-sql-injection-cheat-sheet
http://pentestmonkey.net/cheat-sheet/sql-injection/oracle-sql-injection-cheat-sheet
```

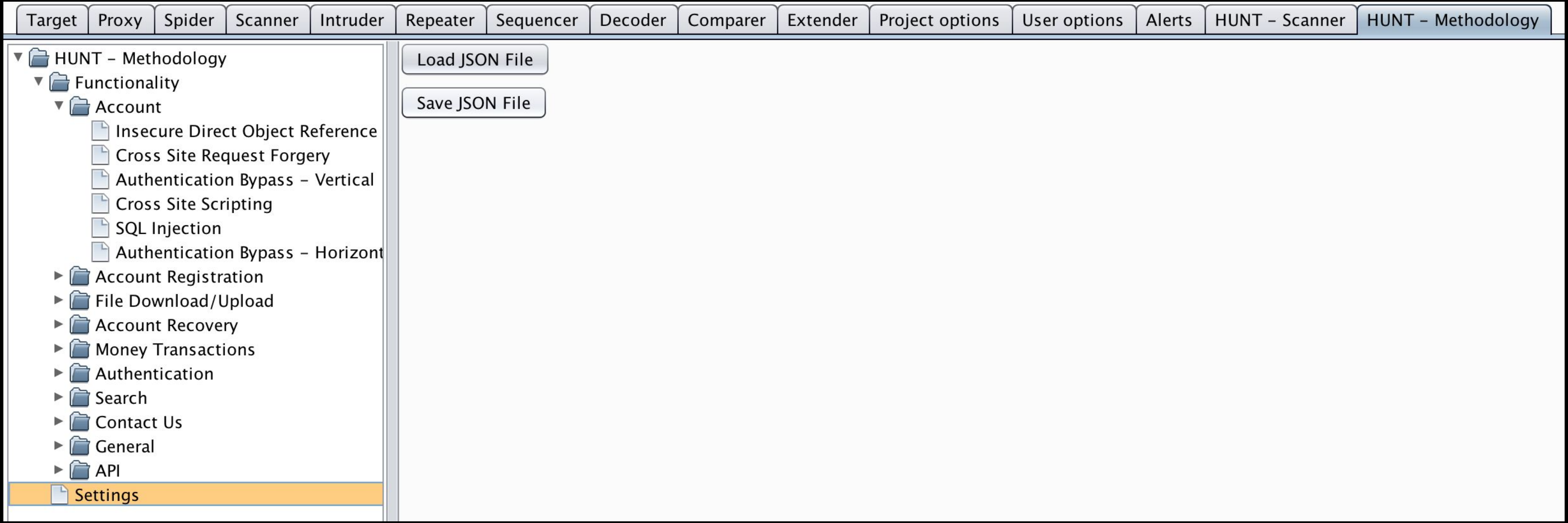
Notes



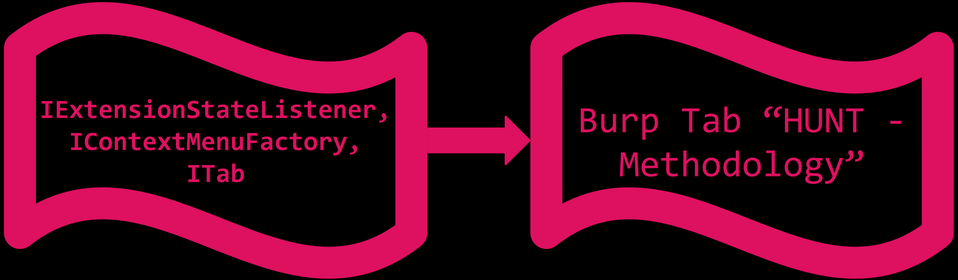
- HUNT – Methodology
  - Functionality
    - Account
      - Insecure Direct Object Reference
      - Cross Site Request Forgery
      - Authentication Bypass – Vertical
      - Cross Site Scripting
      - SQL Injection
      - Authentication Bypass – Horizont
    - Account Registration
    - File Download/Upload
    - Account Recovery
    - Money Transactions
    - Authentication
    - Search
    - Contact Us
    - General
    - API
  - Settings

- Try to break SQLi manually
- Then try SQLmap
- If all else fails, send to Bob

Save/Load JSON File



Methodology Burp Implementation (Python)

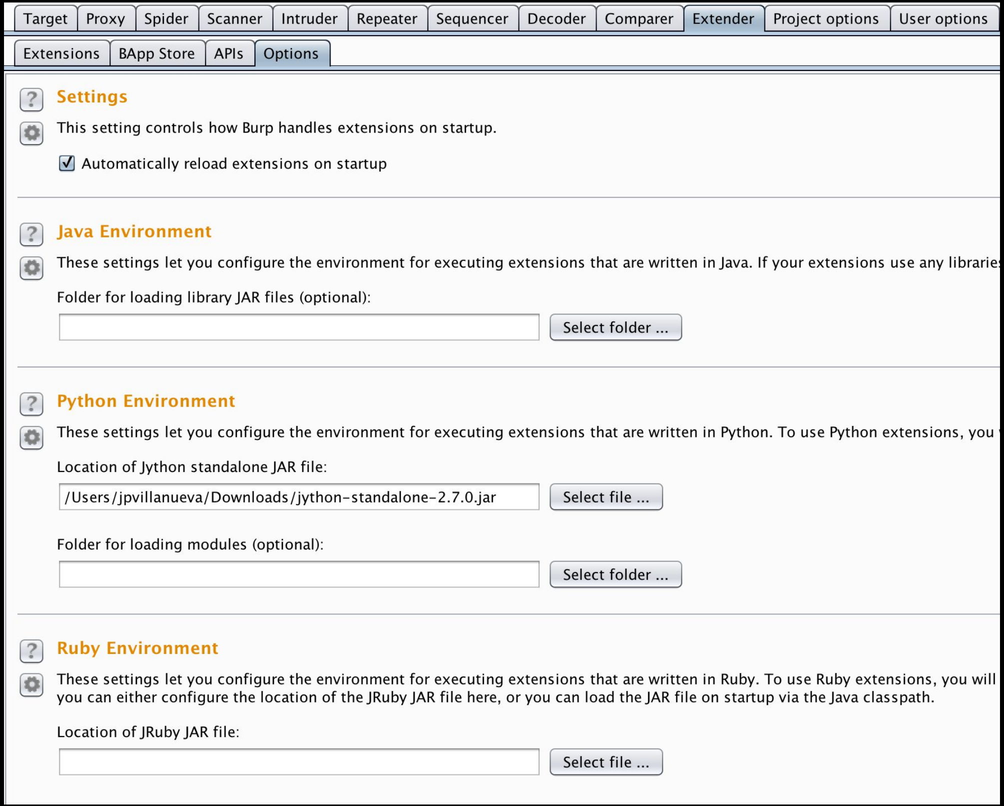

IExtensionStateListener, IContextMenuFactory, ITab
Burp Tab “HUNT - Methodology”

