

Securing Your APIs: What You Need to Know

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Featured Presenters

Our knowledgeable speakers today are:



Elisa Velarde

Senior Product
Marketing Manager
Veracode



Dan Murphy

Software Engineering
Consultant
Veracode



**Peggy Bresnick-
Kendler**

Moderator
Dark Reading



Dark Reading

Securing APIs: What you need to know

January 25, 2022

Elisa Velarde, Sr. Product Marketing Manager

Dan Murphy, Architect & Consulting Software Engineer

Today's Presenters



Elisa Velarde

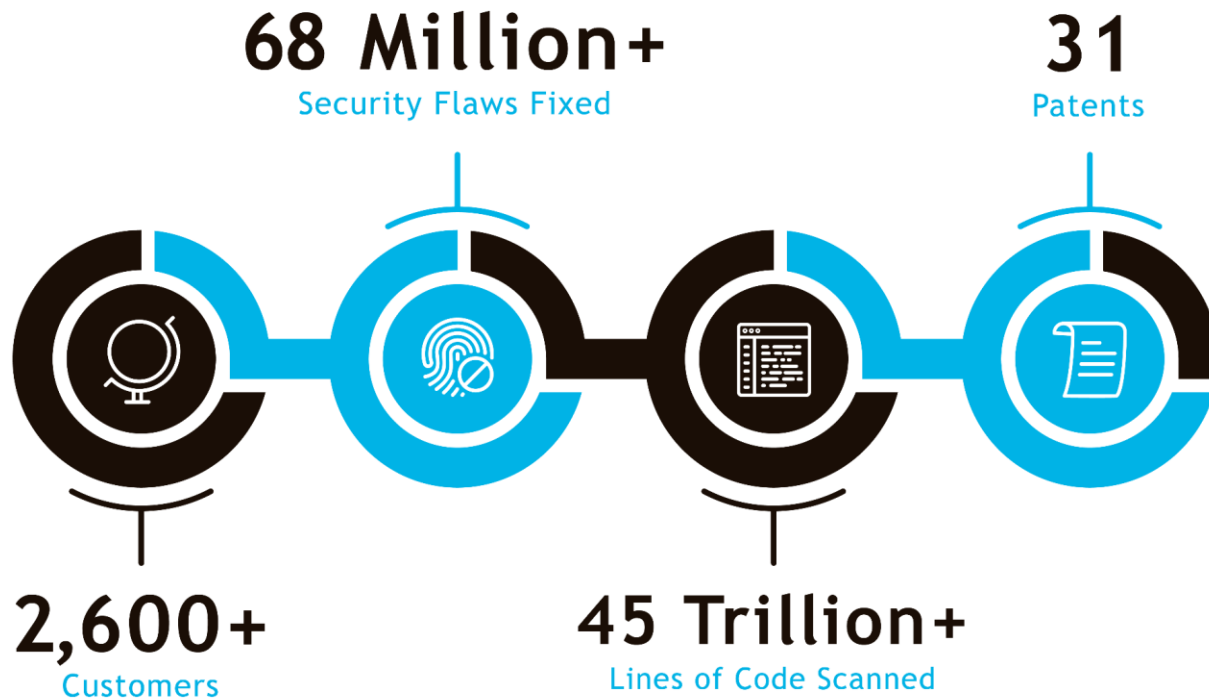
Sr. Product Marketing
Manager



Daniel Murphy

Architect / Consulting
Software Engineer

VERACODE AT A GLANCE



 **15**
Years of
Scan Data

 **8x**
Gartner MQ
Leader

 **27**
Languages
Scanned

 **\$1B +**
Valuation

 **One fifth**
of Fortune 100
as Customers

Application Analysis



Integrate security into the pipeline

Automated scanning through integrations with popular systems, plus APIs and code samples



Cover all application types

Support for web, mobile, microservices in all major programming languages and frameworks



Consolidate AppSec solutions

Simplify vendor management and reporting by combining five analysis types in one solution



Staying ahead of the threat is a daunting task

Hackers were responsible for over 4,000 attacks each day during 2020 or 1,460,000 attacks by the end of the calendar year.

