



Session 1: The new OWASP Top 10 API Security 2023

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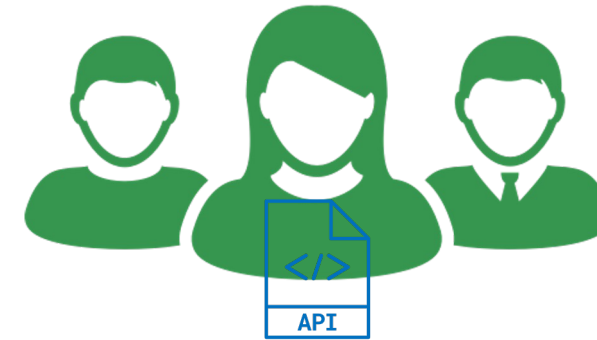
API Security is in the Grey area...

API Owners and SecOps

SecOps



API Owners (Dev Team)

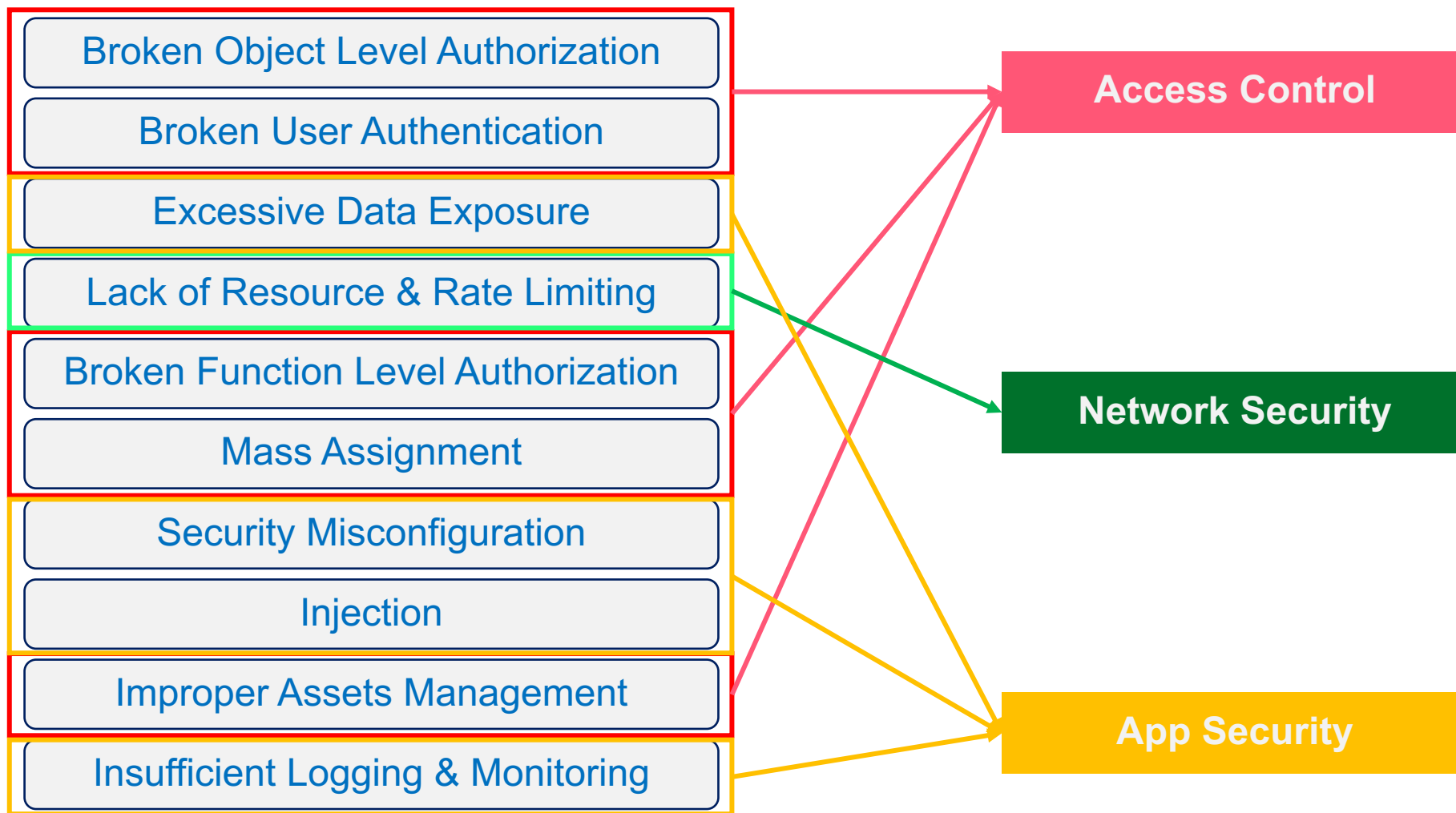


- Responsible for the organization's security policy and compliance
- Operating security policies in NG F/W, WAF, and Anti-Virus
- Managing all alerts, including FPs and FNs
- Normally, SecOps provides the guideline of API security to API owners but they don't have control and visibility of API G/W or API management.

- Responsible for designing the business logic with APIs
- Operating API G/W, API management and required IAM(Identity and Access Management) for APIs
- API Owners are not considered security experts.
- Normally, API Owners manage the API G/W policies and code-level security but do not manage the organization-wide security policy or compliance.

OWASP API Top 10 - 2019

OWASP API Top 10



OWASP API Top 10 - 2023

Broken Object Level Authorization

Broken User Authentication

Excessive Data Exposure

Lack of Resource & Rate Limiting

Broken Function Level Authorization

Mass Assignment

Security Misconfiguration

Injection

Improper Assets Management

Insufficient Logging & Monitoring

Broken Object Level Authorization

Broken Authentication

Broken Object Property Level Authorization

Unrestricted Resource Consumption

Broken Function Level Authorization

Unrestricted Access to Sensitive Business Flows

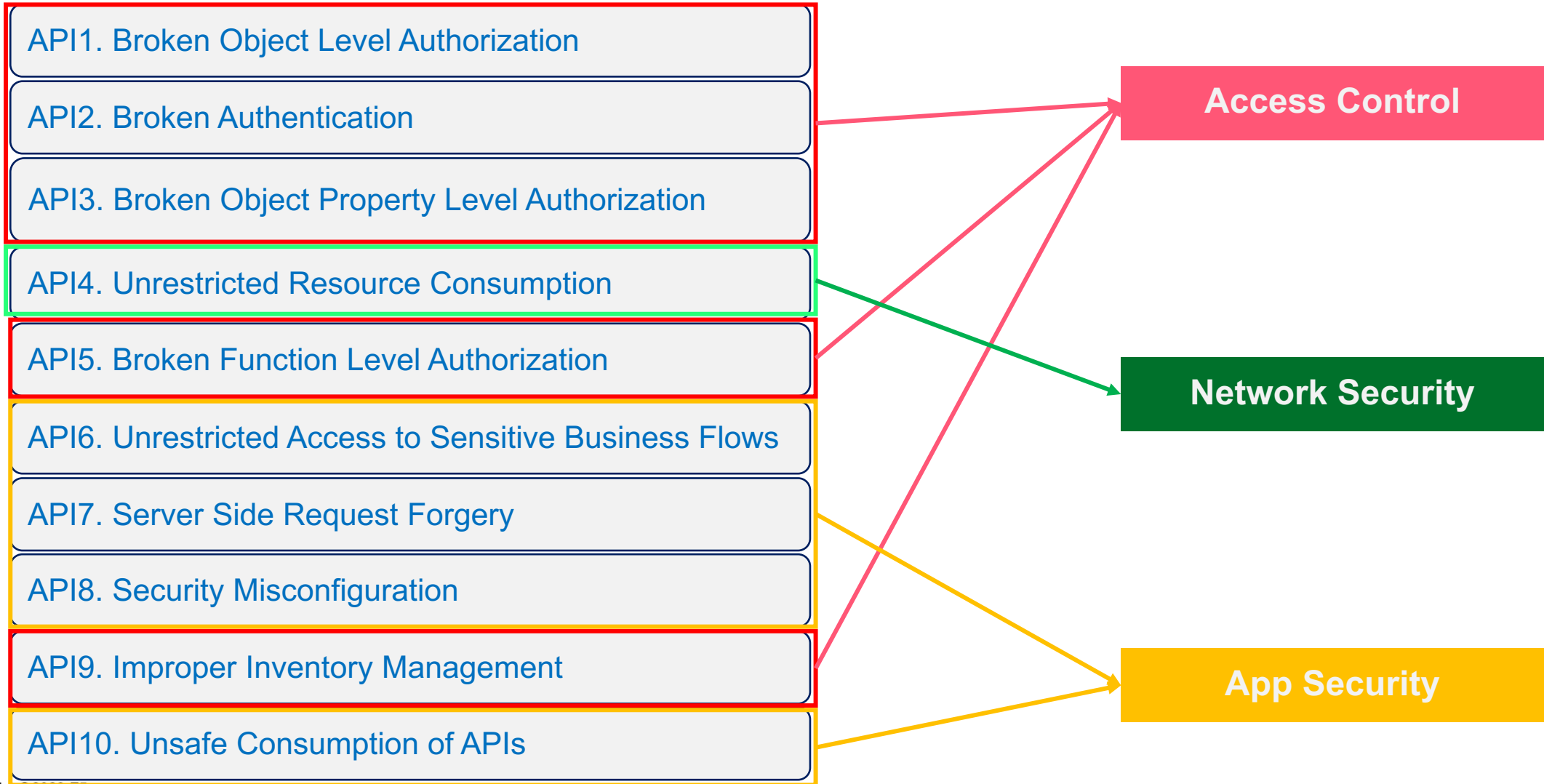
Server Side Request Forgery

Security Misconfiguration


Improper Inventory Management

Unsafe Consumption of APIs

OWASP API Top 10 - 2023



How Can You Comply with the new OWASP 2023?