```
def createMenuItems(self, invocation):
    # Do not create a menu item unless getting a context menu from the proxy history or
scanner results
    is_proxy_history = invocation.getInvocationContext() ==
invocation.CONTEXT_PROXY_HISTORY
    is_scanner_results = invocation.getInvocationContext() ==
invocation.CONTEXT_SCANNER_RESULTS
    is_correct_context = is_proxy_history or is_scanner_results

    if not is_correct_context:
        return

    request_response = invocation.getSelectedMessages()[0]

    functionality = self.checklist["Functionality"]

    # Create the menu item for the Burp context menu
    bugcatcher_menu = JMenu("Send to HUNT - Methodology")

    for functionality_name in functionality:
        vulns = functionality[functionality_name]["vulns"]
        menu_vuln = JMenu(functionality_name)

        # Create a menu item and an action listener per vulnerability
        # class on each functionality
        for vuln_name in vulns:
            item_vuln = JMenuItem(vuln_name)
            menu_action_listener = MenuActionListener(self.view, self.callbacks,
request_response, functionality_name, vuln_name)
            item_vuln.addActionListener(menu_action_listener)
            menu_vuln.add(item_vuln)

        bugcatcher_menu.add(menu_vuln)

    burp_menu = []
    burp_menu.append(bugcatcher_menu)