Largest Breaches and Hacks of 2020, The Year of the Digital Pandemic, Hacked.com

APIs: The rapidly
evolving attack
surface



Why scanning APIs at runtime matters

Software Development is evolving, attack surfaces are morphing

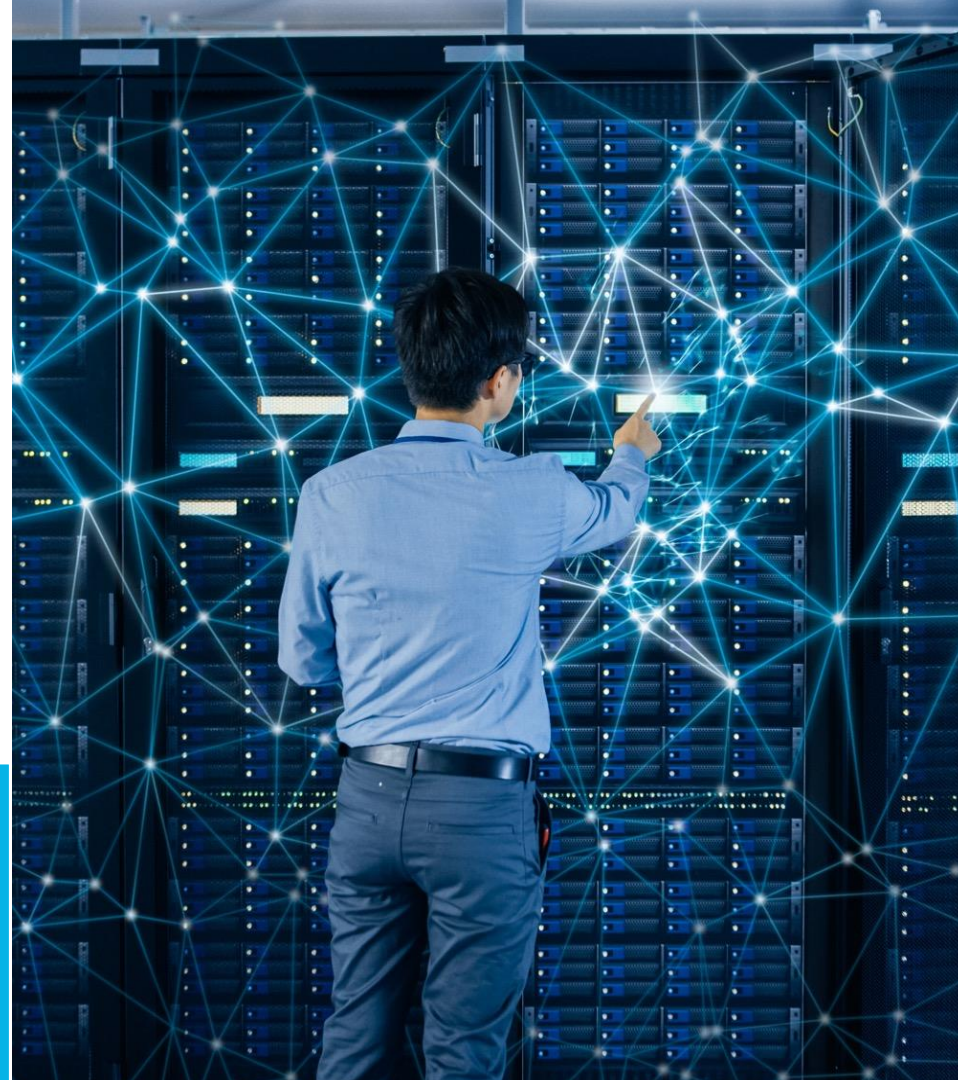
- Modern application architecture requires APIs
- Attackers are leveraging these new architectures with increasing frequency
- "Shifting left" helps, but it's one dimensional
- Security teams need to dynamically test APIs before they are integrated into larger applications where remediation is more costly

By 2023, 90% of web-enabled applications will have more surface area for attack in the form of exposed APIs rather than the user interface (UI), up from 50% in 2020.

- Gartner MQ, 2021

In 2022, API abuses will move from an infrequent to the most frequent attack vector, resulting in data breaches for enterprise web applications.

- Gartner MQ, 2021



What our customers are experiencing



“Shifting Left” is helpful, but doesn’t address the runtime environment



Security teams *still* grapple with balancing development velocity and securing their APIs



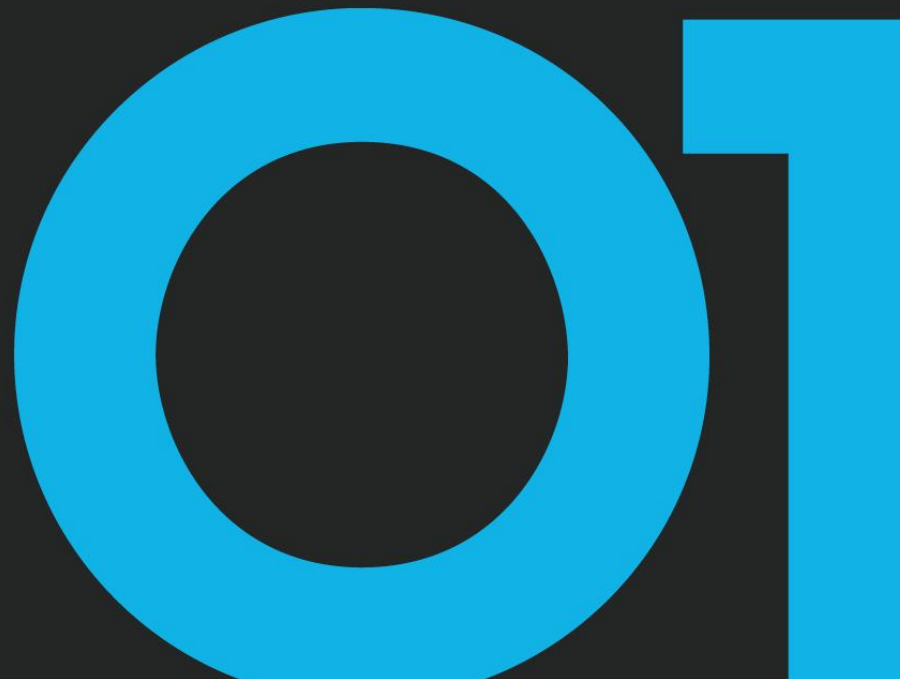
Focused remediation is increasingly difficult due to disparate applications, context switching and “noisy” scan results