API8:2023 Security Misconfiguration

2023
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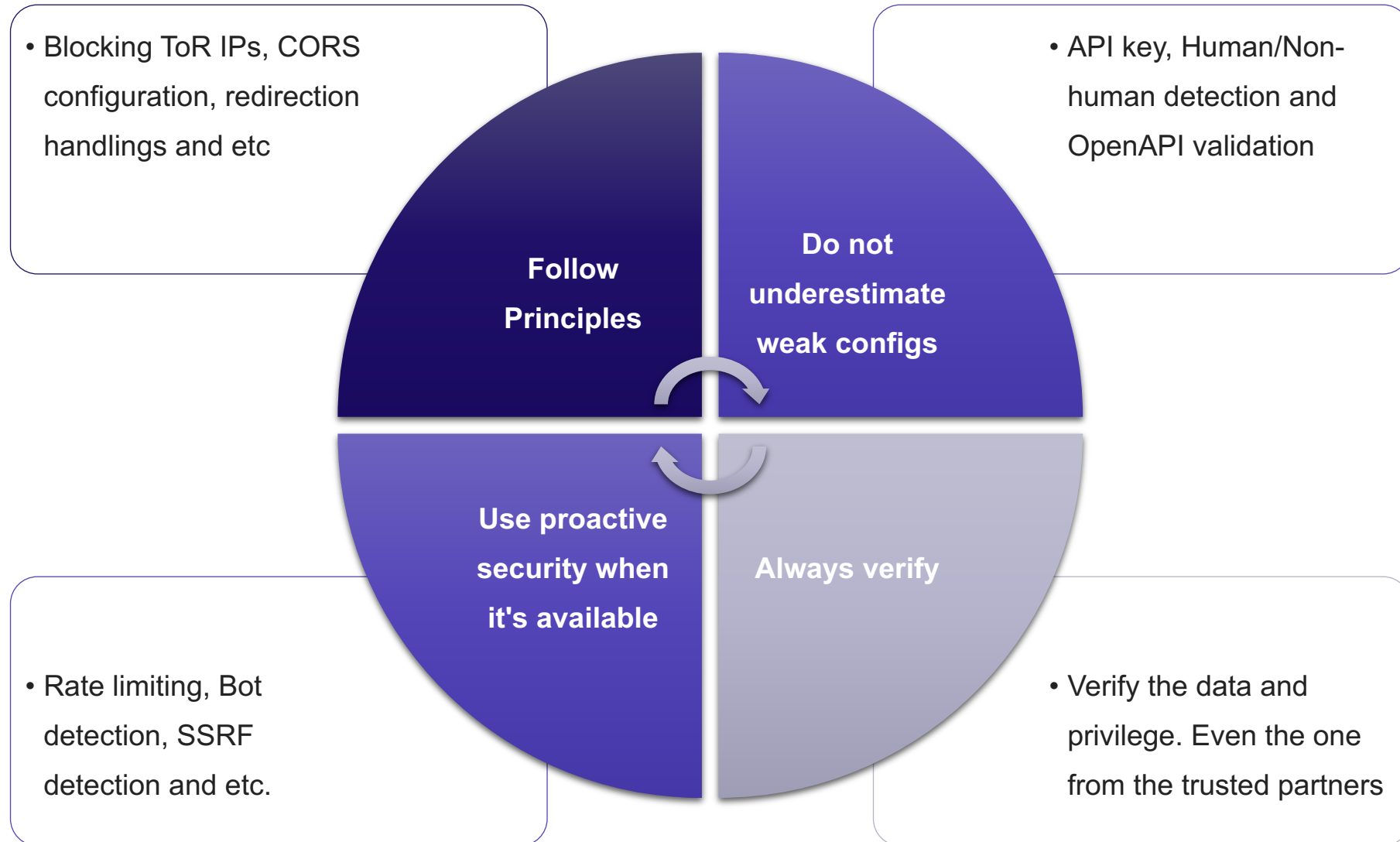
API9:2023 Unrestricted Resource Consumption

🌐

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- Ensure that all API communications from the client to the API server and any downstream/upstream components happen over an encrypted communication channel (TLS), regardless of whether it is an internal or public-facing API.
- Be specific about which HTTP verbs each API can be accessed by: all other HTTP verbs should be disabled (e.g. HEAD).
- APIs expecting to be accessed from browser-based clients (e.g., WebApp front-end) should, at least:
 - implement a proper Cross-Origin Resource Sharing (CORS) policy
- include applicable Security Headers
- Restrict incoming content types/data formats to those that meet the business/ functional requirements.
- Ensure all servers in the HTTP server chain (e.g. load balancers, reverse and forward proxies, and back-end servers) process incoming requests in a uniform manner to avoid desync issues.
- Where applicable, define and enforce all API response payload schemas, including error responses, to prevent exception traces and other valuable information from being sent back to attackers.

Guidelines of the new OWASP API Top 10 - 2023



API Security Maturity Model

API Security Maturity Model

Gartner.

Gartner's API Strategy Maturity Model



FOUNDATIONAL

Refreshed: 27 April 2021 | Published: 21 October 2019 ID: G00451168

Analyst(s): Saniye Alaybeyi, Mark O'Neill

IT organizations struggle to evolve their processes for developing, delivering and managing APIs for integration and digital business transformation. Application leaders must assess and improve their API strategy using five key dimensions explained in this research.



FOUNDATIONAL DOCUMENT

This research is reviewed periodically for accuracy. Last reviewed on 27 April 2021.

Key Findings

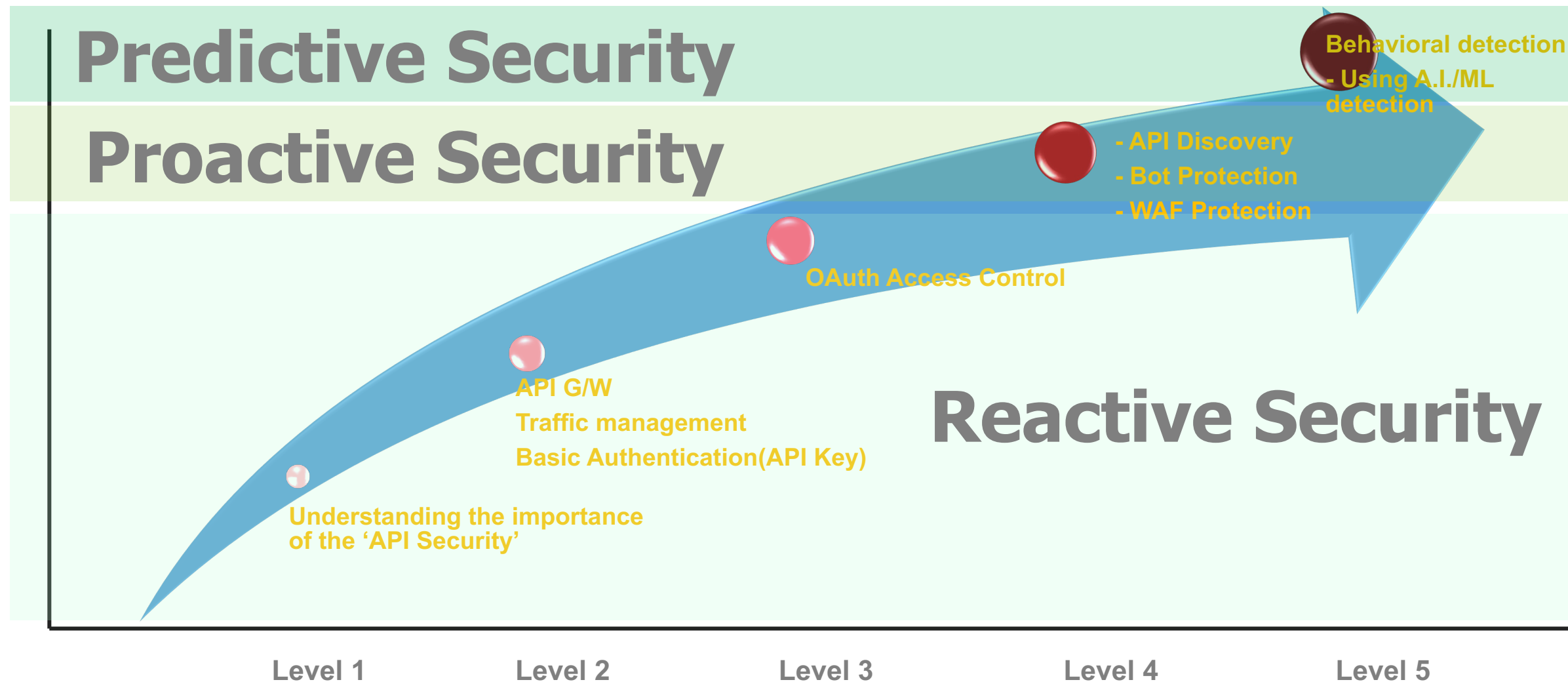
- Misalignment between API strategy and business goals results in failure to capture the benefits initially envisioned from APIs.
- Poor API design limits usage and results in deployment delays and cost overruns.
- Failing to plan for API life cycle management results in an inadequate feedback mechanism for API product managers and consumers.
- Without metrics for API usage and performance there is no visibility into how APIs are working and impacting customers and services, and inhibiting improvements.

API Security Maturity Model

Communications

- **Level 0:** There is no evidence or awareness for authentication, traffic management and privacy mechanisms or policies.
- **Level 1:** API teams understand the importance of an authentication, authorization, traffic management, quality of service (caching), interface protocols and security mechanisms and policies. Some of these basic mechanisms exist in a few silos within the organization and are implemented at various levels, but without API gateway in place.
- **Level 2:** Teams are implementing authentication, authorization and messaging mechanisms based on industry-accepted practices but in isolation of each other. Beyond individual team or solution implementation, standards and policies do not exist for security, interface, data privacy and traffic management (throttling). Instead, these are being implemented on a team-by-team or solution-by-solution basis, typically using API gateways.
- **Level 3:** Core principles, basic standards and policies are defined across the enterprise for API security, traffic management, quality of service, data privacy, service routing and orchestration. Standards are adopted at various levels across the organization, in many cases reactively.
- **Level 4:** API security, privacy, quality and communication standards are being proactively and consistently adopted across the organization. There is active monitoring and proactive intervention ensuring compliance with the defined standards. Developer consumption quotas and traffic prioritization mechanisms are in place. Robust caching, service orchestration and routing (load balancing) capabilities are in place. These may be provided by a full life cycle API management solution, which includes API gateways.
- **Level 5:** Organizations are transitioning their security and traffic management capabilities from proactive to predictive. Full life cycle API management and web application firewalls (WAFs) work together in unison to detect threats and anticipate traffic and required service levels. Network behavior analysis and content inspection mechanisms are in place to detect misuse and attacks. Visualization and advanced reporting monitoring mechanisms are in place.

