
AWS
re:Invent
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AWS WAF: What a BOT it?

Julian Ju
(he/him)
Sr Solutions Architect – Edge Services
AWS

Joanna Knox
(she/her)
Sr Cloud Support Engineer
AWS

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Agenda

- What is a bot?
- AWS WAF overview
- Foundational rules
- AWS WAF Bot Control and Fraud Control
- Customer examples

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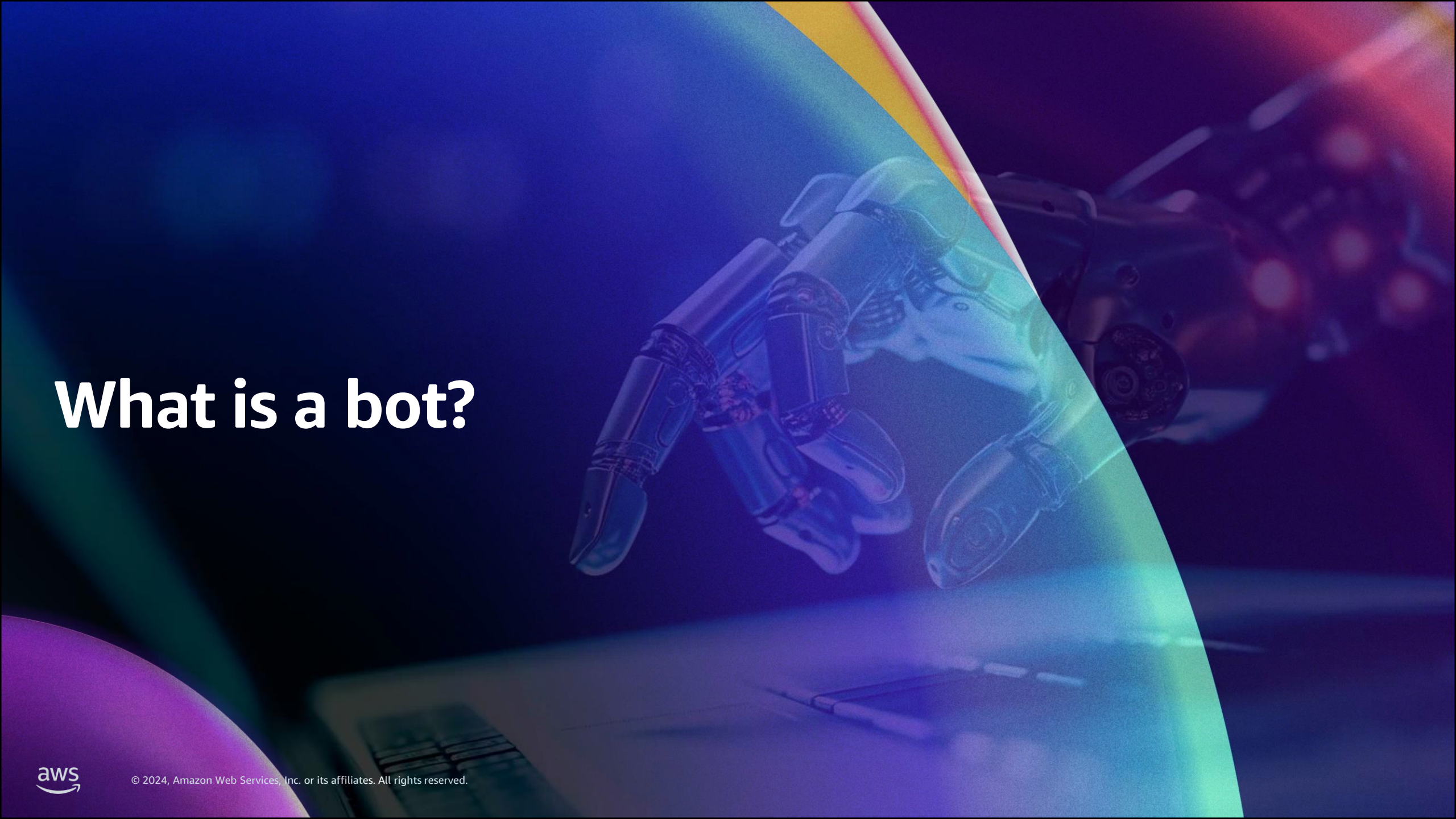
What is a bot?



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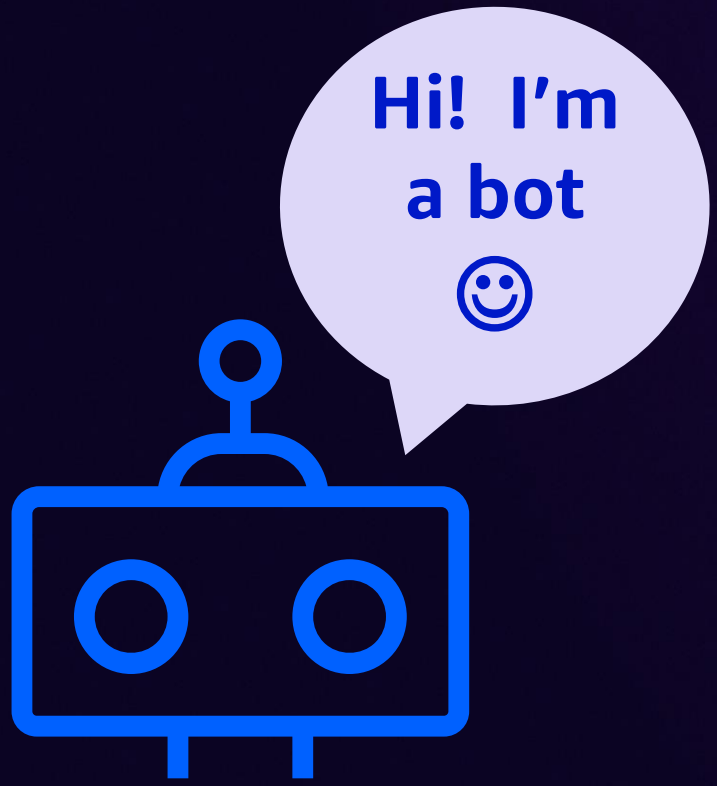

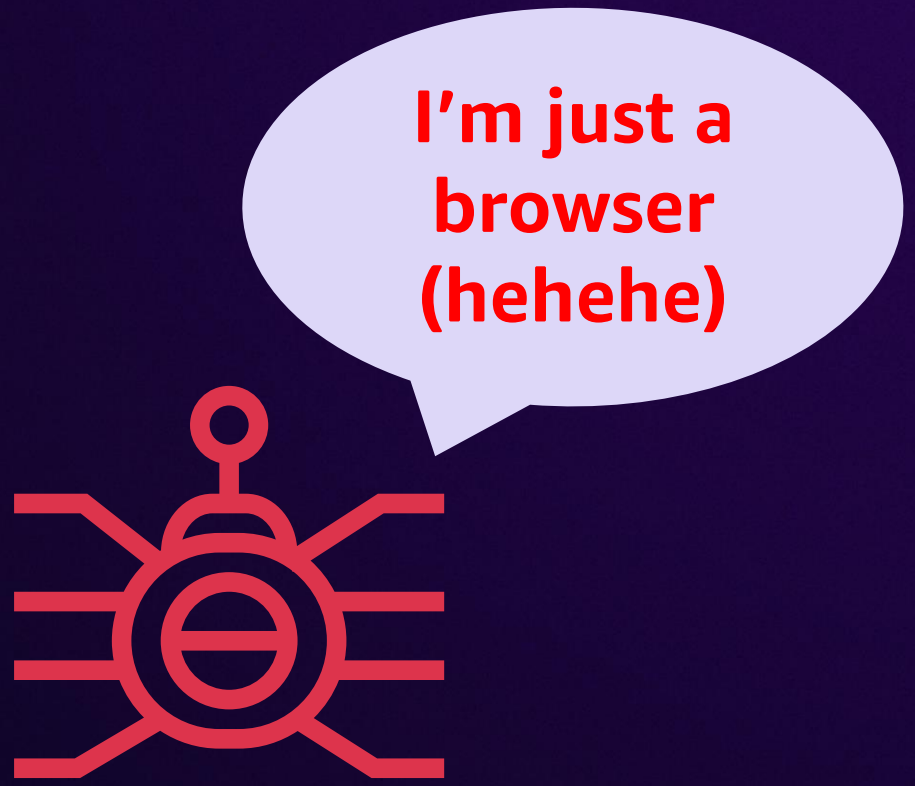

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Bot use cases

Good bots	Bad bots	Grey area
• Search engine • Site monitoring • Authorized vulnerability scans	• DDoS • Account/credit card fraud • Scraping/data theft • SMS pumping • “Click” bots	• Social media • AI bots • Accidental bots