    return burp_menu
```

DEMO

Plugin Installation

Installation - Jython



Settings

This setting controls how Burp handles extensions on startup.

☑ Automatically reload extensions on startup

Java Environment

These settings let you configure the environment for executing extensions that are written in Java. If your extensions use any librarie

Folder for loading library JAR files (optional):

Select folder ...

Python Environment

These settings let you configure the environment for executing extensions that are written in Python. To use Python extensions, you

Location of Jython standalone JAR file:

/Users/jpvillanueva/Downloads/jython-standalone-2.7.0.jar

Select file ...

Folder for loading modules (optional):

Select folder ...

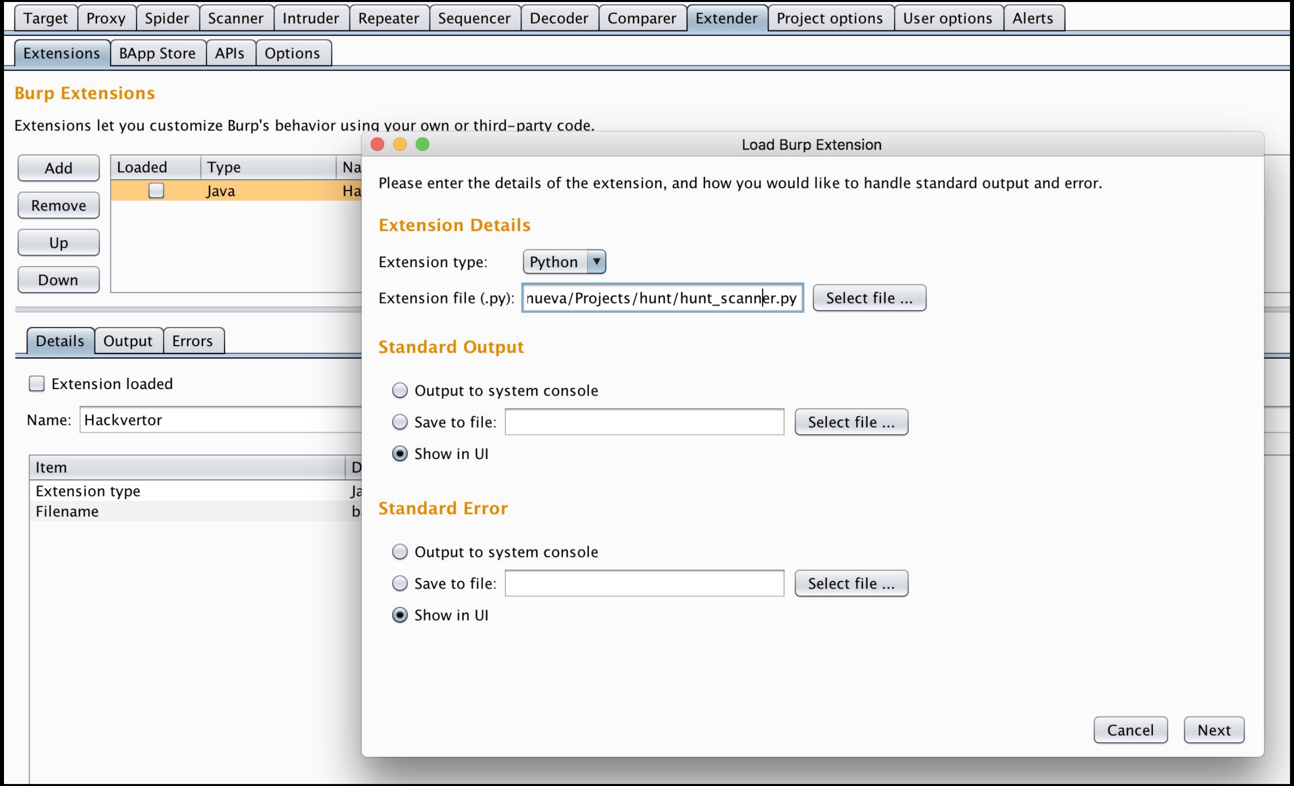
Ruby Environment

These settings let you configure the environment for executing extensions that are written in Ruby. To use Ruby extensions, you will