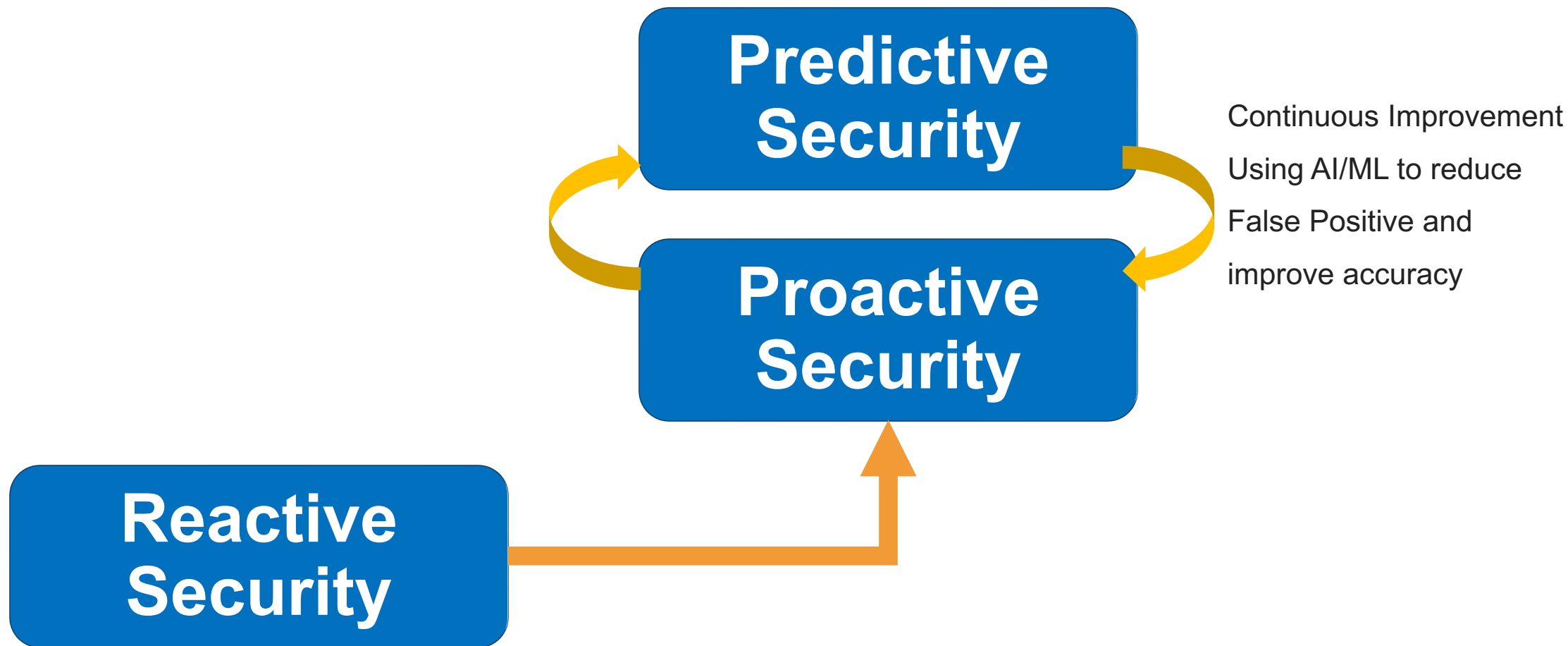
API Security Maturity Model



Reactive vs Proactive vs Predictive

	Reactive	Proactive	Predictive
Premise	<ul style="list-style-type: none">Reactive cyber security introduces defending against attacks that have already happened.	<ul style="list-style-type: none">Proactive cyber security involves identifying and addressing security risks before an attack occurs.	<ul style="list-style-type: none">Using contextual analysis to identify threats before they become incidents
Examples	<ul style="list-style-type: none">Adding IPs to Deny-list after 10 failed logon attempts	<ul style="list-style-type: none">Payload inspection by a WAF/WAAP	<ul style="list-style-type: none">Behavioral – Malicious or Suspicious user and API client detection
Benefits	<ul style="list-style-type: none">Stop-gap when all controls fail	<ul style="list-style-type: none">Real runtime protection	<ul style="list-style-type: none">Advance warning and protection
Powered By	<ul style="list-style-type: none">Logs and telemetry data indicating attacks	<ul style="list-style-type: none">Real time analysis of traffic	<ul style="list-style-type: none">Machine learning on telemetry data
Gartner Maturity Model Levels	<ul style="list-style-type: none">Level 1 ~ Level 3	<ul style="list-style-type: none">Level 4	<ul style="list-style-type: none">Level 5

API Security Maturity Model at Runtime





Session 1: The new OWASP Top 10 API Security 2023

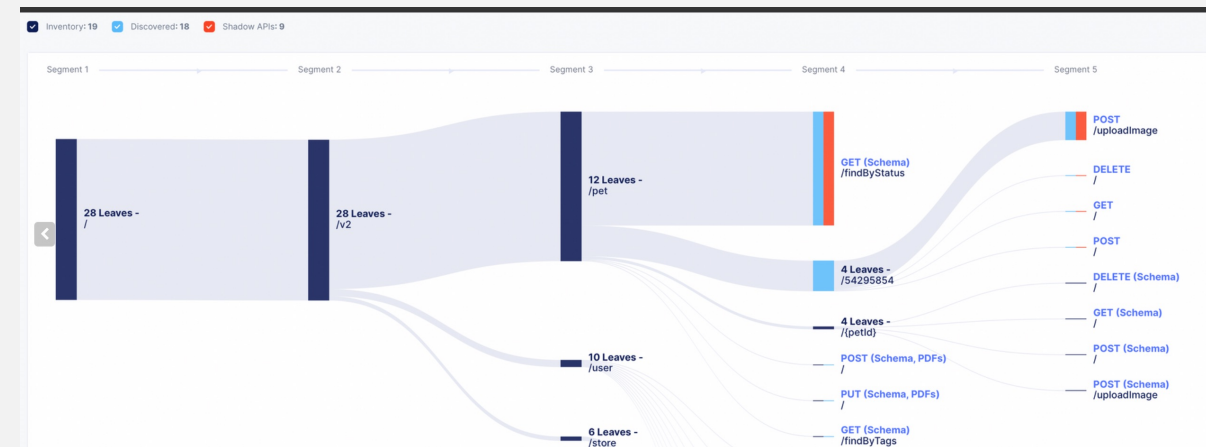
API8:2023 – Security Misconfiguration

API8: Security Misconfiguration

Security misconfiguration vulnerabilities occur when an API component is susceptible to attack due to a misconfiguration or nonsecure configuration

- API Inventory/ documentation incomplete or missing
- APIs don't conform to OpenAPI specifications
- Authentication token includes insecure configuration
- PII data exists in the JWT or API request body
- CORS misconfiguration

- An F&B outlet had an API not meant for external users exposed putting PII information for 100 Million users at risk
- Attacker used brute force to detect the vulnerable API endpoint



[Source: samcurry.net](https://samcurry.net)

API8: Security Misconfiguration

Examples

Case#01.

- An attacker finds the `.bash_history` file under the root directory of the server, which contains commands used by the DevOps team to access the API.

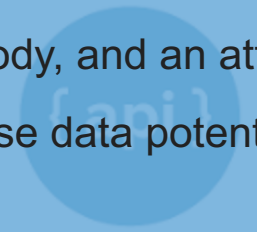


Case#02.

- An attacker finds some API endpoints that are accessible from the internet but don't have the authentication mechanism.

Case#03.

- Some API endpoints include potentially critical data in their token or header or body, and an attacker can exploit those data potentially.



API8: Security Misconfiguration

How to Stop the Security Misconfiguration

API8:2023 Security Misconfiguration



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Top 10 API Security
2023

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zation

23 Broken Authentication

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23 Unrestricted Resource
ption

- Ensure that all API communications from the client to the API server and any downstream/upstream components happen over an encrypted communication channel (TLS), regardless of whether it is an internal or public-facing API.
- Be specific about which HTTP verbs each API can be accessed by: all other HTTP verbs should be disabled (e.g. HEAD).
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- Where applicable, define and enforce all API response payload schemas, including error responses, to prevent exception traces and other valuable information from being sent back to attackers.

API8: Security Misconfiguration

How to Stop the Security Misconfiguration

OpenAPI Spec Validation

- It is always recommended to enable OpenAPI validation to perform a basic schema validation for your APIs.

Strong AuthN/AuthZ

- Need to consider strong authN/authZ methods for your APIs with standard-based protocols such as OAuth/OIDC or SAML.

Continuous Monitoring

- Continuous assessment of the security effectiveness of API endpoints.

HTTP Methods Control

- Enable only relevant HTTP methods for the specific API endpoints.

TLS Policy Setting

- Need to have the capability to set up the different TLS policies based on the backend apps' requirements.

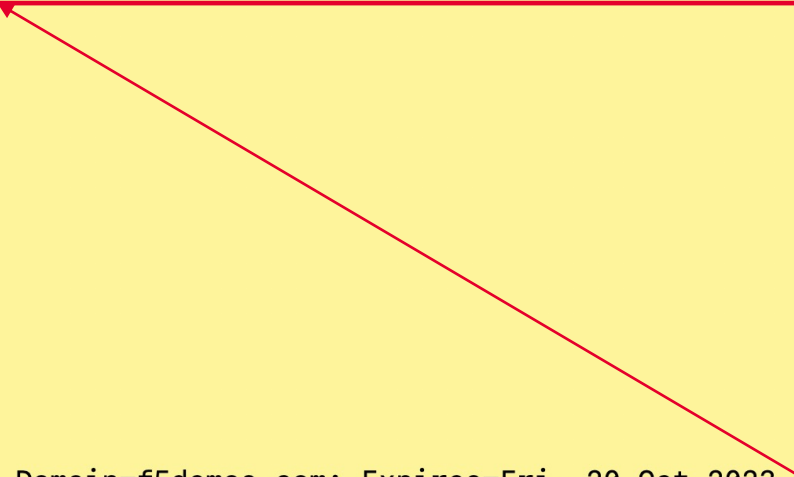
CORS Policy

- Need to configure the correct CORS settings in your apps.

API8: Security Misconfiguration

Protection#01 – CORS Configuration

```
j.lee@C02FPFZPMD6M ~ %  
j.lee@C02FPFZPMD6M ~ % curl -I -H "Origin: https://www.evil.com" https://james.apac-ent.f5demos.com  
HTTP/2 200  
access-control-allow-origin: *  
x-content-type-options: nosniff  
x-frame-options: SAMEORIGIN  
feature-policy: payment 'self'  
x-recruiting: /#/jobs  
accept-ranges: bytes  
cache-control: public, max-age=0  
last-modified: Thu, 20 Jul 2023 02:55:19 GMT  
etag: W/"7c3-18971392a77"  
content-type: text/html; charset=UTF-8  
content-length: 1987  
vary: Accept-Encoding  
date: Thu, 20 Jul 2023 12:24:33 GMT  
x-envoy-upstream-service-time: 7  
set-cookie: 8bd85=1689855873089-779805097; Path=/; Domain=f5demos.com; Expires=Fri, 20 Oct 2023 12:24:33 GMT  
set-cookie: 8bd803=HHC33JWEDc6kXUZPt2cFmIril9/iBbs+FTi7yazF16ENk9KHP+WVa6md5t+aoW2N1c9+HdZu0Ciauth989Gjxhn1F4wGZnfnfxak12ZPLkCiVTOXPNDxbUgj5  
AgQ9Q0HmluTsPTbNyFS8tau3dc6McRprJKtNS4wDTSzuLNXD9PDiu6B; path=/  
x-volterra-location: sg3-sin  
server: volt-adc
```



The webserver has a vulnerable CORS setting with the wildcard(*).

API8: Security Misconfiguration

Protection#01 – CORS Configuration

CORS Policy Configuration

↶ Reset All Fields ^

Order	Allow Origin ①	Actions
There are no items added yet. Start by adding first item.		
<div>+ Add Item</div>		

Order	Allow Origin Regex ①	Actions
⋮ 1	<input type="text" value="https://([-a-z0-9+)\.f5\.com"/> ✕	🗑
⋮ 2	<input type="text" value="https://([-a-z0-9+)\.nginx\...."/> ✕	🗑

+ Add Item

Allow Methods ①
✕

Allow Headers ①

Expose Headers ①

Maximum Age ①
✕

- In XC WAAP, a user can configure the CORS policy. In this case, 'https://*.f5.com' and 'https://*.nginx.com' are only allowed.