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AWS WAF overview

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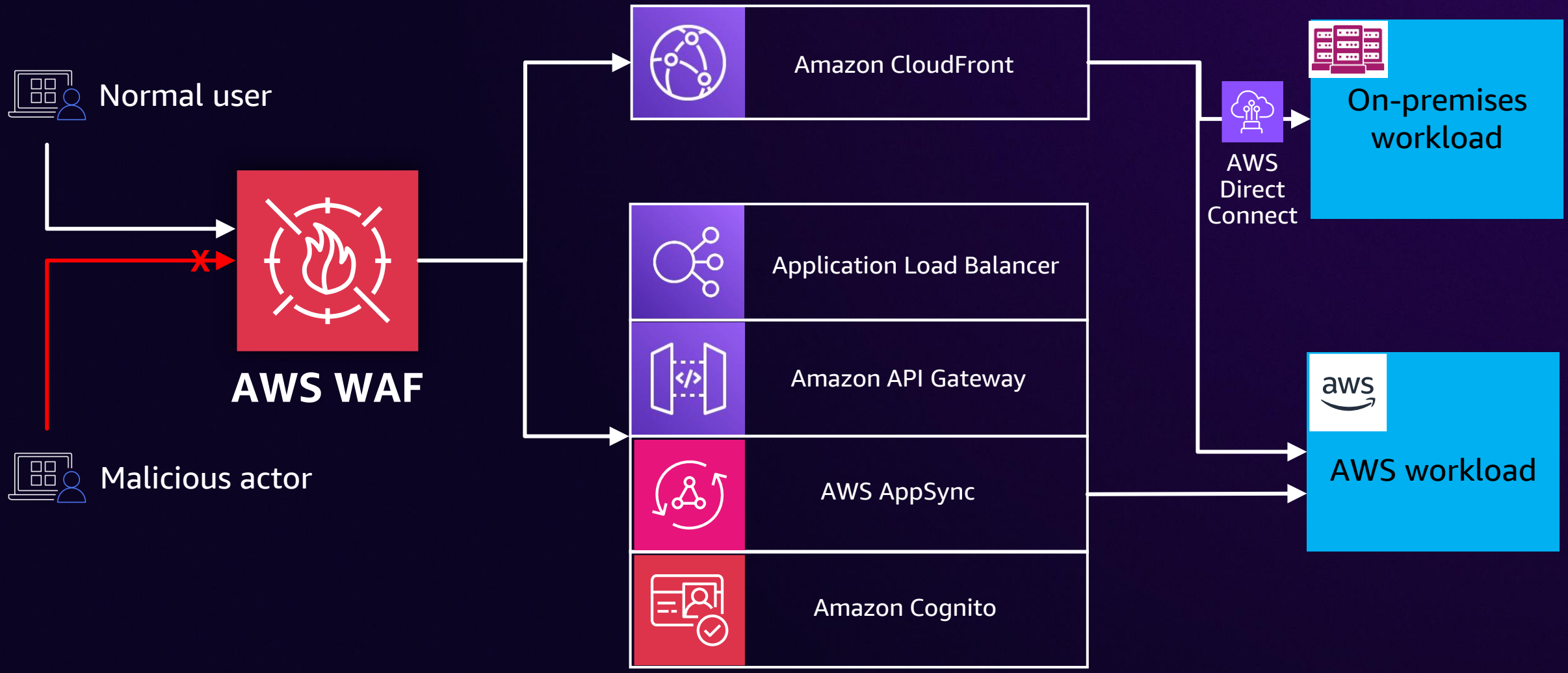
Protect AWS and on-premises applications



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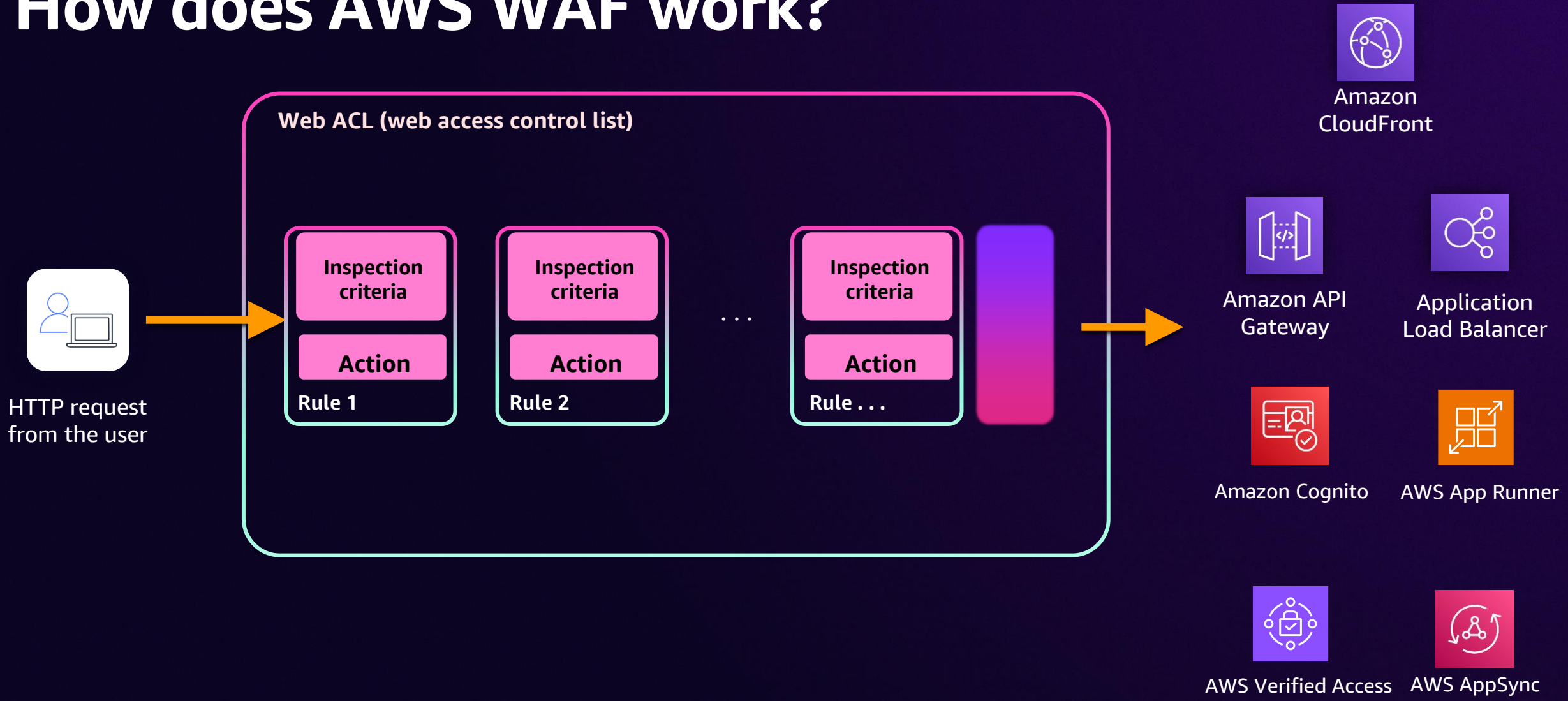
How does AWS WAF work?



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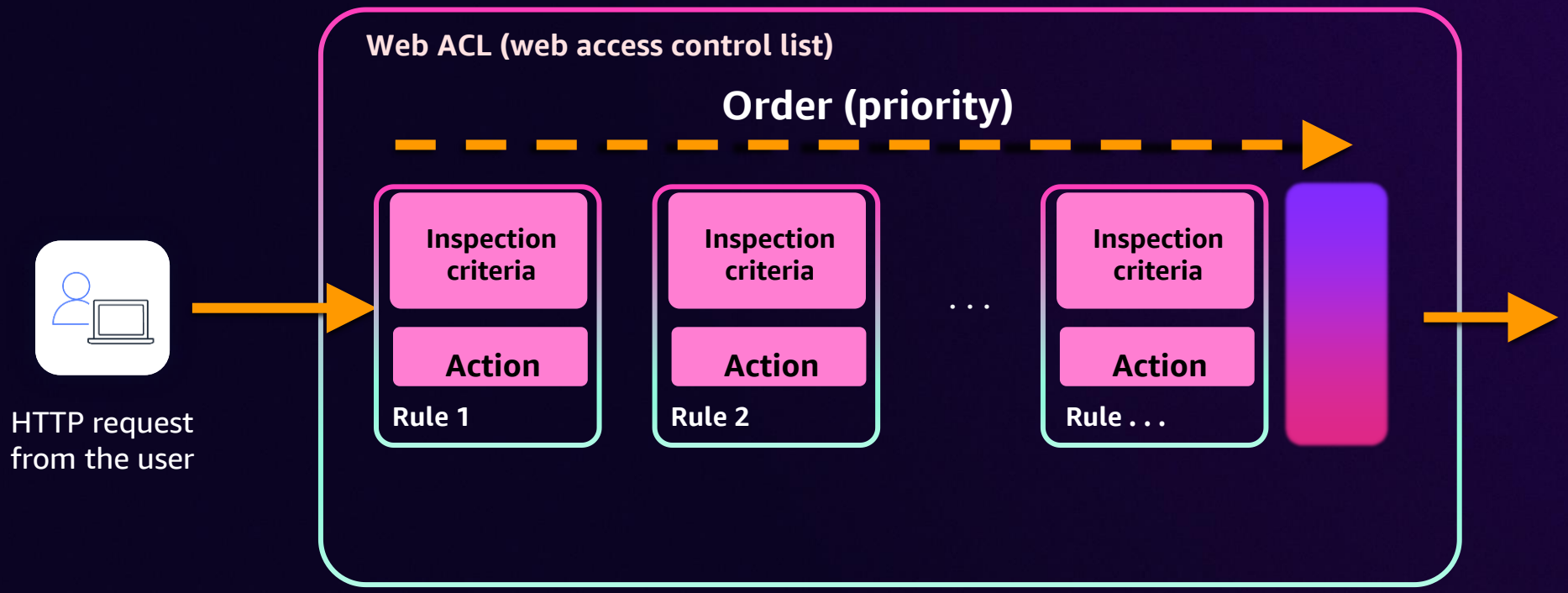