you can either configure the location of the JRuby JAR file here, or you can load the JAR file on startup via the Java classpath.

Location of JRuby JAR file:

Select file ...

Installation - Plugin



Burp Extensions

Extensions let you customize Burp's behavior using your own or third-party code.

Loaded	Type	Na
☐	Java	Ha

☐ Extension loaded

Name: Hackvertor

Item	D
Extension type	Ja
Filename	b

Load Burp Extension

Please enter the details of the extension, and how you would like to handle standard output and error.

Extension Details

Extension type: Python

Extension file (.py): nueva/Projects/hunt/hunt_scanner.py Select file ...

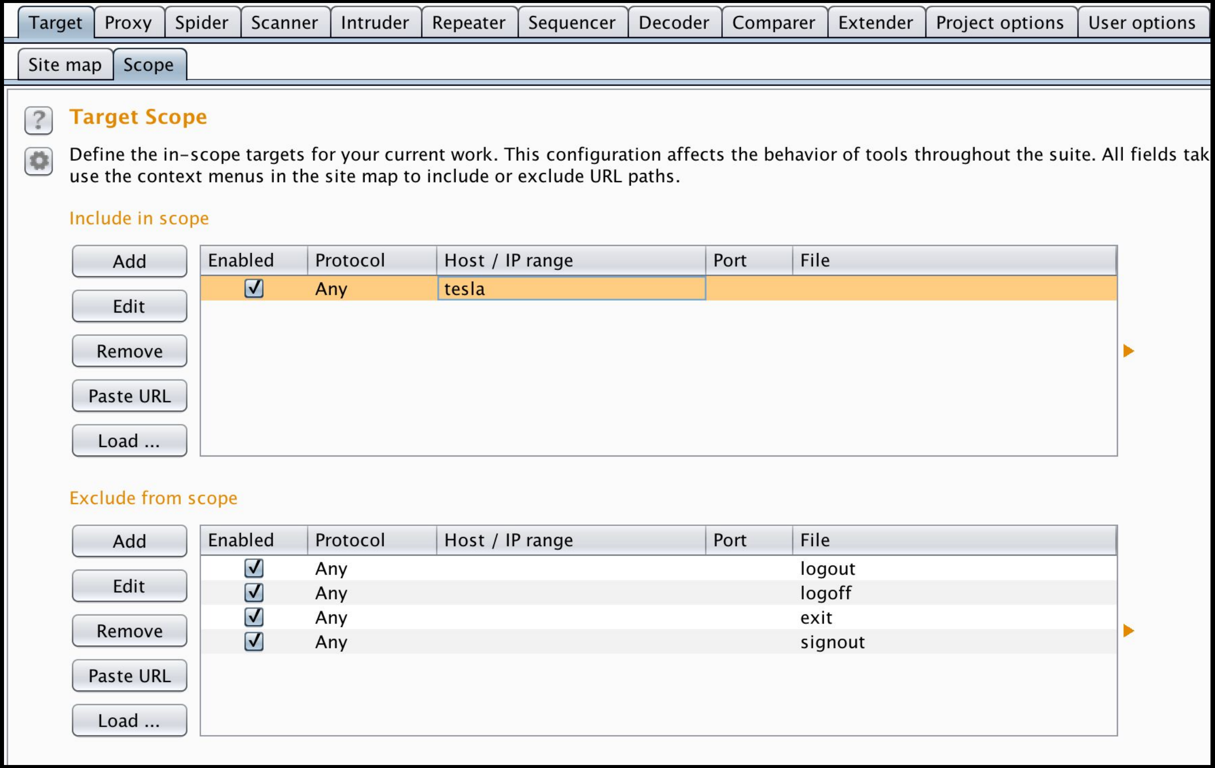
Standard Output

○ Output to system console
○ Save to file: Select file ...
● Show in UI

Standard Error

○ Output to system console
○ Save to file: Select file ...
● Show in UI

Setting Target Scope