API8: Security Misconfiguration

Protection#01 – CORS Configuration

Header Options

Reset All Fields

Add Request Headers ⓘ

There are no items added yet. Start by adding first item.

+ Add Item

Order	Remove Request Headers ⓘ	Actions
There are no items added yet. Start by adding first item.		
+ Add Item		

Add Response Headers ⓘ

There are no items added yet. Start by adding first item.

+ Add Item

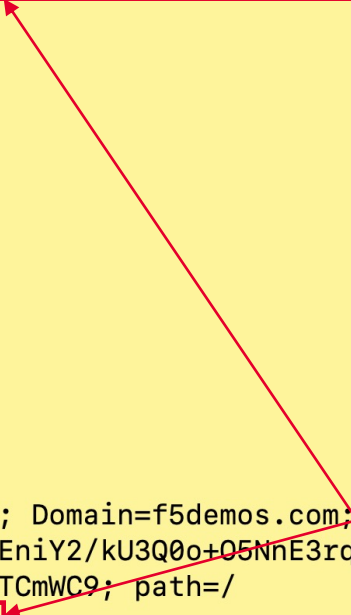
Order	Remove Response Headers ⓘ	Actions
⋮ 1	access-control-allow-origin ×	🗑
+ Add Item		

- By default, XC WAAP does not replace the server's original header.
- A user needs to remove the server's original response using this menu. Then, XC will respond with its CORS configuration.

API8: Security Misconfiguration

Protection#01 – CORS Configuration

```
j.lee@C02FPFZPMD6M ~ %  
j.lee@C02FPFZPMD6M ~ % curl -I -H "Origin: https://www.f5.com" https://james.apac-ent.f5demos.com  
HTTP/2 200  
x-content-type-options: nosniff  
x-frame-options: SAMEORIGIN  
feature-policy: payment 'self'  
x-recruiting: /#/jobs  
accept-ranges: bytes  
cache-control: public, max-age=0  
last-modified: Thu, 20 Jul 2023 02:55:19 GMT  
etag: W/"7c3-18971392a77"  
content-type: text/html; charset=UTF-8  
content-length: 1987  
vary: Accept-Encoding  
date: Thu, 20 Jul 2023 12:17:25 GMT  
x-envoy-upstream-service-time: 7  
set-cookie: 8bd85=1689855445431-141961141; Path=/; Domain=f5demos.com; Expires=Fri, 20 Oct 2023 12:17:25 GMT  
set-cookie: 8bd803=j7PKaEUHKf1anRb6AsNw/pcd0JzZVzEniY2/kU3Q0o+05NnE3rqQ/f2m5jP+q055f0x10q+4QE+Pg5tfGzg7yxgFiU1Wzh2pgOWCbkRLwE7knZ3HC3hN7C  
u6gUgUvgpBGPT1cqsqVcpu1nSPAQBnrvx/hq0zbl7Diec0791TCmWC9; path=/  
access-control-allow-origin: https://www.f5.com  
x-volterra-location: sg3-sin  
server: volt-adc
```



- Since the request includes the correct origin server in the header, XC responds accordingly.

API8: Security Misconfiguration

Protection#01 – CORS Configuration

```
j.lee@C02FPEZPMD6M ~ %  
j.lee@C02FPEZPMD6M ~ % curl -I -H "Origin: https://www.evil.com" https://james.apac-ent.f5demos.com
```

```
HTTP/2 200  
x-content-type-options: nosniff  
x-frame-options: SAMEORIGIN  
feature-policy: payment 'self'  
x-recruiting: /#/jobs  
accept-ranges: bytes  
cache-control: public, max-age=0  
last-modified: Thu, 20 Jul 2023 02:55:19 GMT  
etag: W/"7c3-18971392a77"  
content-type: text/html; charset=UTF-8  
content-length: 1987  
vary: Accept-Encoding  
date: Thu, 20 Jul 2023 12:21:03 GMT  
x-envoy-upstream-service-time: 7  
set-cookie: 8bd85=1689855663446-855534115; Path=/; Domain=f5demos.com; Expires=Fri, 20 Oct 2023 12:21:03 GMT  
set-cookie: 8bd803=+IJPxIAYZFs3NCq1hi7XlZTxbirrP63rHR02l05yCXnyH9AbG5iufM+9PKGWUc1K1/G1rft51lWb1L5w3kI1p5wpxlx/OVQ86qIzhtR+m/8LxwHayEYx6Dq5S  
zCspKaUbKx/mVdoXEs3Sjj4QsnWzmTG+gqBy34XgbZ6YDUaI0GHFRL1; path=/  
x-volterra-location: sg3-sin  
server: volt-adc
```

- Since the request has the 'un-allowed' origin server, XC WAAP does not respond accordingly. Thus, the request would be rejected in the user's browser.

API8: Security Misconfiguration

Protection#02 – TLS Configuration

Domains and LB Type

Reset All Fields Show Advanced Fields

Order	*Domains	Actions
1	jw-owasp.apac-ent.f5demos.com	

Add Item

* Load Balancer Type

HTTPS with Automatic Certificate

☐ HTTP Redirect to HTTPS

☐ Add HSTS Header

HTTPS Listen Port Choice

HTTPS Listen Port

HTTPS Listen Port

443

* TLS Security Level

Low

- Users can configure TLS security level in XC WAAP. In this example, we set it to 'Low' which means the TLS1.0 is allowed.

API8: Security Misconfiguration

Protection#02 – TLS Configuration

```
j.lee@C02FPFZPMD6M ~ %  
j.lee@C02FPFZPMD6M ~ % curl -vv --tlsv1.0 --tls-max 1.0 https://jw-owasp.apac-ent.f5demos.com/index1.php  
* Trying 72.19.3.189:443...  
* Connected to jw-owasp.apac-ent.f5demos.com (72.19.3.189) port 443 (#0)  
* ALPN: offers h2  
* ALPN: offers http/1.1  
* CAfile: /etc/ssl/cert.pem  
* CPath: none  
* [CONN-0-0][CF-SSL] TLSv1.0 (OUT), TLS handshake, Client hello (1):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS handshake, Server hello (2):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS handshake, Certificate (11):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS handshake, Server key exchange (12):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS handshake, Server finished (14):  
* [CONN-0-0][CF-SSL] TLSv1.0 (OUT), TLS handshake, Client key exchange (16):  
* [CONN-0-0][CF-SSL] TLSv1.0 (OUT), TLS change cipher, Change cipher spec (1):  
* [CONN-0-0][CF-SSL] TLSv1.0 (OUT), TLS handshake, Finished (20):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS change cipher, Change cipher spec (1):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS handshake, Finished (20):  
* SSL connection using TLSv1 / ECDHE-ECDSA-AES128-SHA  
* ALPN: server accepted h2  
* Server certificate:  
* subject: CN=jw-owasp.apac-ent.f5demos.com  
* start date: Jul 14 04:17:07 2023 GMT  
* expire date: Oct 12 04:17:06 2023 GMT  
* subjectAltName: host "jw-owasp.apac-ent.f5demos.com" matched cert's  
* issuer: C=US; O=Let's Encrypt; CN=R3  
* SSL certificate verify ok.
```

• *TLS v1.0 works correctly.*
"jw-owasp.apac-ent.f5demos.com"

API8: Security Misconfiguration

Protection#02 – TLS Configuration

Domains and LB Type

Show Advanced Fields ☐

Order	*Domains [?]	Actions
1	<div>jw-owasp.apac-ent.f5demos.com ×</div>	
<div>+ Add Item</div>		

* Load Balancer Type [?]

↗ HTTPS with Automatic Certificate ▼

☐ HTTP Redirect to HTTPS [?]

☐ Add HSTS Header [?]

HTTPS Listen Port Choice [?]

↗ HTTPS Listen Port ▼

HTTPS Listen Port [?]


443 × ⬆ ⬆

* TLS Security Level [?]

↗ High ▼

- Setting the TLS level to 'High' means TLSv1.2+ and PFS will be only allowed.

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API8: Security Misconfiguration

Protection#02 – TLS Configuration

```
j.lee@C02FPFZPMD6M ~ %  
j.lee@C02FPFZPMD6M ~ % curl -vv --tlsv1.0 --tls-max 1.0 https://jw-owasp.apac-ent.f5demos.com/index1.php  
* Trying 72.19.3.189:443...  
* Connected to jw-owasp.apac-ent.f5demos.com (72.19.3.189) port 443 (#0)  
* ALPN: offers h2  
* ALPN: offers http/1.1  
* CAfile: /etc/ssl/cert.pem  
* Capath: none  
* [CONN-0-0][CF-SSL] TLSv1.0 (OUT), TLS handshake, Client hello (1):  
* [CONN-0-0][CF-SSL] TLSv1.0 (IN), TLS alert, protocol version (582):  
* LibreSSL/2.8.3: error:1400442E:SSL routines:CONNECT_CR_SRVR_HELLO:tlsv1 alert protocol version  
* Closing connection 0  
curl: (35) LibreSSL/2.8.3: error:1400442E:SSL routines:CONNECT_CR_SRVR_HELLO:tlsv1 alert protocol version  
j.lee@C02FPFZPMD6M ~ %  
j.lee@C02FPFZPMD6M ~ %
```

- *TLS v1.0 is NOT allowed in XC WAAP.*

API8: Security Misconfiguration

Protection#02 – TLS Configuration

Domains and LB Type Show Advanced Fields

Order	*Domains	Actions
1	jw-owasp.apac-ent.f5demos.com	

*** Load Balancer Type**

HTTPS with Automatic Certificate

- High (Default)
TLS v1.2+ with PFS ciphers and strong crypto algorithms.
- Medium
TLS v1.0+ with PFS ciphers and medium strength crypto algorithms.
- Low
TLS v1.0+ including non-PFS ciphers and weak crypto algorithms.
- Custom
Custom selection of TLS versions and cipher suites

*** Load Balancer Type**

HTTPS with Automatic Certificate

- ☐ HTTP Redirect to HTTPS
- ☐ Add HSTS Header

HTTPS Listen Port Choice

HTTPS Listen Port

443

*** TLS Security Level**

Custom

Minimum TLS version

TLSv1.0

Maximum TLS version

TLSv1.2

Order	*Cipher Suites	Actions
1	TLS_ECDHE_ECDSA_WITH_...	

[+ Add Item](#)

A user also can custom TLS settings in XC WAAP.

API8: Security Misconfiguration

Protection#03 – Continuous Monitoring

Endpoint Details

- With 'Security Posture' feature, XC can discover the potential misconfiguration of API endpoints.
- XC WAAP can discover any sensitive data in the API request or response.

API Endpoint

/api/updatePaymentInfoById...