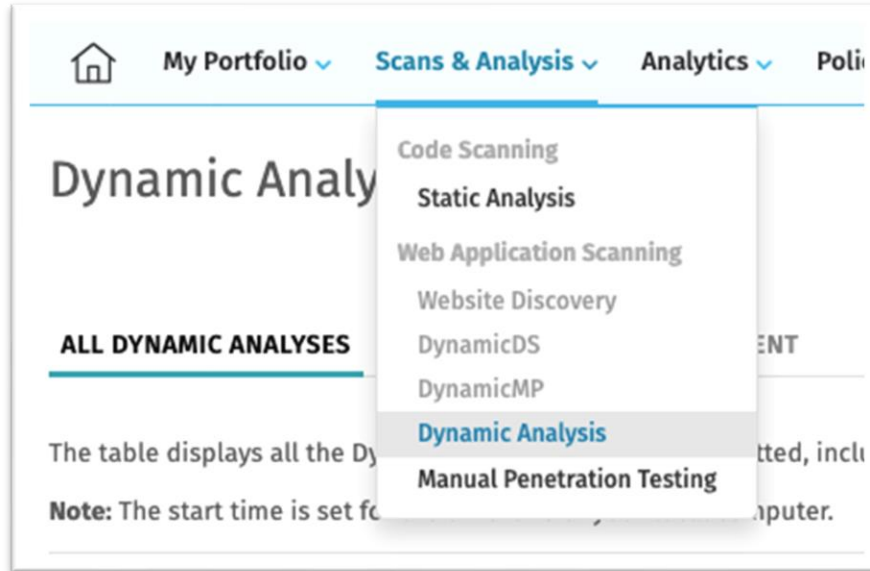


AppSec teams need a more effective way to solve the runtime security problem for APIs

Scan Setup Walkthrough

Dan Murphy





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Scan API Specifications

ALL DYNAMIC ANALYSES API SPECIFICATION MANAGEMENT

Note: The start time is set for the timezone of your local computer.

Q URL or Dynamic Analysis Name

Filter by

Select

1 - 10 of 14

1 of 2

Rows 10 ▼

Dynamic Analysis Name	Scan Type	# of Items	Status	Frequency	Start Date	Actions
OpenAPI Demo	API Specification	1	Completed - Verifying Results	🕒 Once	24 Jan 2022 10:39AM	⋮
Dark Reading Example API Scan (Swagger)	API Specification	1	Completed - Results Available	🕒 Once	23 Jan 2022 2:02PM	⋮
Dark Reading Example API Scan	API Specification	1	Completed - Results Available	🕒 Once	23 Jan 2022 1:58PM	⋮
Demo of API	API Specification	1	🚨 Completed - All Verifications Failed	Prescan Only	14 Dec 2021 10:54AM	⋮
CannotScan	API Specification	1	🚨 All Verifications Failed	🕒 Once	15 Nov 2021 3:45PM	⋮
Swagger Scan Demo	API Specification	1	Completed - Results Available	🕒 Once	1 Nov 2021 9:23AM	⋮
Example API Scan	API Specification	1	Prescan Complete	Prescan Only	21 Oct 2021 12:18PM	⋮
API Scan Demo	API Specification	1	Completed - Results Available	🕒 Once	20 Oct 2021 11:36AM	⋮
Vuln API Example	API Specification	1	Completed - Results Available	🕒 Once	19 Oct 2021 11:01PM	⋮
API Feature Brief - Full Scan	API Specification	1	Completed - Results Available	🕒 Once	14 Oct 2021 1:34PM	17



Create: Unique Name

Basic Information *



Dynamic Analysis Information

Enter or upload URLs to create a Dynamic Analysis.

Dynamic Analysis Name: *

Enter a unique name for the analysis

Veracode supports API Specification file types of OpenAPI 3.0 and 2.0 (.yaml, .json), and HTTP Archive (.har) and authentication specifications on the [API Specifications Management](#) tab.

API Specifications: * Options ▾

Upload New API Specification

Choose Existing API Specifications

You have not added any API Specifications yet.

▸ Dynamic Analysis User Agent

Visibility Settings

Visibility is defined at API Specification level and the analysis inherits an API Specification's visibility. If teams are d

Visibility: Not defined

Upload API Specification



Veracode supports API specification file types of OpenAPI 3.0 and 2.0 (.yaml, .json), and HTTP Archive (.har). Depending on the file size, the upload may take a few seconds to complete.

When this specification is added to the analysis, it will also be added to the API Specification Management tab on the Dynamic Analysis Home Page.

API Specification Name:

Enter optional name or leave blank to use file name.

Select File: *

No file chosen

50 MB Max

For OpenAPI specifications (.yaml, .json), you can add a custom base URL. After uploading the specification, this custom URL will be automatically selected from the list of available servers when configuring a scan. This custom URL replaces any relative URLs in your specification.