Target | Proxy | Spider | Scanner | Intruder | Repeater | Sequencer | Decoder | Comparer | Extender | Project options | User options
Site map | Scope

Target Scope

Define the in-scope targets for your current work. This configuration affects the behavior of tools throughout the suite. All fields tak
use the context menus in the site map to include or exclude URL paths.

Include in scope

Add
Edit
Remove
Paste URL
Load ...

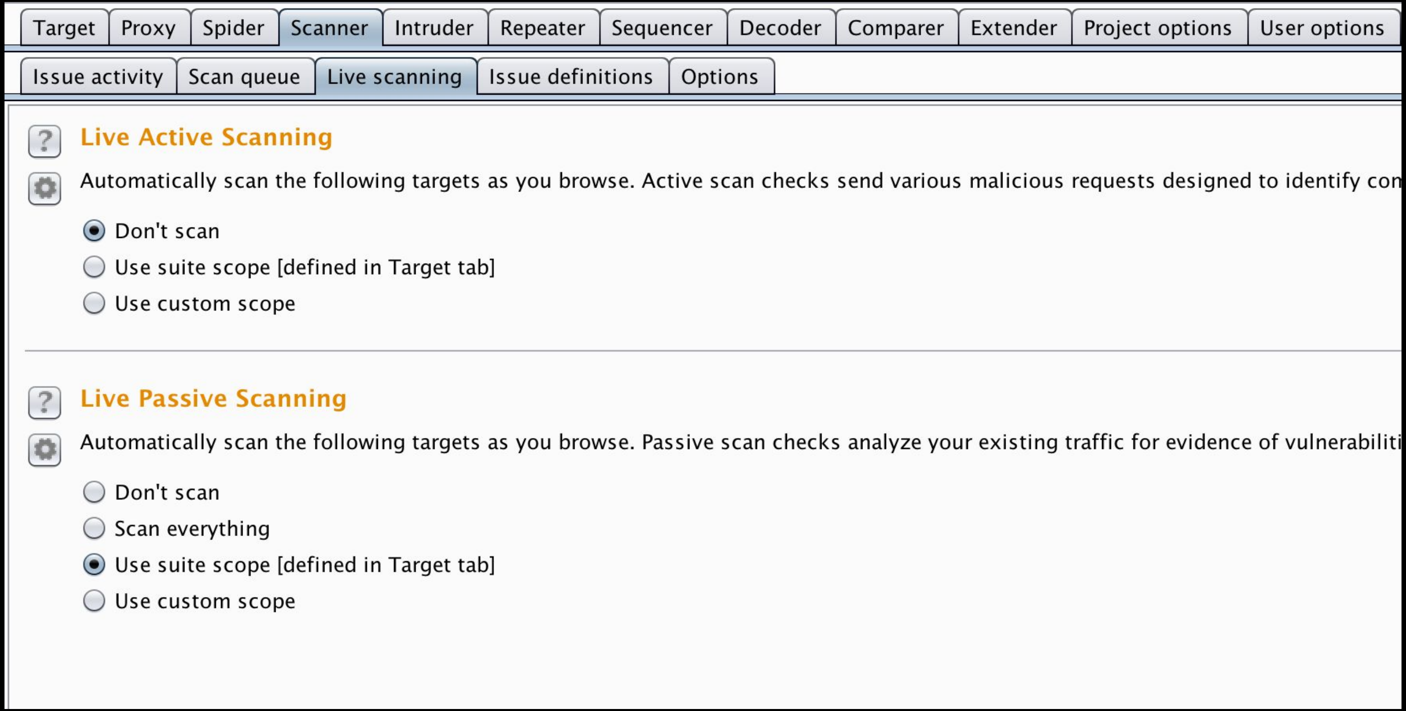
Enabled	Protocol	Host / IP range	Port	File
✓	Any	tesla		

Exclude from scope

Add
Edit
Remove
Paste URL
Load ...

Enabled	Protocol	Host / IP range	Port	File
✓	Any			logout
✓	Any			logoff
✓	Any			exit
✓	Any			signout

Setting Passive Scanner Scope



Live Active Scanning

Automatically scan the following targets as you browse. Active scan checks send various malicious requests designed to identify con

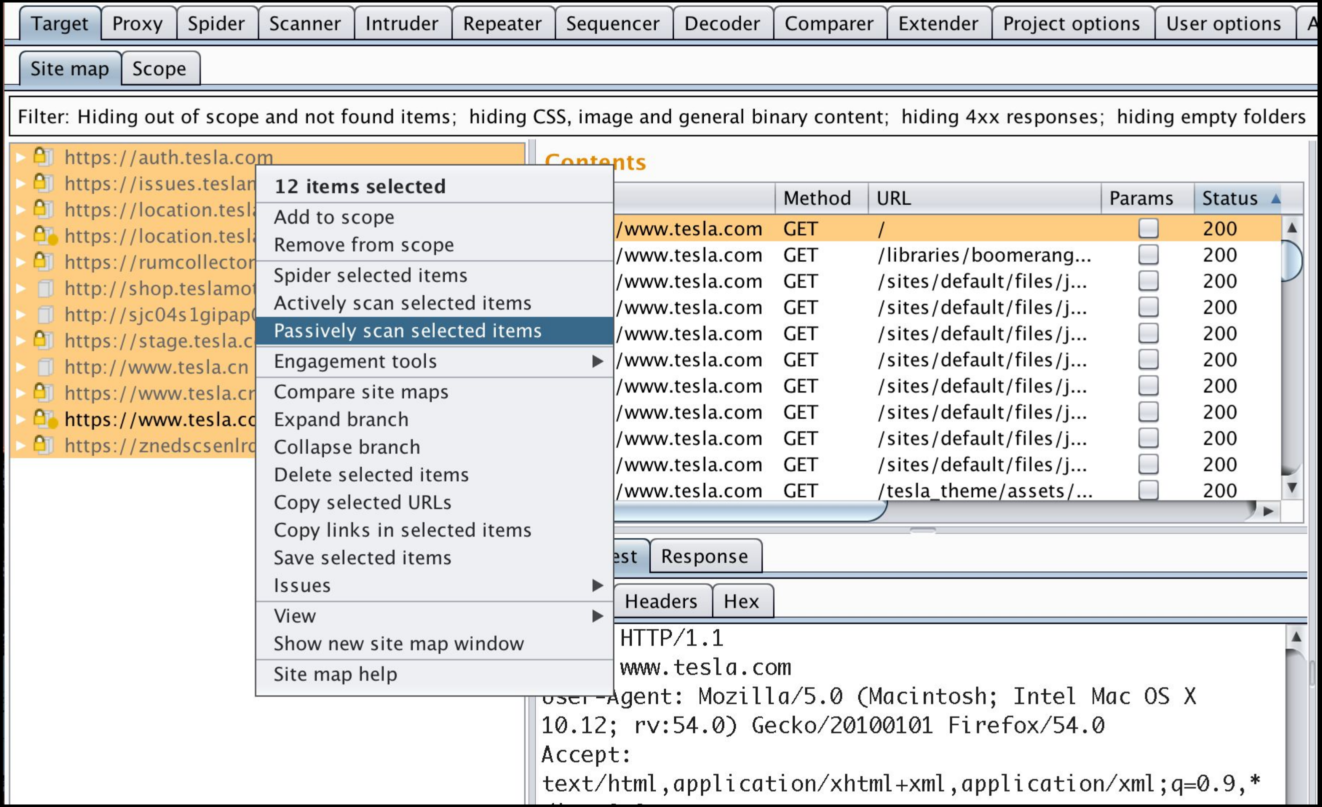
- [✓ Don't scan]
- Use suite scope [defined in Target tab]
- Use custom scope

Live Passive Scanning

Automatically scan the following targets as you browse. Passive scan checks analyze your existing traffic for evidence of vulnerabiliti

- Don't scan
- Scan everything
- [✓ Use suite scope [defined in Target tab]]
- Use custom scope

Running the Passive Scanner



Filter: Hiding out of scope and not found items; hiding CSS, image and general binary content; hiding 4xx responses; hiding empty folders

https://auth.tesla.com
https://issues.teslan
https://location.tesla
https://location.tesla
https://rumcollector
http://shop.teslamot
http://sjc04s1gipap(
https://stage.tesla.c
http://www.tesla.cn
https://www.tesla.cn
https://www.tesla.co
https://znedscsenlrd

	Method	URL	Params	Status
/www.tesla.com	GET	/	☐	200
/www.tesla.com	GET	/libraries/boomerang...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/sites/default/files/j...	☐	200
/www.tesla.com	GET	/tesla_theme/assets/...	☐	200