API Category

Discovered, Shadow

Base Path

—

Authentication

Un-Authenticated

Risk Score

70

Protection Rule

Not Configured | Configure

Method

PUT

Rate Limit

Not Configured | Configure

Overview

Discovered

Inventory OpenAPI

Security Posture

Vulnerabilities

Weak JWT: JWT without Expiration... ● High

Created: 11:10 AM, May 22

Last Observed: 7:40 AM, Jul 20

Weak JWT: "aud" claim is missing ... ● Low

Created: 11:10 AM, May 22

Last Observed: 7:40 AM, Jul 20

Sensitive Data Found in JWT Token... ● None

Created: 11:10 AM, May 22

Last Observed: 7:40 AM, Jul 20

State

Open

Category

Weak Authentication / Authorization

Description

This vulnerability is detected if the JWT does not have an expiration date. The access tokens should be short-lived and are not revoked. A malicious actor that has obtained an access token can use it for extent of its lifetime. Adjusting the lifetime of an access token is a trade-off between improving system performance and increasing the amount of time that the client retains access after the user's account is disabled. Expiration period may range between 15-20 minutes to 60-90 minutes.

Risk Score

Attack impact: 70 (High)

Evidence

[Review Evidence Detection](#)

Remediation

Set expiration period to between 15-20 minutes to 60-90 minutes.

Endpoint Details

API Endpoint

/api/getPaymentInfo/me

API Category

Discovered, Shadow

Base Path

—

Authentication

Un-Authenticated

Risk Score

0

Protection Rule

Not Configured | Configure

Method

GET

Rate Limit

Not Configured | Configure

Overview

Discovered

Inventory OpenAPI

Security Posture

Sensitive Data

Type	Section	Field	Created By
Credentials	Response Body	username	Built-In

Request

Response

Headers

Body

OpenAPI

Authentication

Details

2XX

JSON

Learnt schema

Search

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

"type": "object",

"required": [

"oauth_uid",

"user_phone",

"oauth_provider",

"email",

"id",

"last_login",

"active",

"first_name",

"last_name",

"photoUrl",

"username",

"created_on",

"photo"

API8: Security Misconfiguration

Protection#03 – Continuous Monitoring

API Endpoint ⓘ	Method	Sensitive Data ⓘ	Threat Level ⓘ	Authentication S... ⬆	Authentication T...	API Category	Risk Score
/api/auth/oidc	GET	—	● None	Authenticated	JWT:Header	Discovered Shadow	70
/api/getPaymentInfo/me	GET	Credentials	● None	Un-Authenticated	—	Discovered Shadow	0
/trading/login.php	GET	—	● High	Un-Authenticated	—	Discovered Shadow	0
/api/getStock	GET	—	● None	Un-Authenticated	—	Discovered Shadow	0
/api/getStock	GET	—	● None	Un-Authenticated	—	Discovered Shadow	0

- XC WAAP can discover the Shadow APIs, API authentication types, and their authentication state.
- In this example, some APIs don't have a proper auth mechanism(Un-Authenticated) and they're Shadow APIs which means API is unknown to API owners.
- Those APIs can be categorized as high-risky APIs potentially, and likely it happened because of 'Security Misconfiguration'.

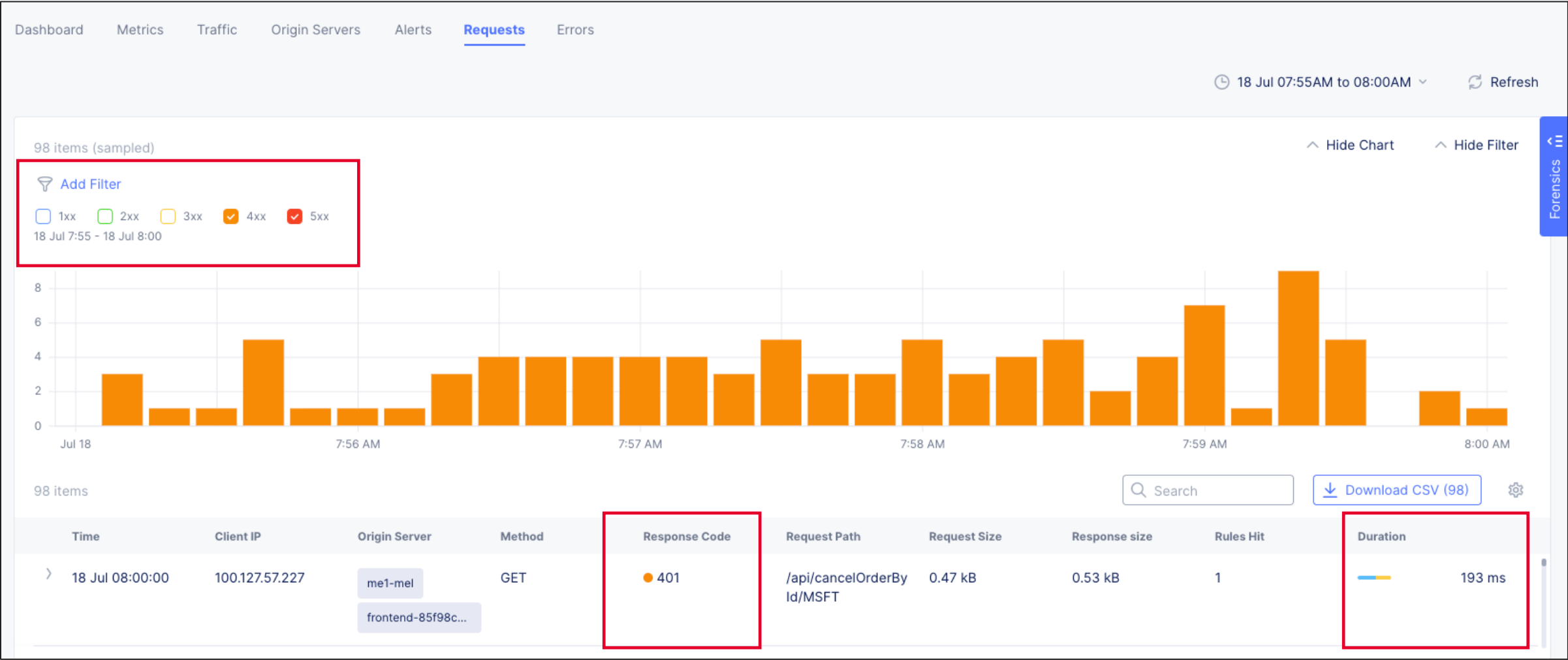
API8: Security Misconfiguration

Protection#04 – Monitoring API Metrics



API8: Security Misconfiguration

Protection#04 – Monitoring API Metrics



API8: Security Misconfiguration

Protection#04 – Monitoring API Metrics

DashboardMetricsTrafficOrigin ServersAlertsRequestsErrors

🕒 18 Jul 07:55AM to 08:00AM ↕ Refresh

98 items (sampled)Show ChartShow Filter

98 itemsSearchDownload CSV (98)⚙️

Time	Client IP	Origin Server	Method	Response Code	Request Path	Request Size	Response size	Rules Hit
18 Jul 08:00:00	100.127.57.227	me1-mel frontend-85f98c...	GET	401	/api/cancelOrderBy Id/MSFT	0.47 kB	0.53 kB	1
18 Jul 07:59:55	100.127.57.227	me1-mel frontend-85f98c...	GET	401	/api/cancelOrderBy Id/AMZN	0.47 kB	0.53 kB	1
18 Jul 07:59:50	100.127.57.227	me1-mel frontend-85f98c...	GET	401	/api/cancelOrderBy Id/FFIV	0.47 kB	0.53 kB	1
18 Jul 07:59:39	192.42.116.186	me1-mel frontend-85f98c...	POST	404	/cart/checkout	0.69 kB	0.89 kB	1

1050100 items per pagePage 1 of 10<>

ForensicsApply

Top country

☐ LU4.1%

☐ NL4.1%

Top asn

☐ 1337 Services GmbH(2105...4.1%

☐ PONYNET(53667)4.1%

Top src_ip

☐ 192.42.116.18667.3%

☐ 100.127.57.22724.5%

Top tls_fingerprint

☐ d0ee3237a14bbd89ca4d...67.3%

☐ 398430069e0a8ecfbc8d...24.5%

API8: Security Misconfiguration

Protection#05 – OpenAPI Validation

Time	Country,city	Src IP	Method	Rsp Code	Event Type	Mode ▾	Authority	Request Path	Actions
14 Jul 15:05:33	SG,UNKNOWN	111.223.104.76	POST	302	API	Report	james.apac-ent.f5demos.com	/profile/image/url	...
<div><div>InformationJSON</div><div><div>Src</div><div>src_ip111.223.104.76</div><div>cityUNKNOWN</div><div>regionUNKNOWN</div><div>countrySG</div><div>asnStarHub Ltd(4657)</div><div>browser_typeChrome</div><div>device_typeOther</div><div>user_agentMozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/11...</div><div>src_sitesa3-sin</div></div><div><div>Request</div><div>req_id6ea75fba-dc92-4c53-a384-e60930da1176</div><div>authorityjames.apac-ent.f5demos.com</div><div>req_path/profile/image/url</div><div>req_params—</div><div>methodPOST</div><div>req_path/profile/image/url</div><div>req_size2033</div><div>rsp_size598</div><div>rsp_code302</div></div></div>									

A user can configure the OpenAPI validation action with 'Report' and using the feature as a 'validator' to find potential errors in API endpoint implementation.

API8: Security Misconfiguration

Protection#06 – HTTP Verbs Control

* Action ⓘ

Deny

API Endpoint

Reset All Fields Show Advanced Fields

* Domain ⓘ

Any Domain

* API Endpoint ⓘ

/anything

HTTP Methods ⓘ

Method List ⓘ

POST PUT DELETE

☐ Invert Method Matcher ⓘ

HTTP Query Parameters ⓘ

There are no items added yet. Start by adding first item.

+ Add Item

HTTP Headers ⓘ

There are no items added yet. Start by adding first item.

- A user can limit the HTTP methods, query and headers for specific API endpoints manually.