Custom Base URL :

Enter a custom base URL, for example: <https://api-mysite.com>

Select who can access this API specification. Users or teams with visibility for this specification can access it from the API Specification Management tab, add it to an analysis, configure it for scanning, and view the scan results. **After adding a specification to an analysis, you cannot change its visibility settings.**

Visibility Settings: *



Security leads only



Security leads and teams

Dynamic Analysis Information

Enter or upload URLs to create a Dynamic Analysis.

Dynamic Analysis Name: *

Enter a unique name for the analysis

Veracode supports API Specification file types of OpenAPI 3.0 and 2.0 (.yaml, .json), and HTTP Archive (.har) and authentication types Client Certification, Basic Authentication/NTLMv2, and Custom HTTP Headers. An analysis can contain a maximum of 250 specifications. You can view and manage uploaded specifications on the [API Specifications Management](#) tab.




API Specifications: *

API Specifications to Scan

1 - 1 of 1

◀◀ ◀ 1 of 1 ▶ ▶▶

Rows 10 ▼

Server	API Specification Name	File Type	Uploaded	Application Name	Internal Scanning Actions
http://a7b11b7461c90455697cc0d3e27b72ad-...	openapi-vulnapi (1).yaml	OpenAPI 3.0	24 Jan 2022 at 10:36AM by dmurph...		  

1 - 1 of 1

◀◀ ◀ 1 of 1 ▶ ▶▶

Rows 10 ▼

► Dynamic Analysis User Agent

* Required

API Specification Information

If the API Specification has multiple servers, select the server you want to scan.

Server:

API Specification Name: openapi-vulnapi (1).yaml

File Type: OPEN_API_V3

Visibility: Security leads only

▼ <http://a7b11b7461c90455697cc0d3e27b72ad-1519729585.us-east-1.elb.amazonaws.com>

All endpoints are scanned by default and toggled to "Include". If you do not want to scan an endpoint, toggle to "Exclude".

[Toggle All Endpoints to Exclude](#)

GET	/	<input checked="" type="checkbox"/> Include
POST	/tokens	<input checked="" type="checkbox"/> Include
GET	/uptime	<input checked="" type="checkbox"/> Include
GET	/uptime/{flag}	<input checked="" type="checkbox"/> Include
POST	/user	<input checked="" type="checkbox"/> Include
GET	/user/{user}	<input checked="" type="checkbox"/> Include
POST	/widget	<input checked="" type="checkbox"/> Include

Authentication

If this URL requires authentication, provide credentials so Veracode can login and perform the scan.

Authentication required: ☐ Not required
☒ Required

▼ Additional Authentication Options

☐ Client Certificate

Use this method for logins that require a certificate for authentication. The certificate must be PFX or P12 file type.

☐ Basic Authentication

Use this method for username and password logins or NTLMv2. For NTLMv2, you can include the Netbios domain separated from the username with a backslash, for example, DOMAIN\username.

☒ Custom HTTP Header ⓘ

Use this method for logins that require a custom HTTP header.

Header 1

Header Name: *

Name of HTTP header, for example: "Authorization". Do not include trailing colon.

Header Value: *

Value of HTTP header, commonly starts with "Bearer" or "token".

Restrict to URL:

*Optional full URL or wildcard, for example: https://veracode.com or *.veracode.**

[Add Another](#)

▼ Internal Scanning

If this URL is behind a firewall, select the gateway and endpoint that can reach it. You can only use one endpoint for one URL configuration.

Gateway:

Endpoint:

▼ Advanced Options

User Agent

Select a different browser if you want to scan mobile websites and web applications that are designed to allow traffic from that specific browser.

Browser: ☒

Selecting a browser auto-completes the user agent string. If the desired browser is not available, select Custom and enter the user agent string below.

User Agent:

Use the browser-specific user agent string format. You can add custom text to the end of the string to identify the traffic source.

Requests Per Second

Specify the number of requests sent to the server every second.

Request Limit: ☒ Unlimited

☐ Limit to requests per second

Range between 500-1

Cancel

Save



Schedule and Prescan: Example Dark Reading API Scan

Basic Information *



Schedule



Review and Submit *



* Required

Dynamic Analysis Schedule and Prescan

There are several options for saving, prescanning, or scheduling a Dynamic Analysis. After you configure your Dynamic Analysis, you can save it for submission later, run a prescan to verify connection and authentication parameters, run the Dynamic Analysis immediately, or schedule a Dynamic Analysis to start up to 90 days in the future.

Frequency: ☒ Save for Later ?