Amazon CloudFront

Amazon API Gateway

Application Load Balancer

Amazon Cognito

AWS App Runner

AWS Verified Access

AWS AppSync

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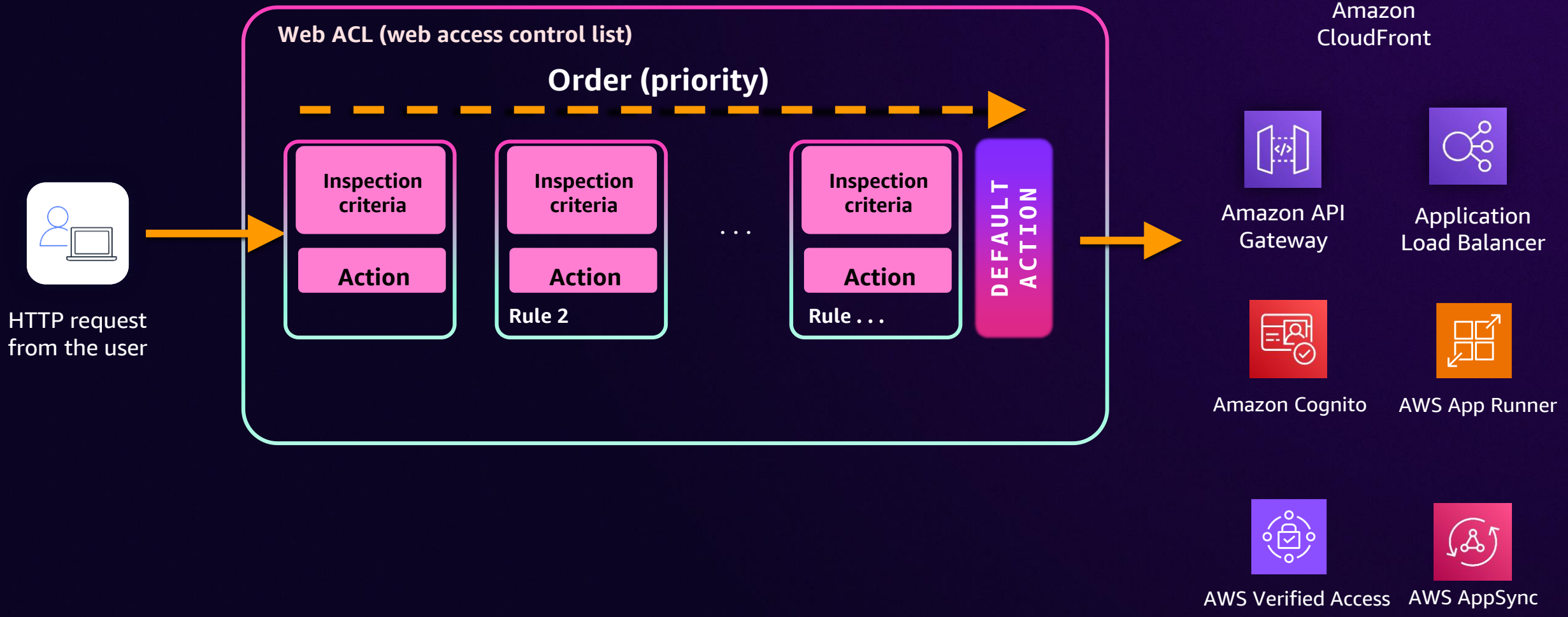

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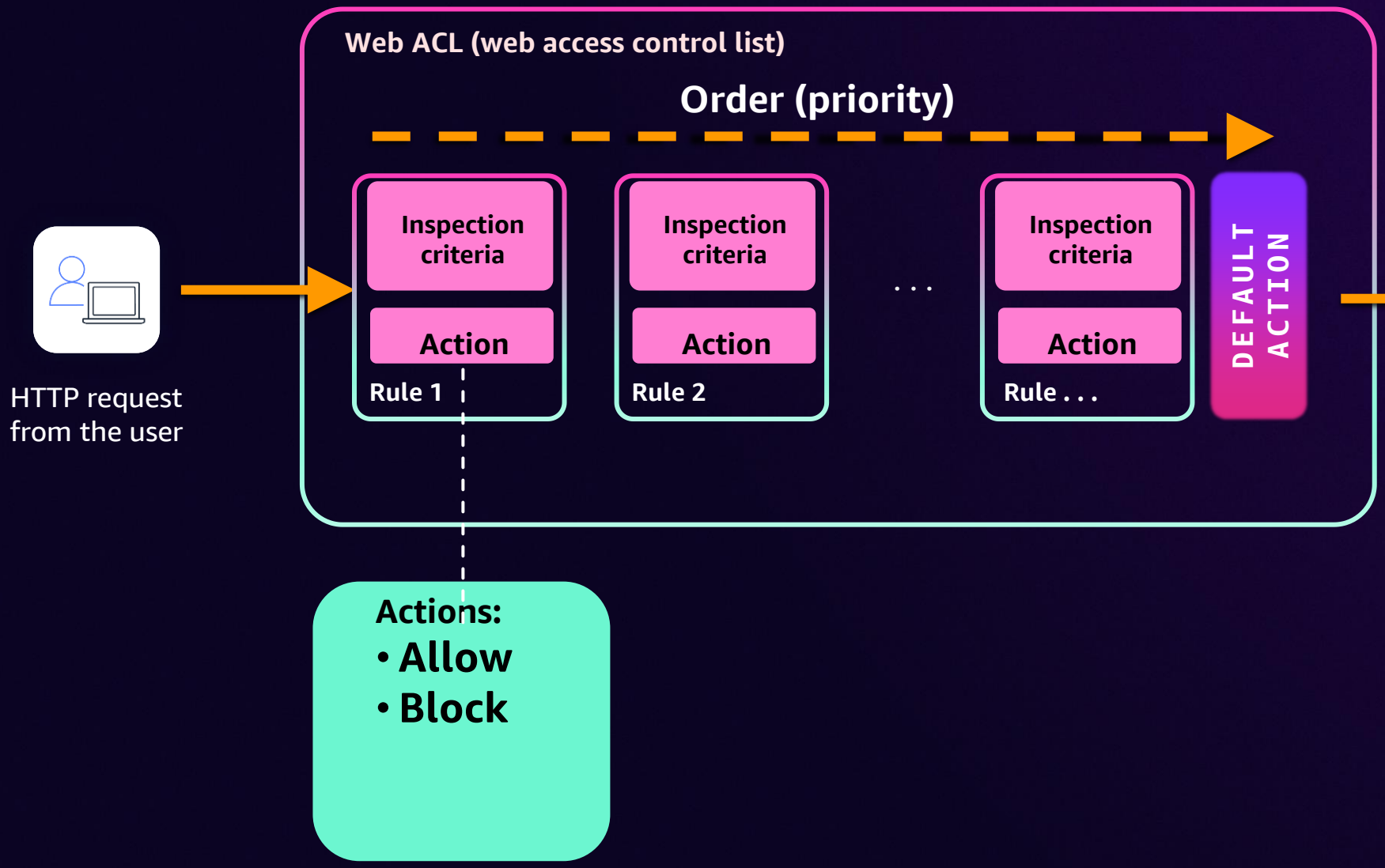