API8: Security Misconfiguration

Protection#06 – HTTP Verbs Control

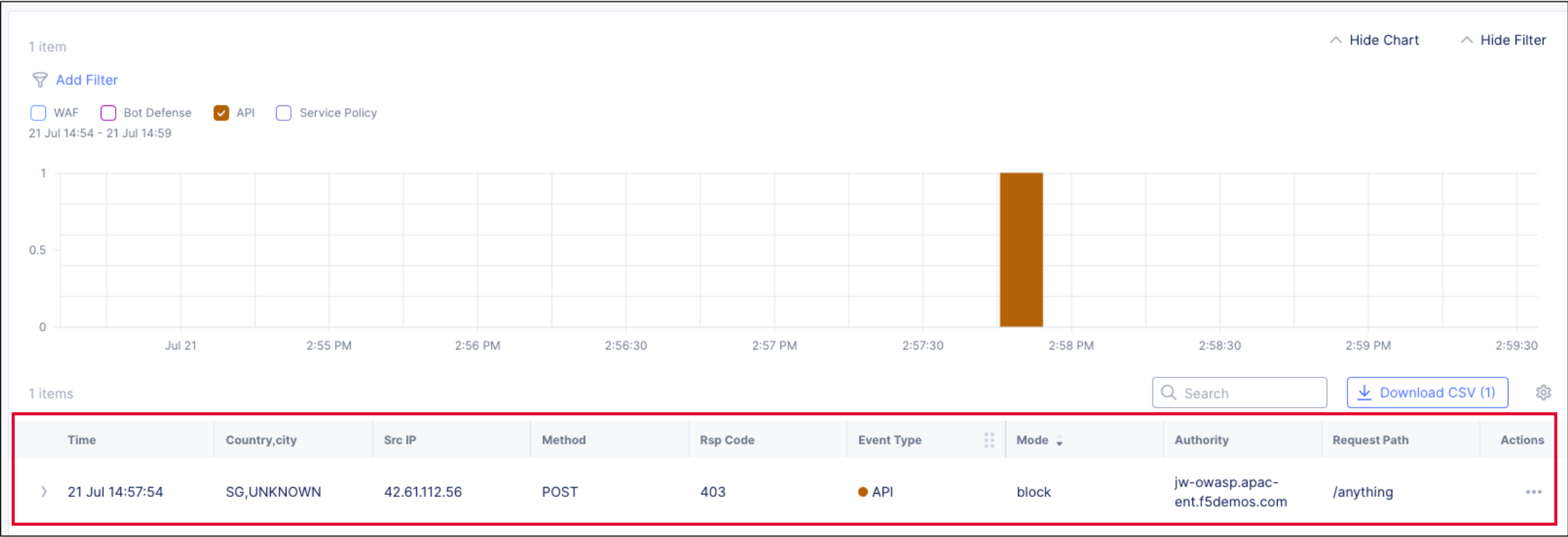
```
j.lee@C02FPFZPMD6M Desktop %  
j.lee@C02FPFZPMD6M Desktop % curl -X POST https://jw-owasp.apac-ent.f5demos.com/anything  
<html><head><title>Error Page</title></head>  
<body>The requested URL was rejected. Please consult with your administrator.<br/><br/>  
Your support ID is 2893bba9-7513-4d71-bf27-0febd6ce174b<h2>Error 403 - Forbidden</h2>F5 site: sg3-sin<br/><br/><a href='javascript:history  
.back();'>[Go Back]</a></body></html>  
j.lee@C02FPFZPMD6M Desktop %  
j.lee@C02FPFZPMD6M Desktop %  
j.lee@C02FPFZPMD6M Desktop % curl -X GET https://jw-owasp.apac-ent.f5demos.com/anything  
{  
  "args": {},  
  "data": "",  
  "files": {},  
  "form": {},  
  "headers": {  
    "Accept": "/*/*",  
    "Host": "jw-owasp.apac-ent.f5demos.com",  
    "User-Agent": "curl/7.87.0",  
    "X-Envoy-External-Address": "42.61.112.56",  
    "X-F5-Request-Id": "21e1e5d9-5381-44b5-90c3-ecac0c778c53"  
  },  
  "json": null,  
  "method": "GET",  
  "origin": "42.61.112.56",  
  "url": "https://jw-owasp.apac-ent.f5demos.com/anything"  
}  
j.lee@C02FPFZPMD6M Desktop %
```



- GET is allowed, but POST is blocked.

API8: Security Misconfiguration

Protection#06 – HTTP Verbs Control





Session 1: The new OWASP Top 10 API Security 2023

API10:2023 – Unsafe Consumption of APIs

API10: Unsafe Consumption of APIs

Developers tend to trust data received from 3rd party APIs, especially for APIs from well-known companies. Thus, it sometimes has a lack of input validation and sanitization for those APIs.

- Does not properly validate and sanitize the data from 3rd party companies.
- Blindly follows redirections.
- No timeout mechanism with 3rd party APIs.
- No limit the number of resources.

Scenario #2

An API integrates with a third-party service provider to safely store sensitive user medical information. Data is sent over a secure connection using an HTTP request like the one below:

```
POST /user/store_phr_record
{
  "genome": "ACTAGTAG__TTGADDAAIICCTT..."
}
```

Bad actors found a way to compromise the third-party API and it starts responding with a `308 Permanent Redirect` to requests like the previous one.

```
HTTP/1.1 308 Permanent Redirect
Location: https://attacker.com/
```

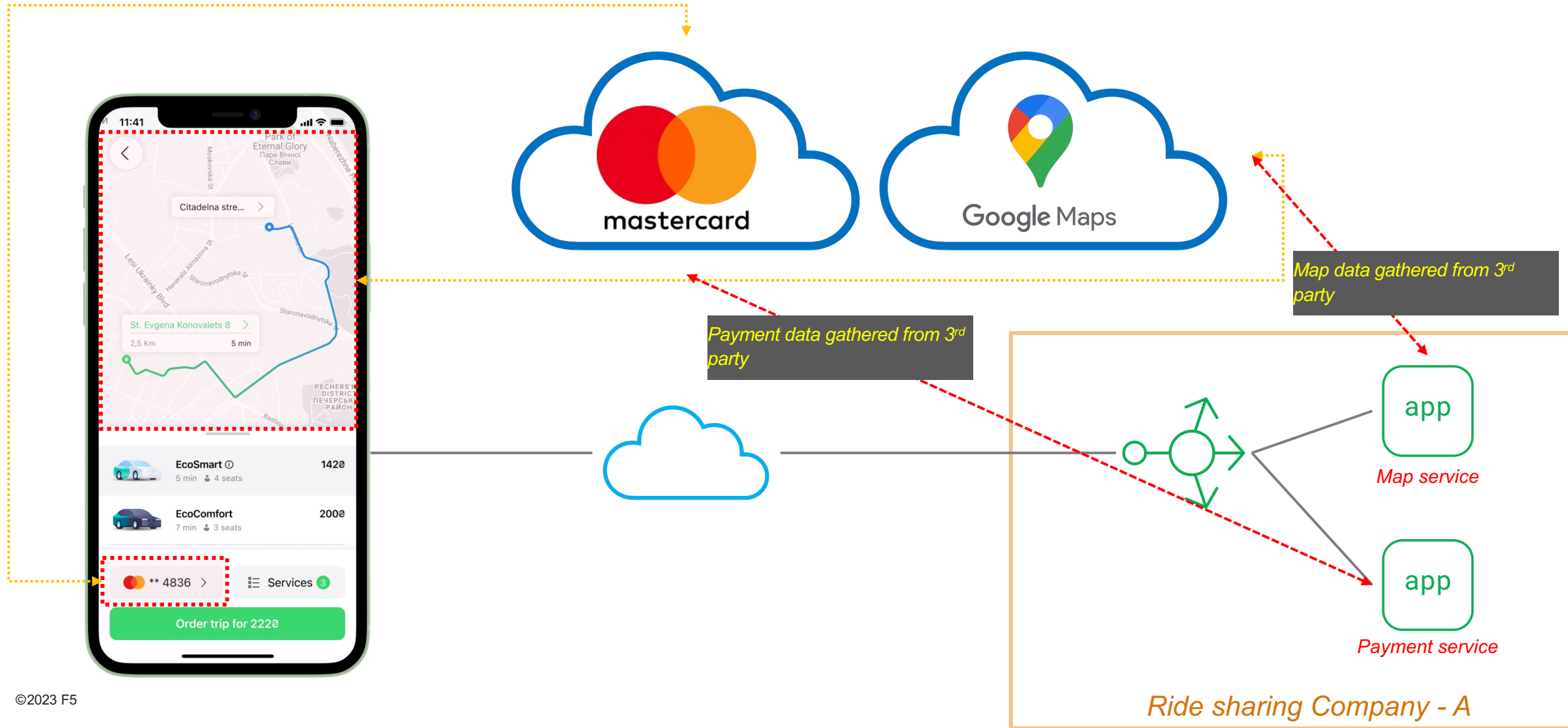
Since the API blindly follows the third-party redirects, it will repeat the exact same request including the user's sensitive data, but this time to the attacker's server.



**OWASP API
SECURITY TOP 10**

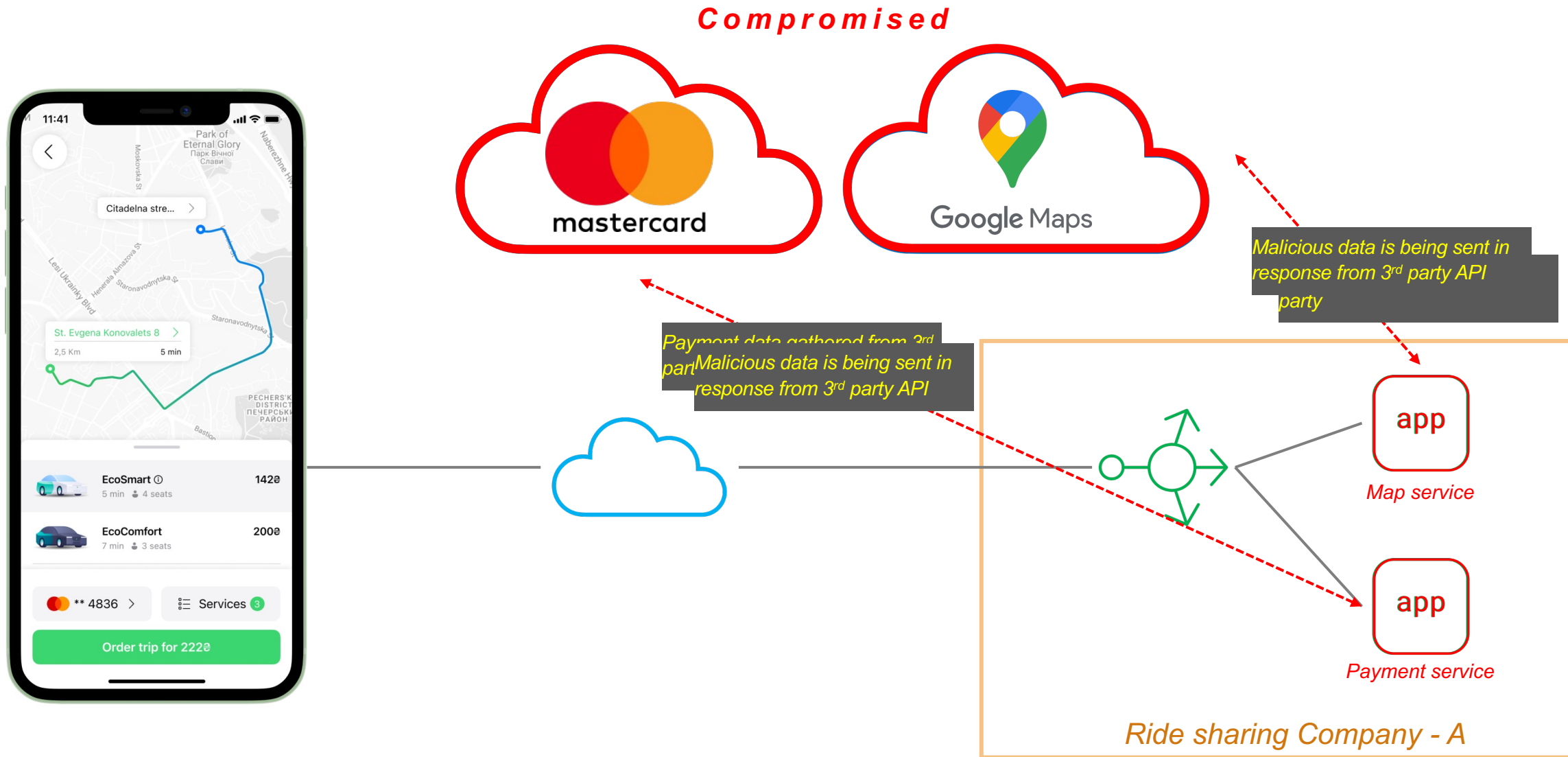
API10: Unsafe Consumption of APIs

How does it work? And why does it risky?