```
HTTP/1.1
www.tesla.com
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X
10.12; rv:54.0) Gecko/20100101 Firefox/54.0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,*
```

Extensibility

Scanner Extensibility

Creating new issue checks are as simple as adding to the JSON file.

```
{
  "issues": {
    "OS Command Injection": {
      "check_location": {
        "request": true,
        "response": false
      },
      "detail": "HUNT located the <b>$param$</b> parameter inside of your application traffic. The <b>$param$</b> parameter is most often susceptible to OS Command Injection. HUNT recommends further manual analysis of the parameter in question.<br><br>For OS Command Injection HUNT recommends the following resources to aid in manual testing:",
      "level": "Information",
      "name": "Possible OS Command Injection",
      "params": [
        "daemon",
        "upload",
        "dir",
        "execute",
        "download",
        “sexyparam”
      ]
    }
}
```

Methodology Extensibility

Creating new methodologies are as simple as adding to the JSON file.

```
{
 "checklist": {
   "Settings": "",
   "Functionality": {
     "SEXY METHODOLOGY SECTION": {
       "description": "SWAG",
       "tests": {
         "Authentication Bypass - Vertical": {
           "description": "Check to see if the login sequence can be bypassed in any way to get higher level permissions.",
           "resources": [],
           "bugs": [],
           "notes": ""
         }
       }
     }
   }
 }
}
```

DEF CON 25

DEMO

The Future

- More built-in methodologies
  - PCI, HIPAA, CREST, OWASP, PTES
- Port to ZAP?
- More scanner checks/vulnerability classes
- More resources
- Dynamic JSON structure support
- Perfect GUI lol
- REST Support
- Full Burp helpers (right click, search, highlight, etc)
- Resource/File name analysis (Instead of params)
- Alerts on content types (XML, JSON, Multipart-form)
- Response analysis alerts (errors ++)

Thanks!

Questions?

www.github.com/bugcrowd/HUNT

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@bugcrowd