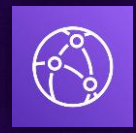

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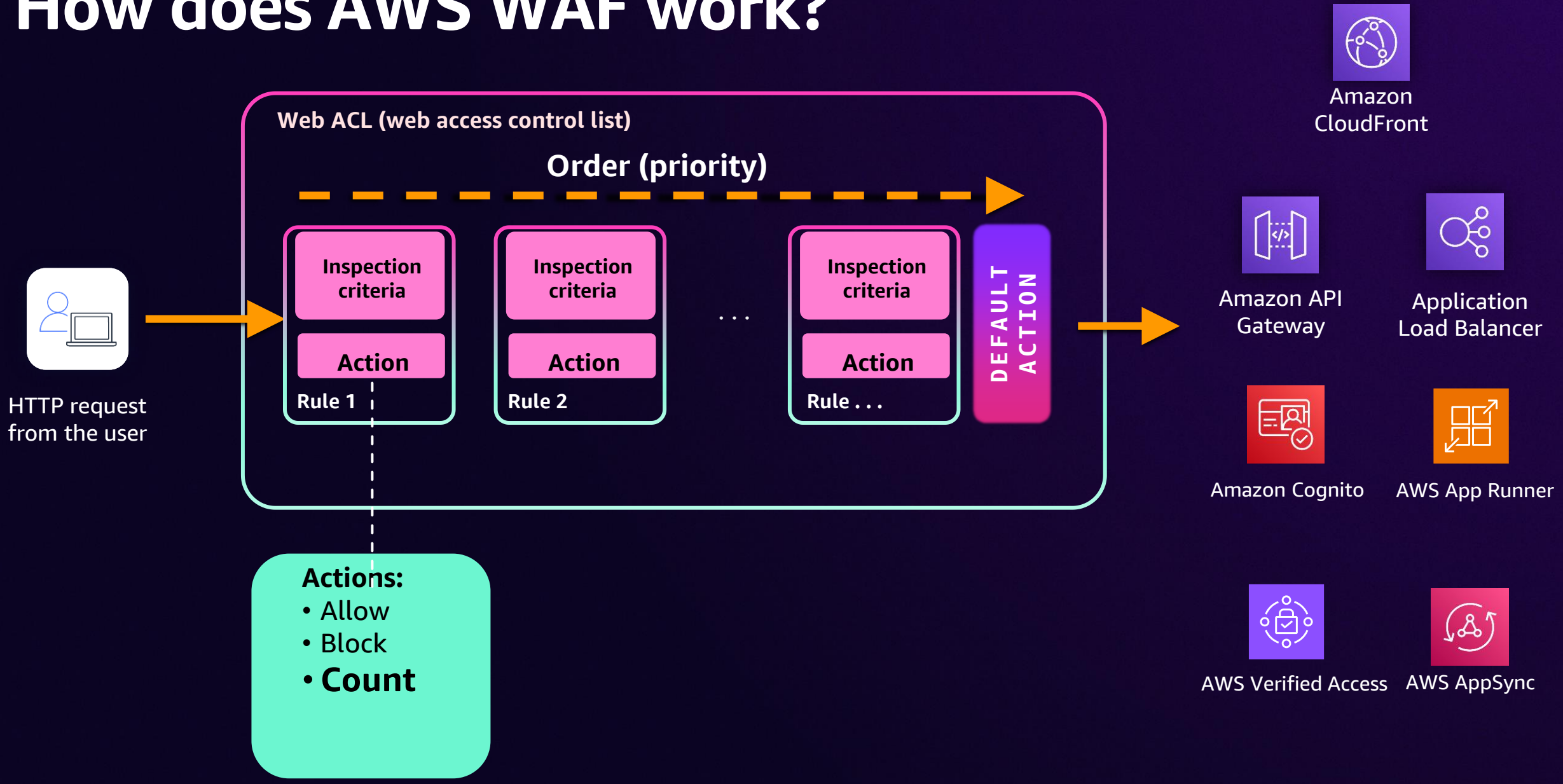

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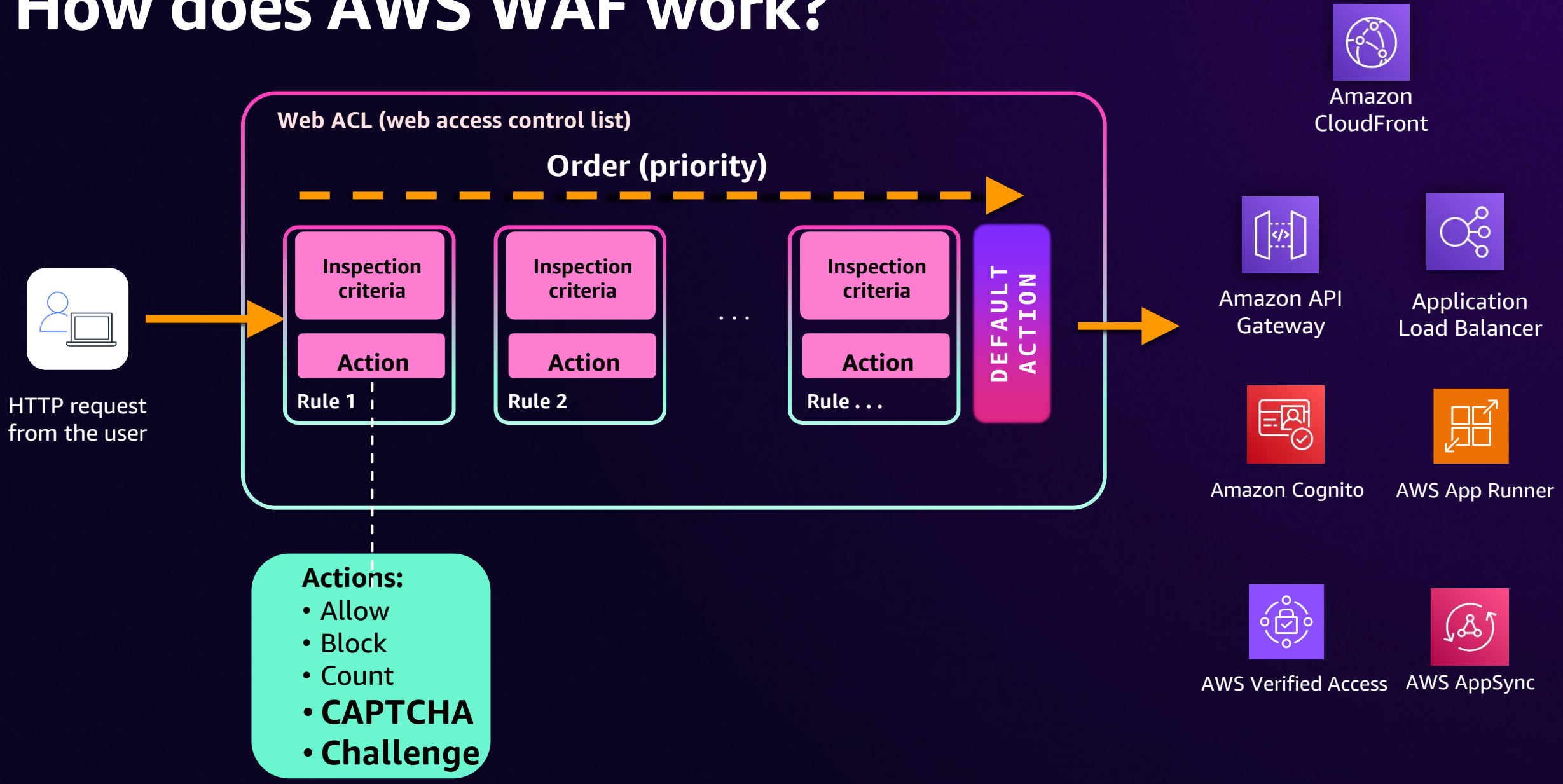