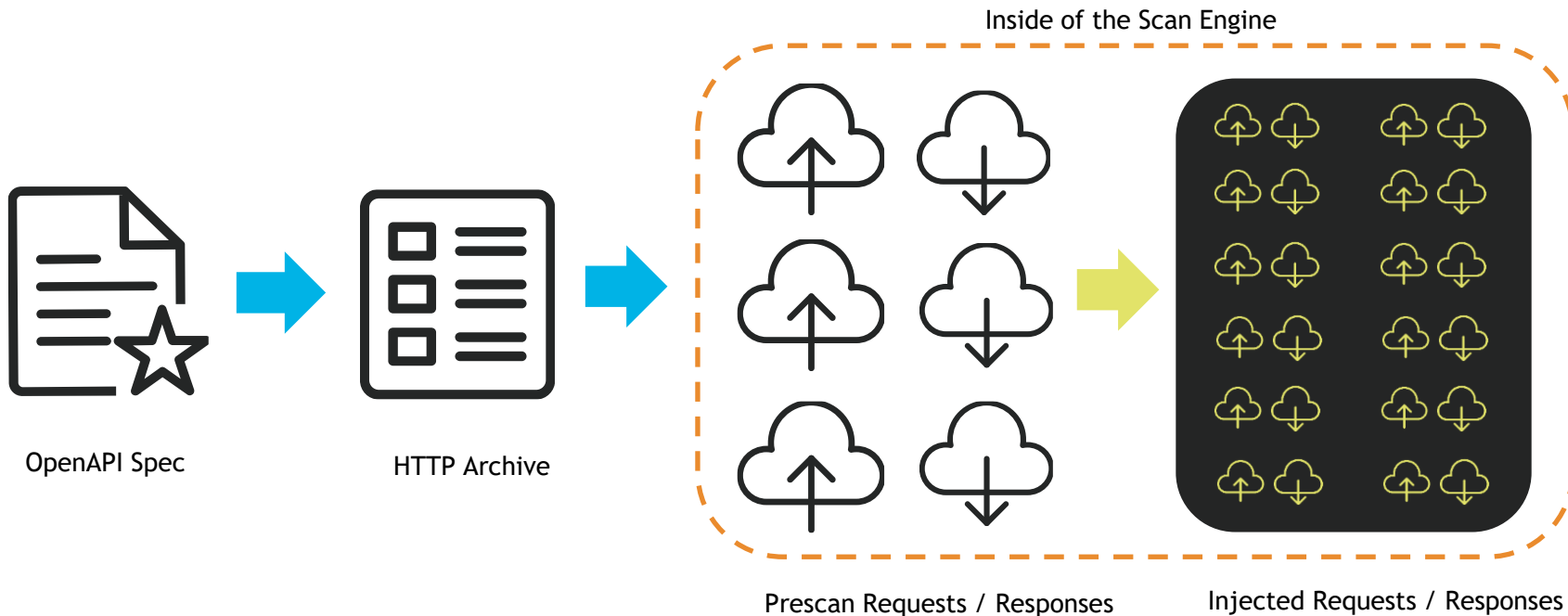
☐ Prescan Only ?

☐ Once

☐ Recurring

[Preview Schedule](#)

Generating API Traffic



Good Specs = Good Coverage



OK

Correct Types

```
parameters:  
- in: path  
  name: farmerId  
  required: true  
  schema:  
    type: string
```

Better

Formats

```
parameters:  
- in: path  
  name: farmerId  
  required: true  
  schema:  
    type: string  
    format: uuid
```

Best

Examples

```
parameters:  
- in: path  
  name: farmerId  
  required: true  
  schema:  
    type: string  
    format: uuid  
    example: 9BE20D4D- ... 9D967
```

Go Deep!



```
PUT /user/{username}
{
  "id": 42,
  "username": "v3ra",
  "firstName": "v3ra",
  "lastName": "v3ra",
  "email": "v4ra",
  "referrerId": "v3ra"
}
```

✗ 400 Bad Input

id: 42

lastName: "v3ra"

✗ 404 Not Found

id: "1B2E84F7-7E32-42B4-BBD7-254316ECF17B"

lastName: "v3ra"

✗ 500 Internal Server Error

id: AB0B97B9-A858-428F-B025-7D43A6B12E11

lastName: "v3ra"

✓ 200 OK

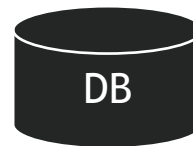
id: 1B2E84F7-7E32-42B4-BBD7-254316ECF17B

lastName: "Hanna"

Controller

Service

Repository



Advanced Tricks



- OpenAPI converts to HAR
- Veracode allows the download of the converted HAR
- HAR can be uploaded directly to scan
- Don't like the conversion?
 - Advanced users can tweak values
 - Fine-grained control over inputs
 - Not required, but nice for technical users