API10: Unsafe Consumption of APIs

How does it work? And why does it risky?



OWASP Recommendation



API10:2023 Unsafe Consumption of APIs



Search



OWASP/API-Security
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202:
Noti
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Risk
API1

Example Attack Scenarios

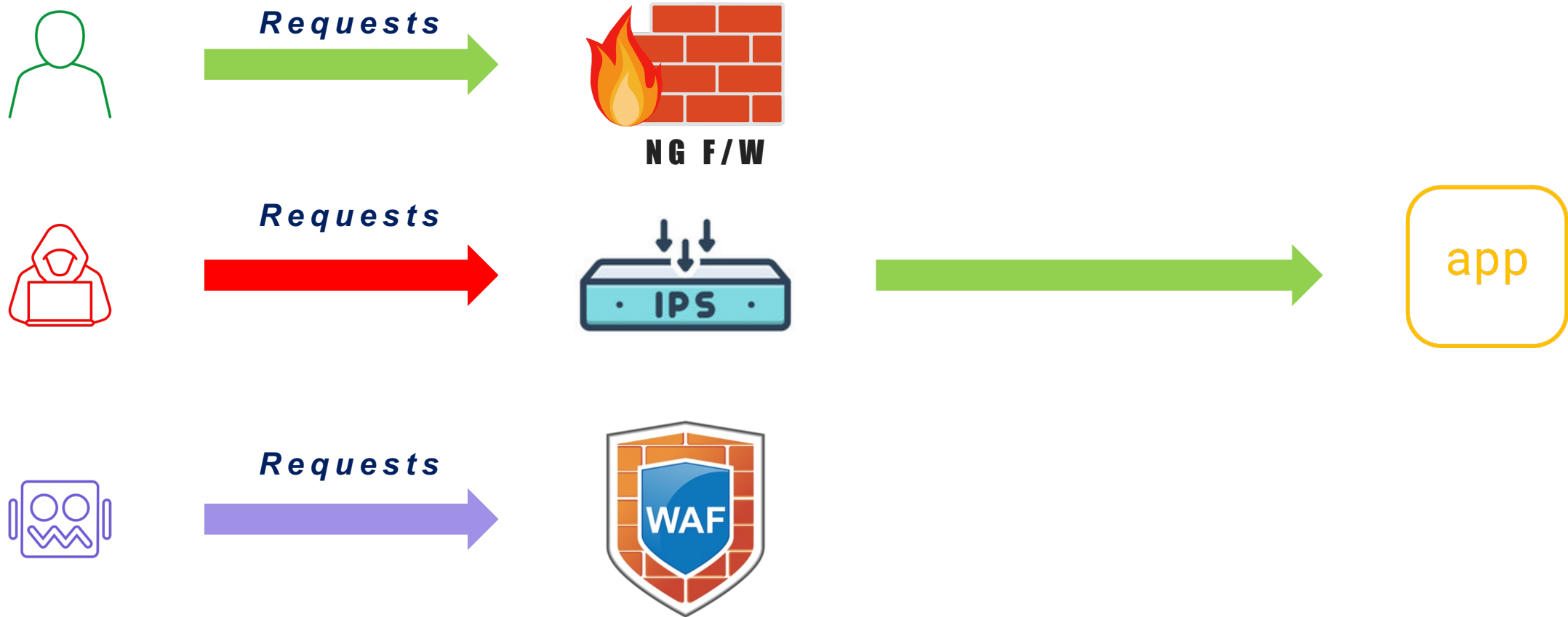
Scenario #1

An API relies on a third-party service to enrich user provided business addresses. When an address is supplied to the API by the end user, it is sent to the third-party service and the returned data is then stored on a local SQL-enabled database.

Bad actors use the third-party service to store an SQLi payload associated with a business created by them. Then they go after the vulnerable API providing specific input that makes it pull their "malicious business" from the third-party service. The SQLi payload ends up being executed by the database, exfiltrating data to an attacker's controlled server.

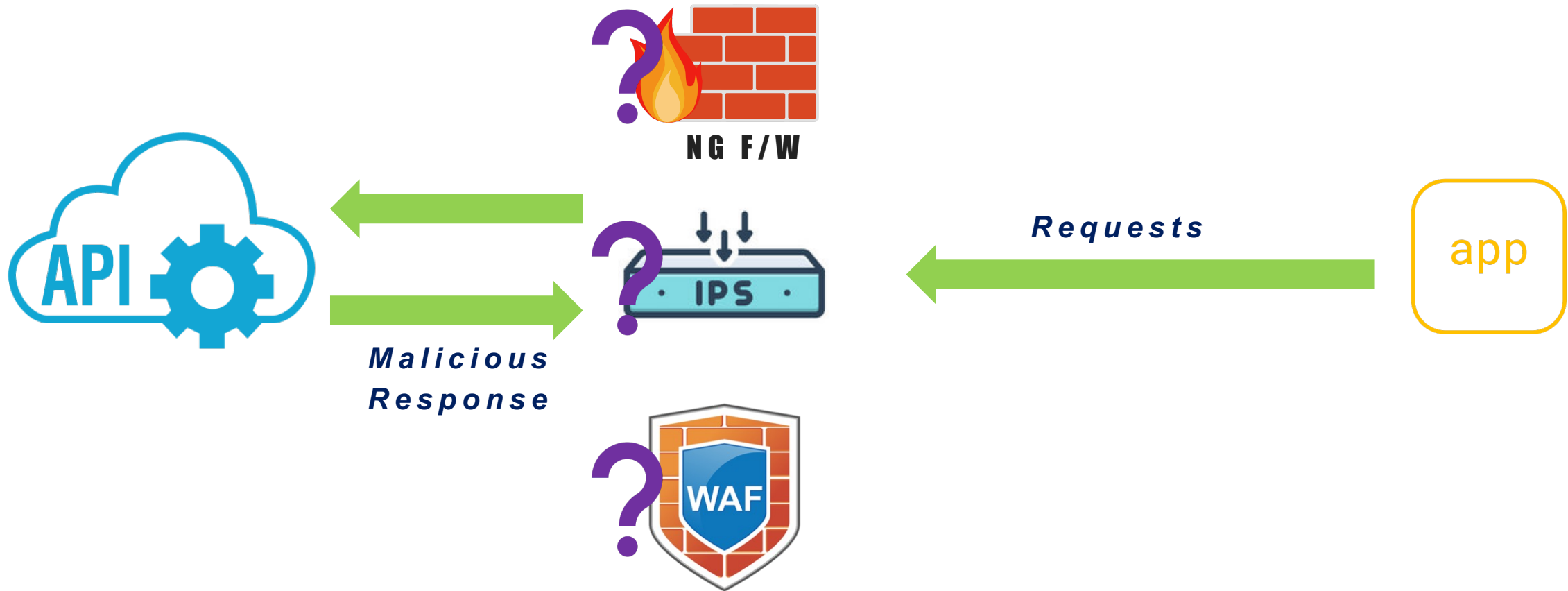
API10: Unsafe Consumption of APIs

How to Stop the 'Unsafe Consumption of APIs'



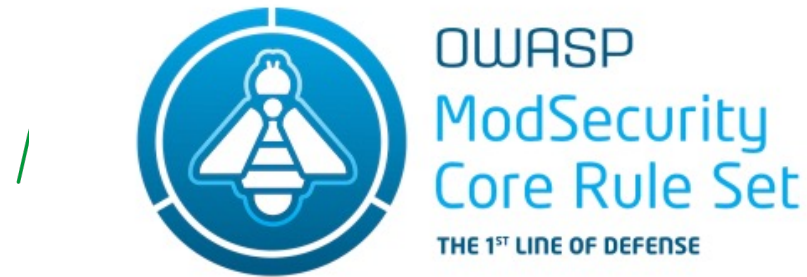
API10: Unsafe Consumption of APIs

How to Stop the 'Unsafe Consumption of APIs'



API10: Unsafe Consumption of APIs

How to Stop the 'Unsafe Consumption of APIs'



Requests



Requests



REQUEST-932-APPLICATION-ATTACK-RCE.conf REQUEST-933-APPLICATION-ATTACK-PHP.conf REQUEST-934-APPLICATION-ATTACK-GENERIC.conf

TODO

REQUEST-941-APPLICATION-ATTACK-XSS.conf TODO

| REQUEST-942-APPLICATION-ATTACK-SQLI | Configuration Path: [rules/REQUEST-942-APPLICATION-ATTACK-SQLI.conf](#) ||
Within this configuration file we provide rules that protect against SQL injection attacks. SQLi attackers occur when an attacker passes crafted control characters to parameters to an area of the application that is expecting only data. The application will then pass the control characters to the database. This will end up changing the meaning of the expected SQL query.

| REQUEST-943-APPLICATION-ATTACK-SESSION-FIXATION | Configuration Path:
[rules/REQUEST-943-APPLICATION-ATTACK-SESSION-FIXATION.conf](#) || These rules focus around providing protection against Session Fixation attacks.

| RESPONSE-954-DATA-LEAKAGES-IIS | Configuration Path: [rules/RESPONSE-954-DATA-LEAKAGES-IIS.conf](#) || These rules provide protection against data leakages that may occur because of Microsoft IIS

| RESPONSE-952-DATA-LEAKAGES-JAVA | Configuration Path: [rules/RESPONSE-952-DATA-LEAKAGES-JAVA.conf](#) || These rules provide protection against data leakages that may occur because of Java

| RESPONSE-953-DATA-LEAKAGES-PHP | Configuration Path: [rules/RESPONSE-953-DATA-LEAKAGES-PHP.conf](#) || These rules provide protection against data leakages that may occur because of PHP

| RESPONSE-950-DATA-LEAKAGES | Configuration Path: [rules/RESPONSE-950-DATA-LEAKAGES.conf](#) || These rules provide protection against data leakages that may occur generically

API10: Unsafe Consumption of APIs

How to Stop the 'Unsafe Consumption of APIs'

Secure Proxy for External API calls

- With proxy configuration with the custom script, reverse proxy can validate and sanitize the response data from external APIs.

OpenAPI Spec Validation

- With OpenAPI validation process, you can validate the response from 3rd party API vendors.