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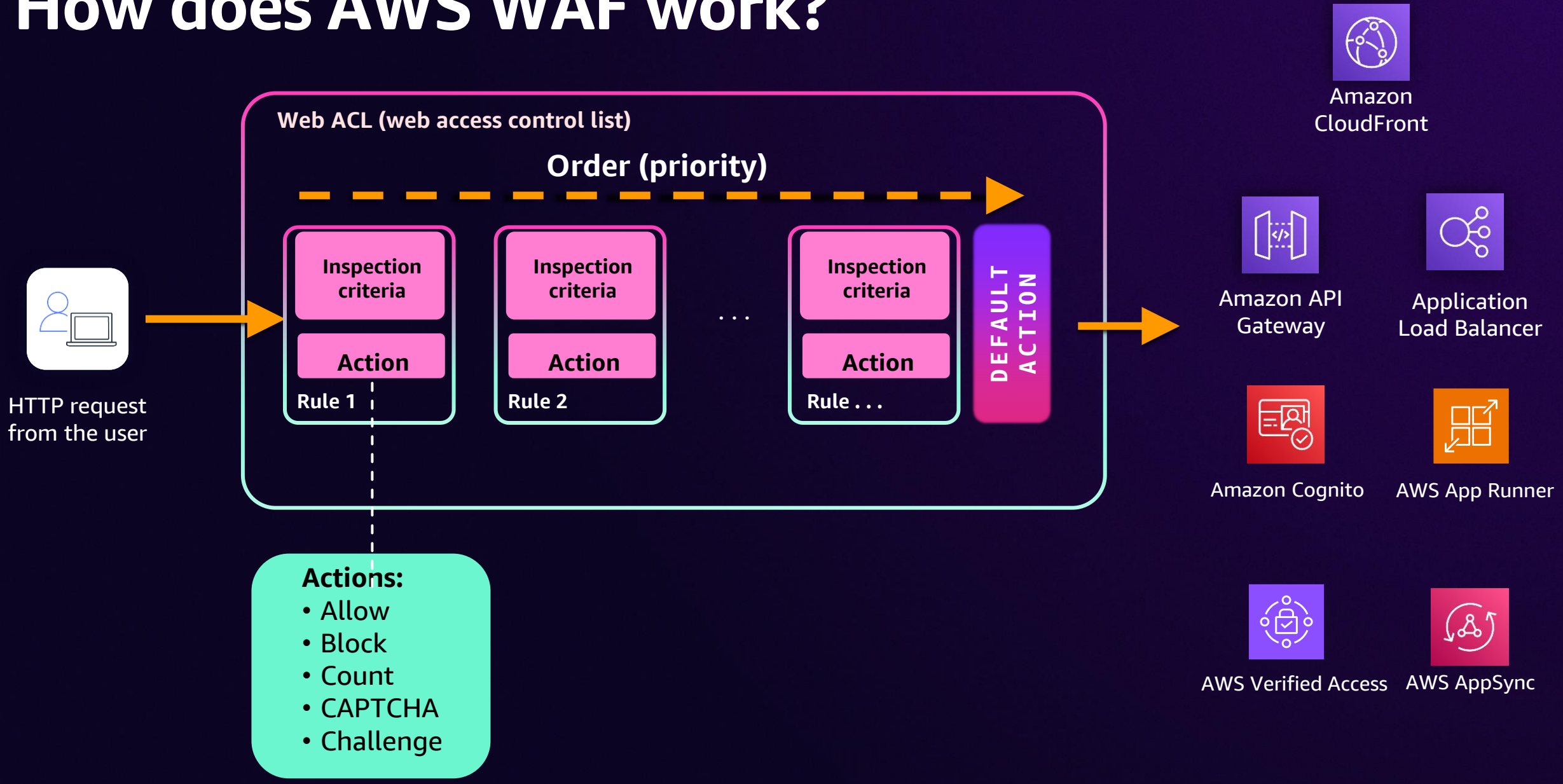

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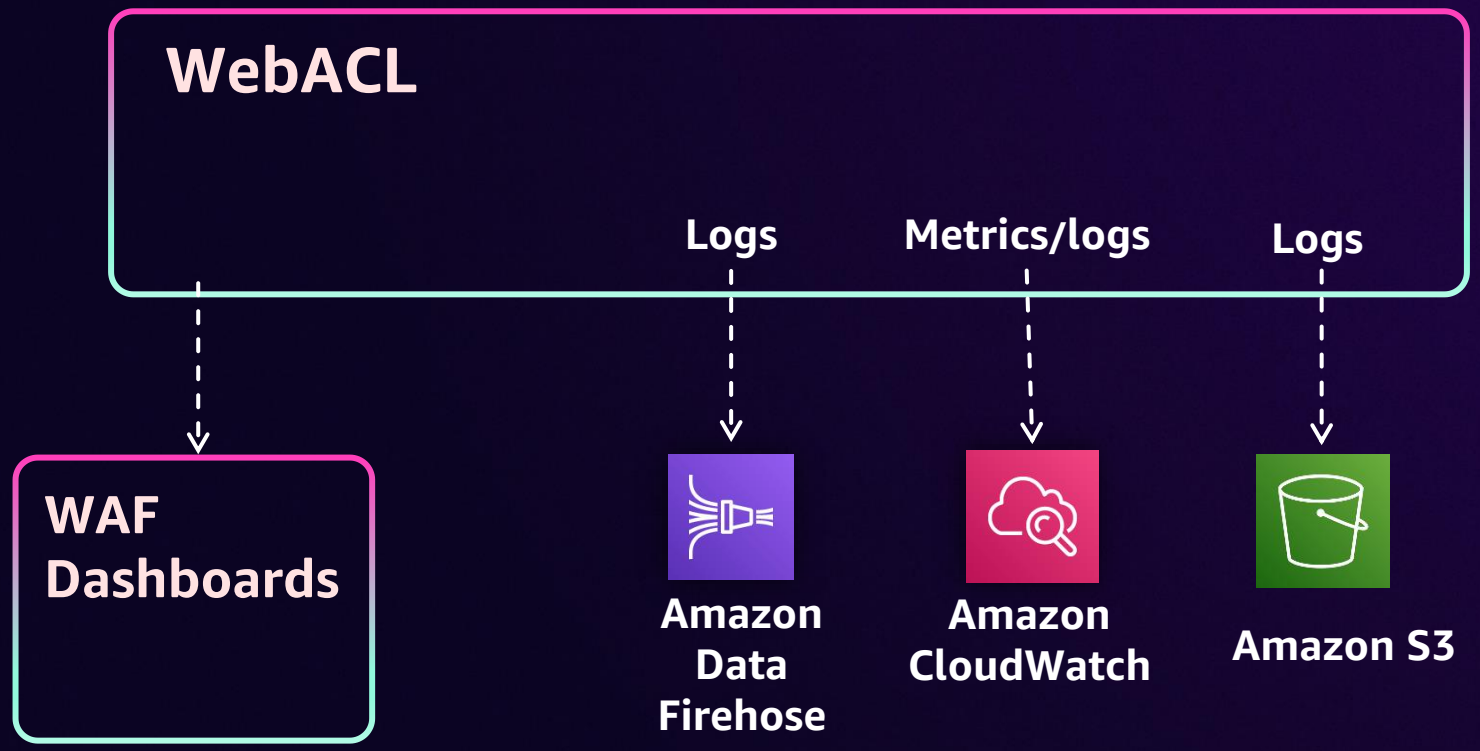
Visibility is power



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Foundational rules

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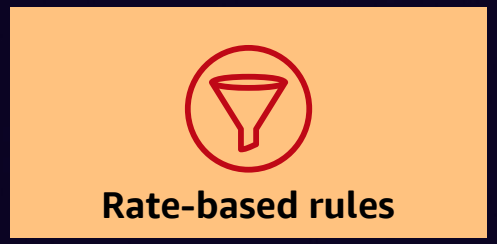
Rate-based rules

Detect the HTTP flood attack and suppress the requests



Block L7 DDoS attacks once a rate threshold is reached

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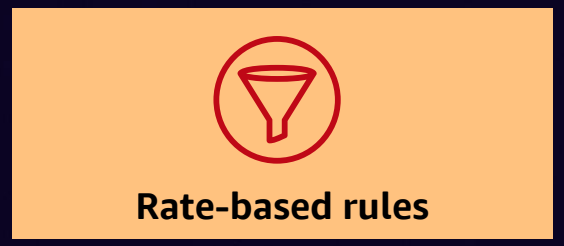
Layering rate-based rules



Catch-all rule

Rule type: Rate-based

Rule name: rbr_global

Scope-down: None (matches all)

Aggregation key: IP (default)

Evaluation window: 300 (default)

Limit: **500**

Action: Block

API rule

Rule type: Rate-based

Rule name: rbr_api

Scope-down: If uri starts_with ‘/api/’

Aggregation key: IP (default)

Evaluation window: 300

Limit: **50**

Action: Block

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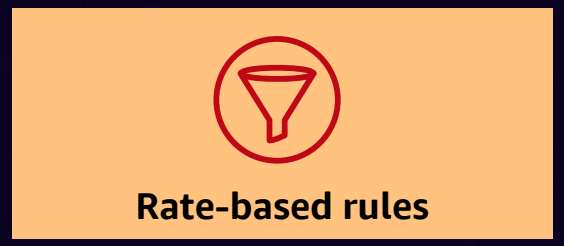
Layering rate-based rules – Anti-DDoS



Anti-DDoS rule

Rule type: Rate-based

Rule name: rbr_ddos

Scope-down: None

Aggregation key: Header (Host) + URI + IP

Evaluation window: 60

Limit: **10**

Action: Block

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IP-based controls

Protection against attacks from known malicious IP addresses

Block or allow **requests from specific IPs** or IP sets

Amazon IP reputation list managed rule group

AWSManagedIPReputationList
Rule action: **Block**
Choose rule action override

AWSManagedReconnaissanceList
Rule action: **Block**
Choose rule action override

AWSManagedIPDDoSList
Rule action: **Count**
Choose rule action override

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“Challenge” rule action

JavaScript challenge

AWS WAF token

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AWS WAF Bot Control and Fraud Control

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AWS WAF Bot and Fraud Control overview

Bot Control

- Identifies, labels, and manages both friendly and malicious bots
- 2 levels of protection
  - Common – for self-identifying bots
  - Targeted – for evasive bots

Fraud prevention

- Detects and prevents fraud attempts
- Account takeover prevention (ATP)
- Account creation fraud prevention (ACFP)

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Detecting common bots

What are the common bots?