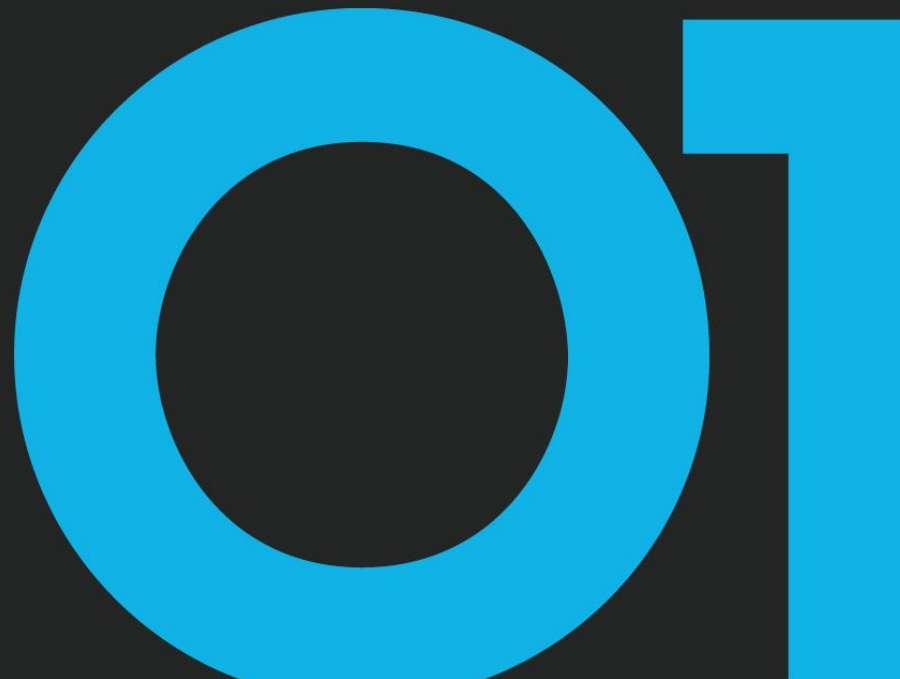
```
},
"queryString":
[],
"postData":
{
  "mimeType": "application/json",
  "params":
  [],
  "text": "{\\"username\\": \\"USERNAME\\",\\"password\\": \\"PASSWORD\\"}"
},
"headersSize": -1,
```



```
"queryString":
[],
"postData":
{
  "mimeType": "application/json",
  "params":
  [],
  "text": "{\\"username\\": \\"arealuser\\",\\"password\\": \\"battery horse staple\\"}"
},
"headersSize": -1,
"bodySize": -1
},
"response":
```

Scan Results Walkthrough

Dan Murphy



[My Portfolio](#) ▾[Scans & Analysis](#) ▾[Analytics](#) ▾[Policies](#) ▾[Security Training](#) ▾[API_scan_demo](#) ▾

Dynamic Analysis

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Subscription Capacity: 10 URL scans at a time ?

[Scan Web Applications](#)[Scan API Specifications](#)[ALL DYNAMIC ANALYSES](#)[API SPECIFICATION MANAGEMENT](#)

The table displays all the Dynamic Analyses you have submitted, including the status, start time, and number of items in the Dynamic Analysis.

Note: The start time is set for the timezone of your local computer.

All Dynamic Analyses

[Find](#)Filter by [Select](#) ▾

=

[Select](#) ▾[Apply](#)

1 - 10 of 15

[◀](#) [◀](#) [◀](#) [1](#) of 2 [▶](#) [▶](#) [▶](#)Rows [10](#) ▾

Dynamic Analysis Name	Scan Type	# of Ite...	Status	Frequency	Start Date	Actions
Example Dark Reading API Scan	API Specificat...	1	Submitted	🕒 Once	24 Jan 2022 3:34PM	...
OpenAPI Demo	API Specificat...	1	Completed - Verifying Results	🕒 Once	24 Jan 2022 10:39AM	...
Dark Reading Example API Scan (Swagger)	API Specificat...	1	Completed - Results Available	🕒 Once	23 Jan 2022 2:02PM	...
Dark Reading Example API Scan	API Specificat...	1	Completed - Results Available	🕒 Once	23 Jan 2022 1:58PM	...

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Dark Reading Example API Scan (Swagger)

Analysis Status

Completed - Results Available

The Dynamic Analysis has successfully completed and results are available.

Analysis Schedule

Scheduled Start: 23 Jan 2022 at 01:59PM

Scheduled End: 24 Jan 2022 at 01:59PM

Actual Start: 23 Jan 2022 at 02:02PM

Actual End: 23 Jan 2022 at 02:13PM

Duration: 10m 53s

Frequency: ⌚ Once

Additional Information

Subscription 10 URL scans at a time ⓘ

Capacity:

▼ Dynamic Analysis Configuration

Business Unit: ⚠️ Not available

User Agent: Veracode Security Scan/support@veracode.com

Visibility: Security leads only ⚠️ Not available

API Specifications List

Set Columns

1 - 1 of 1

1 of 1

Rows 10 ▾

Server	API Specification	Application Name	Status	VH	H	M	L	Total	Start Date	Duration	Internal Scanning	Actions
http://was-test-hackazon...	was-test-hackazon-swagg...		Completed - Resu...	0	8	2	0	10	Yesterday	10m 50s		⋮

1 - 1 of 1

1 of 1

Rows 10 ▾

► Analysis Audit Log

Request and Response

This table displays up to 100 requests in chronological order. Use this table to understand coverage quality. The scan engine sends representative traffic conforming to the specification, and may substitute strings like 'v3rac0d3' if explicit examples are not defined in the API specification. Endpoints that return errors will be excluded from a scan. Adding specific payload examples to OpenAPI files or editing HAR files to include well-formed traffic may improve scan results.