API10: Unsafe Consumption of APIs

Protection#01 – Secure Proxy for External API calls

```
ubuntu@ubuntu:~$  
ubuntu@ubuntu:~$ curl -k -H 'Content-Type: application/json' https://14c1fa7d-c460-4da3-ba49-a923dbb3a63d.access.udf.f5.com/normal.json  
{  
  "email": "james@test.com",  
  "age": "32",  
  "company": "F5"  
}  
ubuntu@ubuntu:~$
```

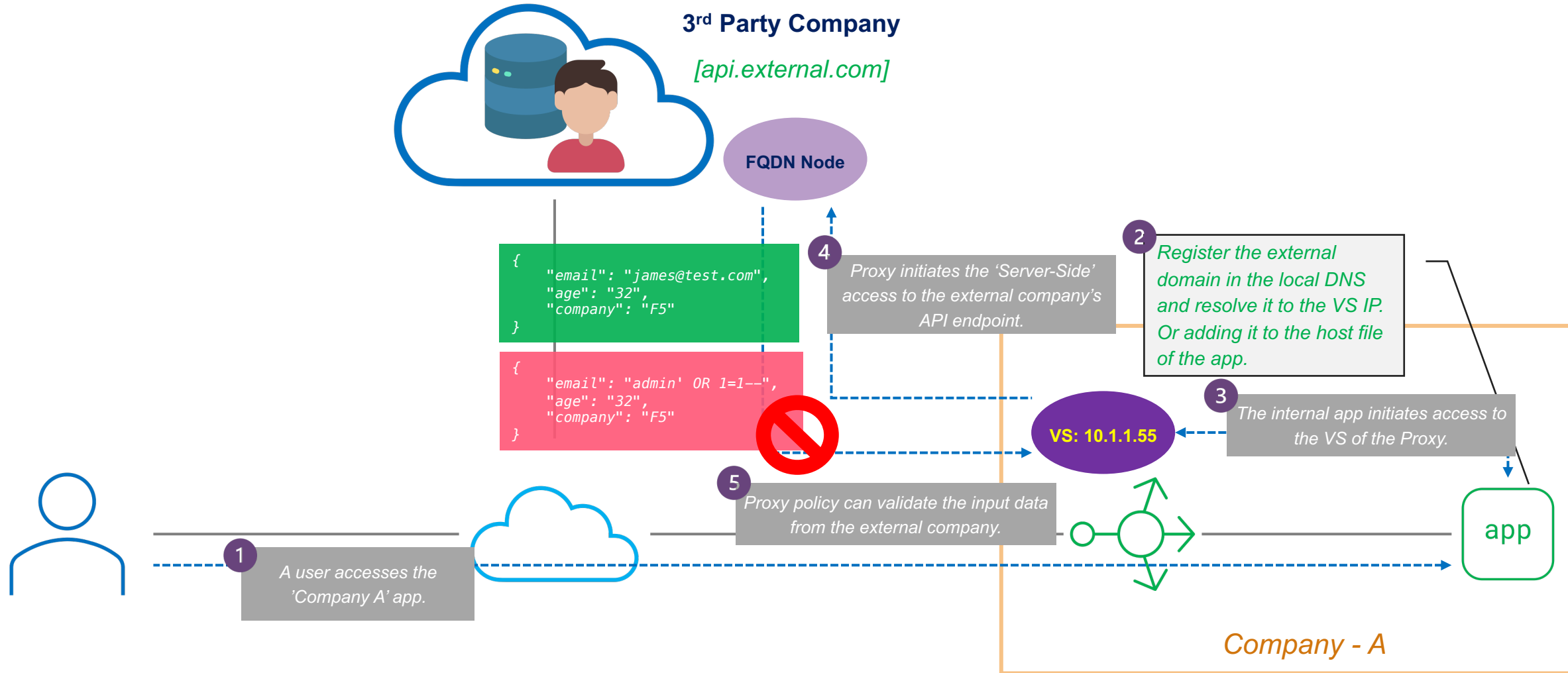
- The internal app can fetch the user's data from the external company via API.

```
ubuntu@ubuntu:~$  
ubuntu@ubuntu:~$ curl -k -H 'Content-Type: application/json' https://14c1fa7d-c460-4da3-ba49-a923dbb3a63d.access.udf.f5.com/malformed.json  
{  
  "email": "admin' OR 1=1--",  
  "age": "32",  
  "company": "F5"  
}  
ubuntu@ubuntu:~$
```

- If the external company's app is compromised, it could send malicious content.
- In this example, the attacker put the SQLi payload in the 'email' field. If the internal app trusts the 3rd party company's data without additional validation, this could cause the SQLi attack.
- This example is the same example that OWASP described as 'Scenario #1'.

API10: Unsafe Consumption of APIs

Protection#01 – Secure Proxy for External API calls



API10: Unsafe Consumption of APIs

Protection#01 – Secure Proxy for External API calls

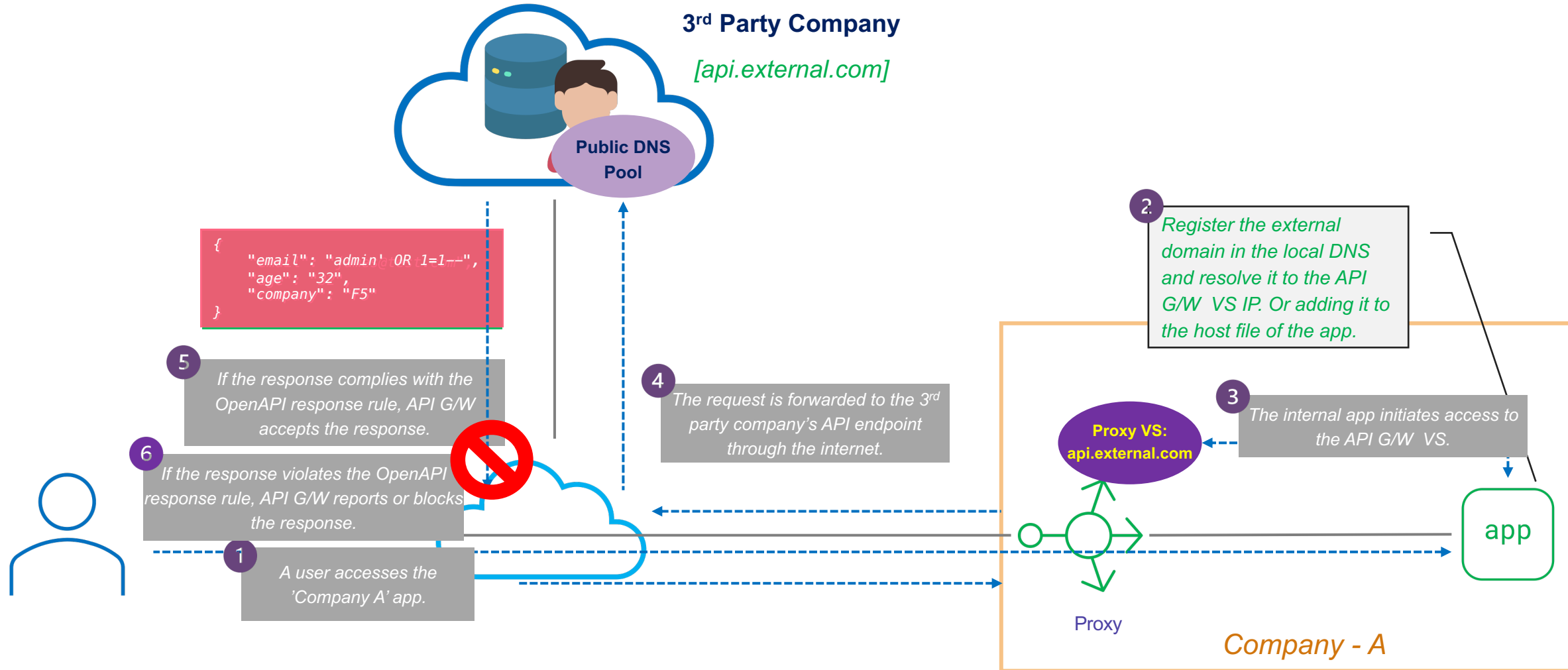
```
[ubuntu@ubuntu:~$  
[ubuntu@ubuntu:~$ curl -k -H 'Content-Type: application/json' https://14c1fa7d-c460-4da3-ba49-a923dbb3a63d.access.udf.f5.com/normal.json  
{  
  "email": "james@test.com",  
  "age": "32",  
  "company": "F5"  
}  
[ubuntu@ubuntu:~$  
[ubuntu@ubuntu:~$  
[ubuntu@ubuntu:~$ curl -k -H 'Content-Type: application/json' https://14c1fa7d-c460-4da3-ba49-a923dbb3a63d.access.udf.f5.com/malformed.json  
curl: (56) OpenSSL SSL_read: Connection reset by peer, errno 104  
[ubuntu@ubuntu:~$  
[ubuntu@ubuntu:~$
```

If the received data is aligned with the defined format in the Proxy policy, the data is consumed as normal.

- However, if the data format violates the defined format in the Proxy policy, Proxy reset the session.

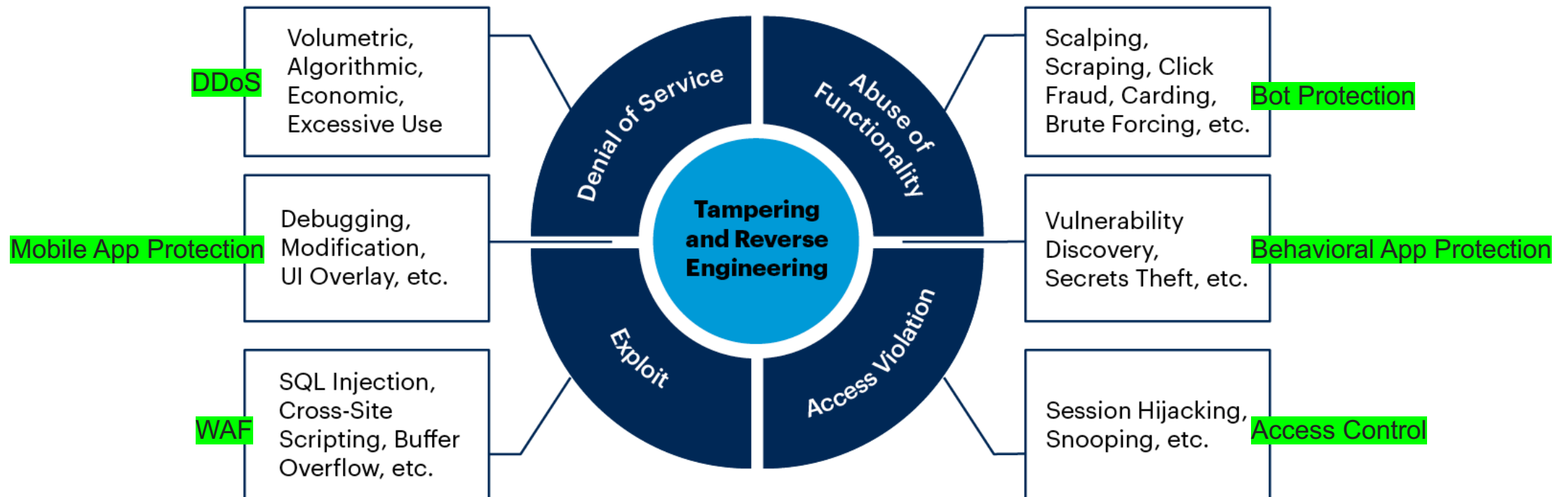
API10: Unsafe Consumption of APIs

Protection#02 – OpenAPI Validation



Web App and API Attack Pattern

Web App and API Attack Pattern



Source: Gartner
747213_C