- Self-identifying
- Search engines/social media/HTTP library

```
GET /
Host: www.example.com
Accept: */*
Accept-Encoding: deflate, gzip
User-Agent: facebookexternalhit/1.1
(+http://www.facebook.com/externalhit_uatext.php)
Range: bytes=0-524287
X-FB-CrawlerBot: AaknqfYgnBhDfF.....
```

What does common bot control do?

- Looks for request, IP, TLS fingerprint
- Verifies the bot
- Provides labels

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Challenges of evasive bots

Challenges

- Use existing browser headers and values
- Not using well-known bot IP addresses
- Mimic the real browser activities such as JavaScript execution

Responses

- Client interrogation
- Uniquely identify the client session
- Monitor the client session behavior

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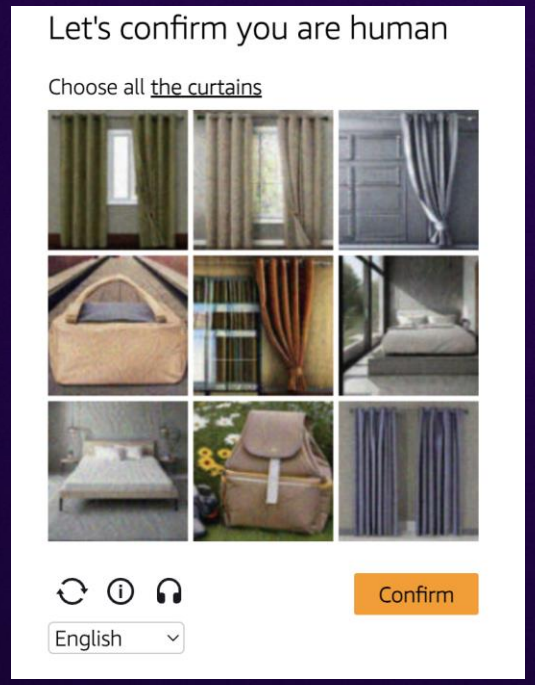
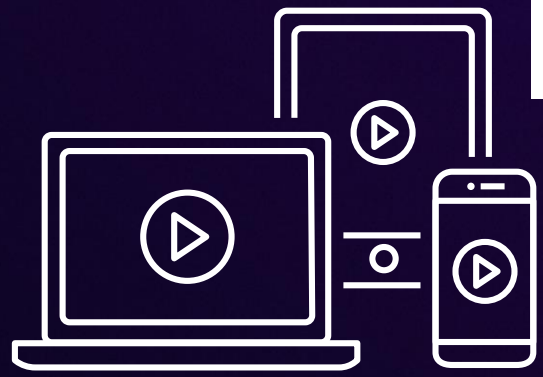
A bit more on client interrogation

- JavaScript execution or CAPTCHA puzzle
- Collect client information
  - Canvas info/installed fonts/installed plugins/other
- Look for browser automation
  - Selenium/Puppeteer
- Collect client telemetries
  - Mouse movement/key press





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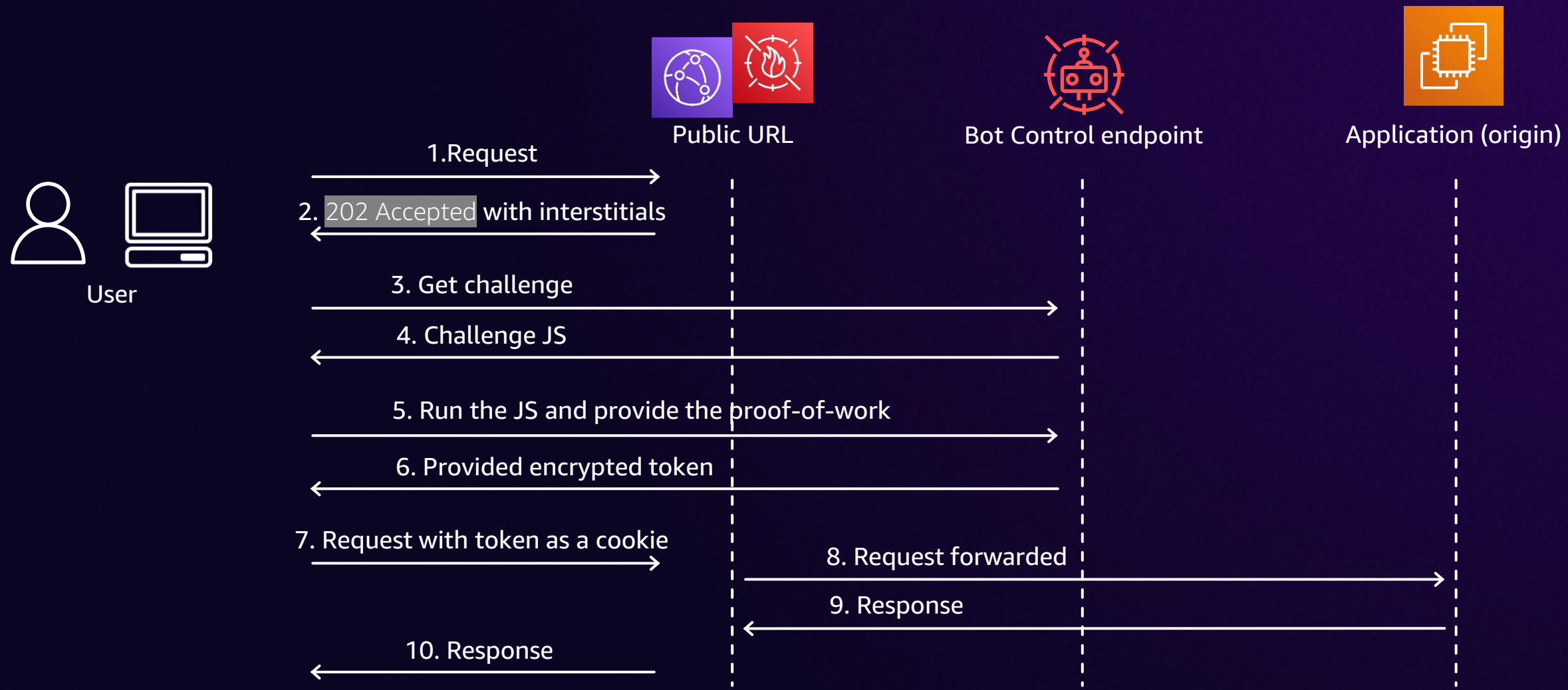
Silently challenging the browser