Method	Request	Response	Redirect
GET	http://was-test-hackazon.prod.veracode.io/api/auth	404	
GET	http://was-test-hackazon.prod.veracode.io/api/category?page=1&per_page=1	200	
GET	http://was-test-hackazon.prod.veracode.io/api/product?page=1&categoryId=1	200	
GET	http://was-test-hackazon.prod.veracode.io/api/product/1?categoryId=1	200	
POST	http://was-test-hackazon.prod.veracode.io/api/cartItems?uid=v3rac0d3	400	
GET	http://was-test-hackazon.prod.veracode.io/api/customerAddress?page=1&per_page=1	200	
POST	http://was-test-hackazon.prod.veracode.io/api/customerAddress	200	
GET	http://was-test-hackazon.prod.veracode.io/api/cart/my?uid=v3rac0d3	200	
GET	http://was-test-hackazon.prod.veracode.io/api/cart/v3rac0d3	404	
PUT	http://was-test-hackazon.prod.veracode.io/api/cart/v3rac0d3	400	
DELETE	http://was-test-hackazon.prod.veracode.io/api/cart/v3rac0d3	404	
GET	http://was-test-hackazon.prod.veracode.io/api/order?page=1&per_page=1	200	
POST	http://was-test-hackazon.prod.veracode.io/api/order	400	
GET	http://was-test-hackazon.prod.veracode.io/api/order/1?page=1&per_page=1	404	
POST	http://was-test-hackazon.prod.veracode.io/api/orderAddresses	500	
POST	http://was-test-hackazon.prod.veracode.io/api/orderItems	200	
GET	http://was-test-hackazon.prod.veracode.io/api/user/me	200	

© Veracode, Inc. 2006 - 2021 [Usage Guidelines](#) [Responsible Disclosure Policy](#) [Help Center](#) [Contact Support](#)

Last account activity on from: for usa under 115, 104, 105, 9, 677, 155, 9, 645, 800, 9, 675, 906, 9, 786, 043, 9, 707, 920, 9, 705, 831, 9, 745, 155, 7, 793, 606, and 9, 854, 924, and native's handling



Scan Configuration

API Specification : was-test-hackazon-swagger-prod.json

Server : <http://was-test-hackazon.prod.veracode.io>

Visibility : Security leads only

Uploaded API Specification: [was-test-hackazon-swagger-prod.json](#)

Converted API Specification: [was-test-hackazon-swagger-prod_converted.har](#)

Uploaded : 17 Sep 2021 at 10:22AM by dmurphy_api_demo

Application: None

Directory Restrictions: Directory and Subdirectories

Request Limit: Unlimited requests per second

Scope Rules: Include: 19 Endpoints

Exclude: 0 Endpoints

[View Endpoints Configuration](#)

Scan mode: Advanced Framework Support

Authentication Options: Custom HTTP Header

Header Name: Authorization

Header Value: *****

Restrict to URL: Not specified

Custom Host to IP Resolution: Not configured

Crawl Script: Not configured

Internal Scanning: Not configured

User Agent String: Veracode Security Scan/support@veracode.com

Business Unit: Not Specified

Analysis Contact: None

Analysis Contact Email: None

Scan Audit Log

http://was-test-hackazon.prod.veracode.io

SCAN DETAILS SCAN CONFIGURATION **COVERAGE REPORT**

Coverage Report

Download Report

The Coverage Report provides information on attack traffic and non-attack traffic that Veracode detected during a Dynamic Analysis scan. Use the column filters for a custom view and select to download reports for unique URLs, attack traffic, or all scan activity details.

Scan Times and Duration

Scan Status: **Completed - Results Available**

Start: 23 Jan 2022 at 02:02PM

End: 23 Jan 2022 at 02:13PM

Duration: 10m 50s

Coverage Summary

Total Unique URLs Found: 37

Audited URLs: 37

Ignored URLs: 0

Blocked URLs: 0

Total Scan Activity URLs: 18297

Directory Restrictions: Directory and Subdirectories

UNIQUE URLS FOUND **SCAN ACTIVITY LOG**

The Scan Activity table provides a comprehensive view of all traffic that the Dynamic Analysis executed. You can filter most columns for a custom view.

Scan Activity Log

Set Columns

1 - 10 of 18297

1 of 1830

Rows 10

Timestamp	URL	Method	Response	Duration(ms)	Type	Scope	Source
23 Jan 2022 2:04PM	http://was-test-hackazon.prod.veracode.io/api/auth	GET	404	13	Network	Audit	<input type="checkbox"/> Code Injection
23 Jan 2022 2:04PM	http://was-test-hackazon.prod.veracode.io/api/auth	GET	404	13	Network	Audit	<input type="checkbox"/> Cross-Site Scripting
23 Jan 2022 2:04PM	http://was-test-hackazon.prod.veracode.io/api/category?page=1&per_page=1	GET	200	10	Network	Audit	<input type="checkbox"/> HTTP Trace Method
23 Jan 2022 2:04PM	http://was-test-hackazon.prod.veracode.io/api/category?page=1&per_page=1	GET	200	10	Network	Audit	<input checked="" type="checkbox"/> OS Command Injection
							<input type="checkbox"/> Directory Traversal
							<input type="checkbox"/> Server Side Request Forgery
							<input type="checkbox"/> SQL Injection

1701

Reset filtersApply filters

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[Schedule a Consultation](#)[Download Flaw Details](#)[Download Flaw Details](#)

Vulnerable Parameter: first_name

Injected Value: `'=(select(0)from(select(sleep(15)))as0x41)=`

Original Value: v3rac0d3

Font re-size:

Description

By injecting invalid SQL queries or commands such as `"=select(0)from(select(select(sleep(4000)))asQ)x41"` into the first_name parameter, the application was observed to respond slower to custom attacks meant to cause execution of SQL queries to be delayed for a measurable amount of time. This is a form of time based SQL injection, where an attacker injects a query that takes a long period of time to complete to infer whether the target inputs are vulnerable.