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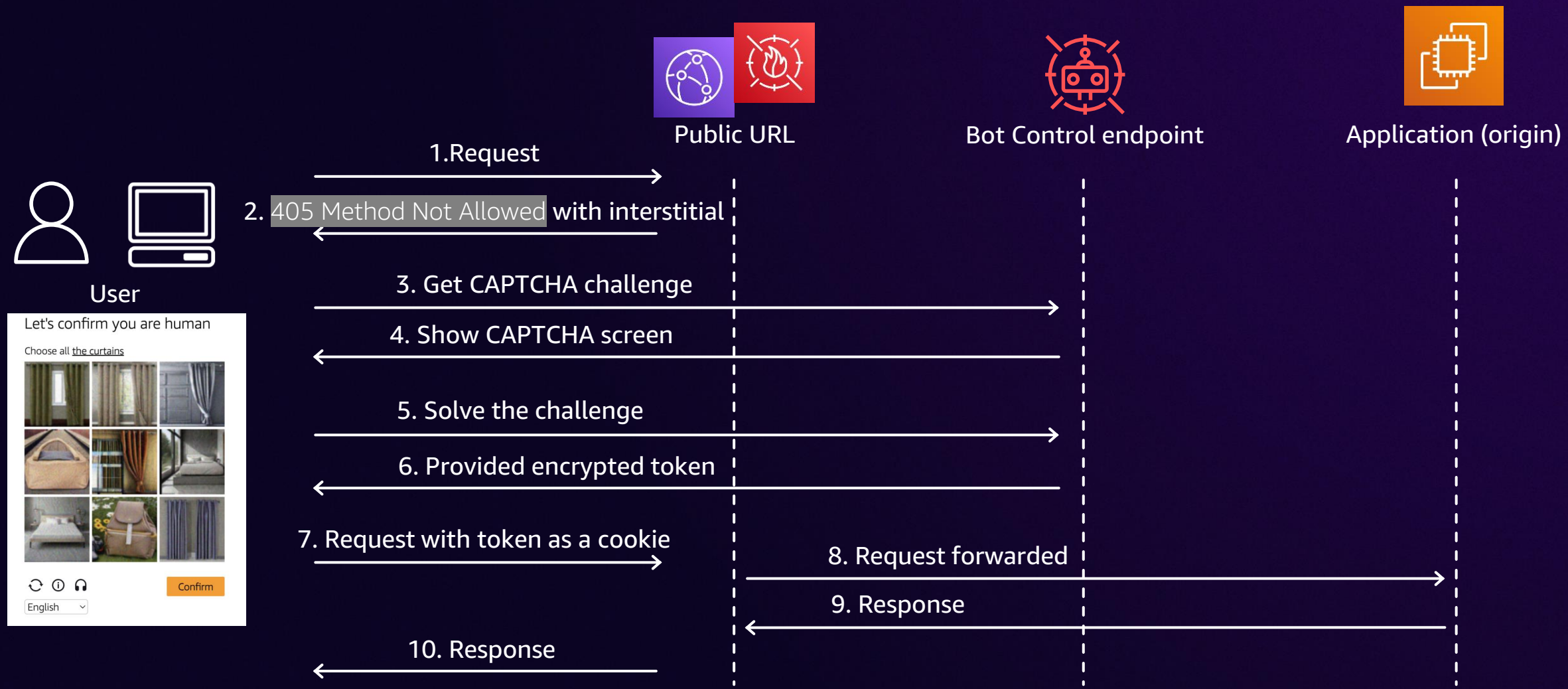
Challenging with the CAPTCHA



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SDK integration

Without SDK integration

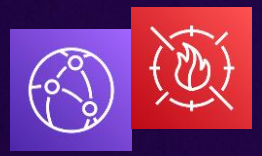
Static frontend

Mobile app

1. API call such as `fetch()`

2. Challenge or CAPTCHA

3. ???



API endpoint

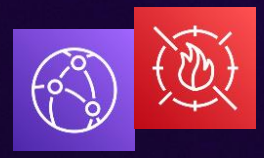
- Client interrogation and token creation
- Can programmatically throw CAPTCHA
- Lower latency

With SDK integration

Static frontend

Mobile app

`AwsWafIntegration.fetch()`



API endpoint

2. Detect and respond

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Token for tracking

Detects	Details	Default action
Too many requests without token	More than 5 requests from 1 IP	Challenge
Too many requests from a session	Baseline determined with historic patterns Confidence level: Low/medium/high/maximum	Block for maximum CAPTCHA for high
Suspected automated browser	Indicators of browser automation found during the client challenge	CAPTCHA
Browser inconsistency	Indicators of browser inconsistency found during the client challenge	CAPTCHA
Single token among multiple IP, multiple ASN, multiple countries	Multiple level: Low/medium/high	Count for low CAPTCHA for medium Block for high

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Fraud prevention

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Account takeover prevention (ATP)

Protects from credential stuffing and brute force

- Analyzes POST request to the login URL
- Detects compromised credentials
- Login and password traversal
- Tracks response too (when used with CloudFront)

Stolen credentials	
Login A	Password A
Login B	Password B
Login C	Password C

Brute force	
Login X	password
Login X	p@ssw0rd
Login X	pa$$word

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Account creation fraud prevention (ACFP)

Prevents fraud account creation

- Analyzes human interaction in the registration page and POST request
  - SDK integration is mandatory for human interaction detection
- Detects phone number and address abuse

Detections include:
Compromised credentials
Human interactivity is absent
Same phone number or address is used multiple times
High volume of successful account creation

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Customer examples

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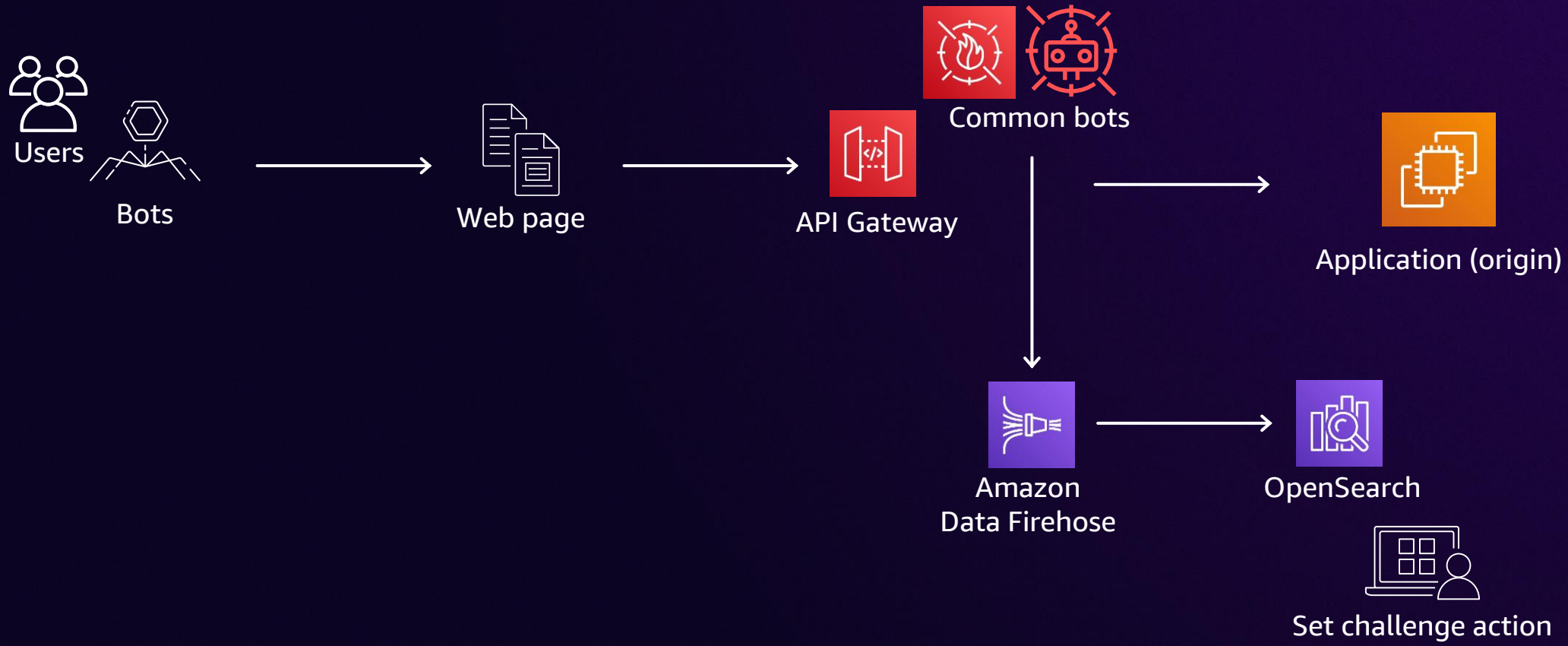
Bot Control building up example



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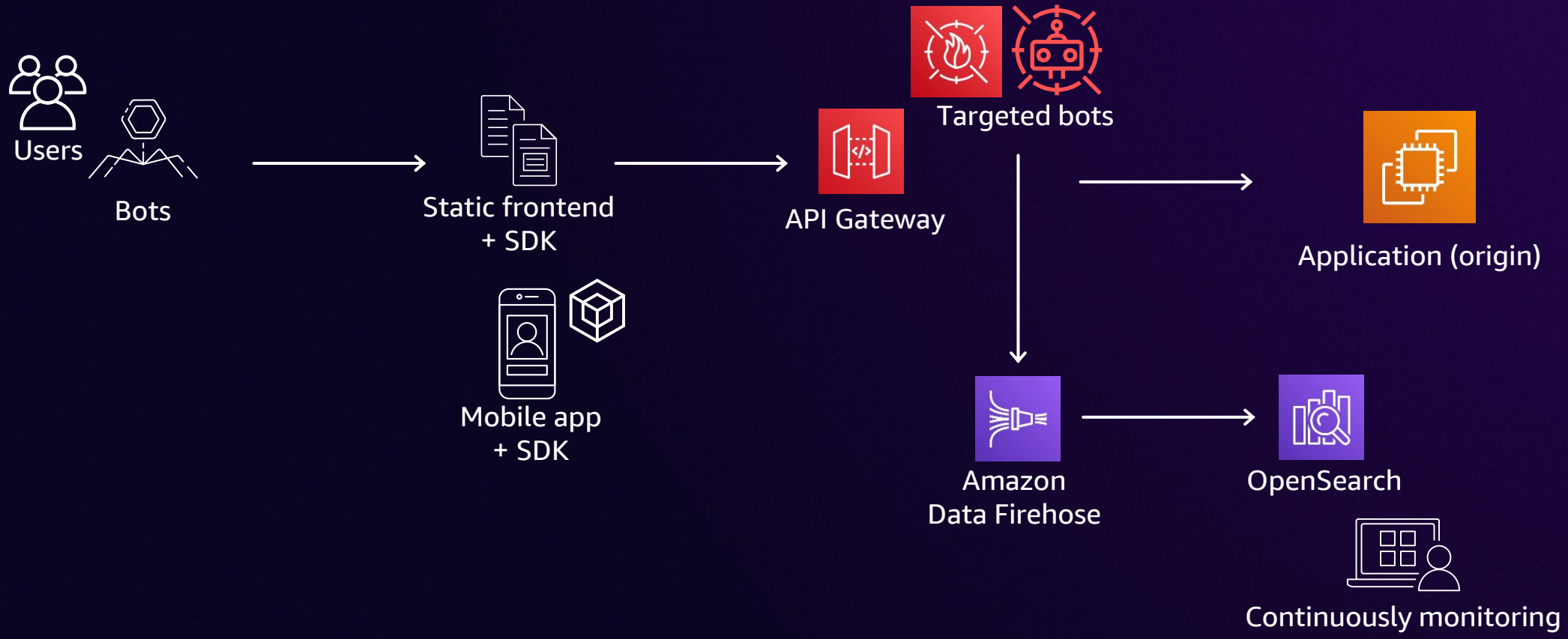