Additional Resources: [CWE](#) [OWASP](#) [WASC](#)

Recommendations

Recommendations

Avoid dynamically constructing SQL queries. Instead, use parameterized prepared statements to prevent the database from interpreting the contents of bind variables as part of the query.

Rows/Page: 100 ▾

Select Action...   

[hackazon.prod.veracode.io:8U](#)

Dynamic Analysis > Dark Reading Example API Scan...

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Showing Results for 1 Site

[Schedule a Consultation](#)

Show: ☐ Fix First Analyzer ☒ Flaw Details ☐ None

Improper Neutralization of Special Elements used in an SQL Command ('SQL Injection') [CWE ID: 89](#)

[Download Flaw Details](#)

Method: PUT

Protocol: Http

Injected Value: '=(select(0)from(select(sleep(15)))as0x41)='

Original Value: v3rac0d3

Details

Request/Response

Font re-size:

Request:

```
PUT /api/user/1 HTTP/1.1
User-Agent:Veracode Security Scan/support@veracode.com
content-length:316
Host:was-test-hackazon.prod.veracode.io
Content-Type:application/json
Authorization:Token c486323f0162cbd89f826c314e92a131c6284c7e

{"id":1,"username":"v3rac0d3","first_name":
'=(select(0)from(select(sleep(15)))as0x41)='
,"last_name":"v3rac0d3","user_phone":"v3rac0d3","email":"v3rac0d3","oauth_provider":"v3ra
```

Response:

```
HTTP/1.1 200 OK
Date:Sun, 23 Jan 2022 19:07:28 GMT
Server:Apache/2.4.7 (Ubuntu)
Access-Control-Allow-Origin:*
Access-Control-Allow-Methods:POST, GET, OPTIONS, PUT, DELETE, HEAD
Access-Control-Allow-Headers:Authorization
X-Powered-By:PHP/5.5.9-lubuntu4.29
Content-Length:268
Content-Type:application/json; charset=utf-8
```

Flaws: 10 of 10

Rows/Page: 100

Injection Points



PATH

FILE

QUERY PARAM

PUT /api/v1/creature?universe=starwars HTTP/1.1

Host: api.example.com

Connection: keep-alive

Accept: application/json

Content-Type: application/json

Accept-Encoding: gzip,deflate

X-API-Key: deadbeef1337c0de

QUERY VALUE

CUSTOM HEADER

JSON STRUCTURE

```
{  
  "id": 0,  
  "creature": "rancor",  
  "tags": ["big", "scary", "kinda adorable"]  
}
```

JSON STRING VALUE

SQL Injection Example



PUT /api/v1/endpoint HTTP/1.1

Host: api.example.com

Connection: keep-alive

Accept: application/json

Content-Type: application/json

Accept-Encoding: gzip,deflate

```
{
  "id": 42,
  "creature": "rancor",
  "tags": ["big", "scary", "kinda adorable"]
}
```

VULNERABLE CODE

```
var query = String.format("SELECT * FROM CREATURES
  WHERE creature = '%s'", createFromPut);
stmt.execute(query);
```

EXAMPLE PAYLOAD

```
{
  "id": 42,
  "creature": "'select(0)from(select(sleep(15)))';",
  "tags": ["big", "scary", "kinda adorable"]
}
```

RESPONSES

200 OK (response time 101 ms)

200 OK (response time 15101 ms)

Generic Injection



PUT /api/v1/endpoint HTTP/1.1

Host: api.example.com

Connection: keep-alive

Accept: application/json

Content-Type: application/json

Accept-Encoding: gzip,deflate

```
{
  "id": 42,
  "creature": "rancor",
  "tags": ["big", "scary", "kinda adorable"]
}
```

PAYLOAD PAIRS EXPECTED TO BE DIFFERENT

<pre>{ "id": 42, }</pre>	<pre>{ "id": 42 *zxxxxxxz, }</pre>
<pre>{ "id": 42 *zxxxxxxz, }</pre>	<pre>{ "id": 42 *000000001, }</pre>
<pre>{ "id": 42, }</pre>	<pre>{ "id": 42 *000000001 }</pre>

VERACODE

Thank You



Questions?

Submit questions to the presenters via the on-screen text box



Elisa Velarde

Senior Product
Marketing Manager
Veracode



Dan Murphy

Software Engineering
Consultant
Veracode



**Peggy Bresnick-
Kendler**

Moderator
Dark Reading

Thank you for attending

Please visit our sponsor and access any of the resources featured in the resource section of the attendee console.



VERACODE