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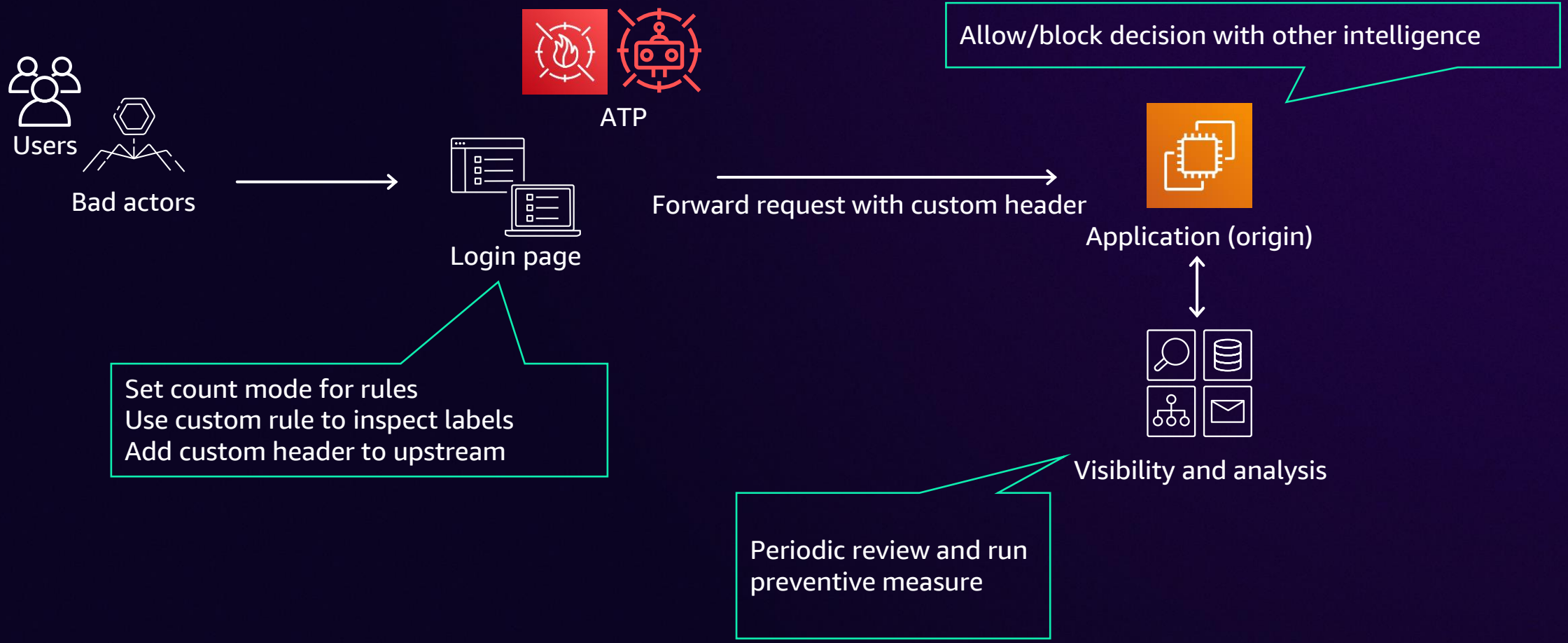
ATP example – Collecting intelligence



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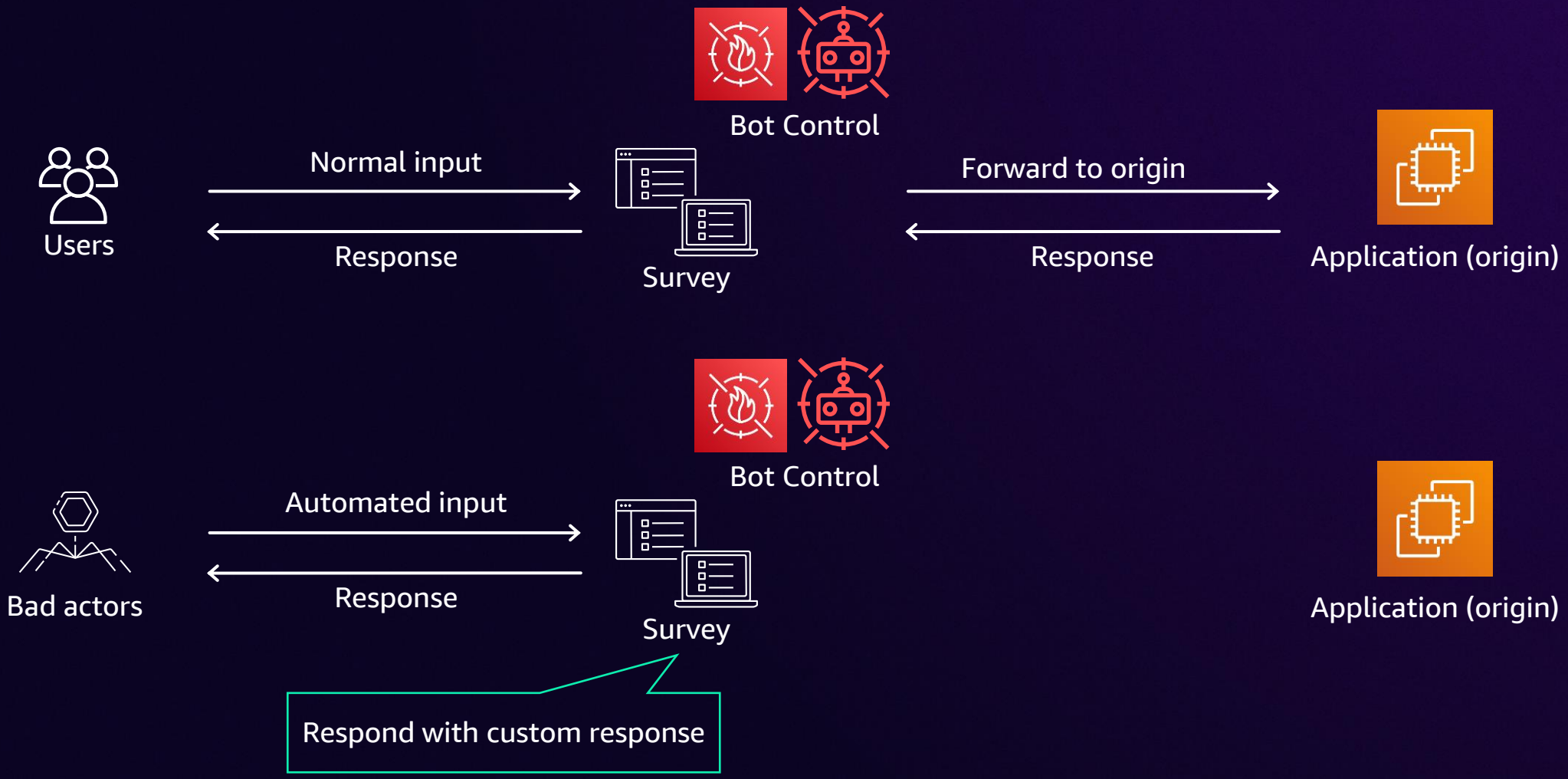
Don’t let them know we know



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Thank you!

Please complete the session survey in the mobile app

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