

KG GAME

Cloud Migration Strategy

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[Click here](#) to download the "Tech Documentation - KR"



Agenda



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- ❖ Project Schedule

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1. Project Introduction

- ❖ Why AWS?
- ❖ Project Schedule



Why AWS?

Safety & Stability

World-class security experts who monitor our infrastructure also build and maintain our broad selection of innovative security services.

Own Players from Anywhere

AWS provides services to users in more than 200 countries around the world, game companies can provide services to game users around the world through AWS.

Cost Optimization

Only pay for what you use in AWS. It can reduce the upfront investment costs and the costs for management and operation.

Scalable Management

Resources can be quickly scaled up or down in minutes based on demand, reducing the cost of failure, allowing more innovation attempts.



Project Schedule

Project Timeline	week 1							week 2							week 3						
	oct							nov							nov						
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Assigned to: Amerie Lee	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Scenario																					
Cloud Configuration																					
Web Server Configuration																					
Game Server Configuration																					
Data Analysis Pipeline																					
Dev & Test Server Configuration																					
VPC Peering																					
GitHub																					
On-Premise Configuration																					
Create the Tech Documentation																					
Presentation Structure																					
Create the Deck																					

2. Scenario

- ❖ Customer Introduction
- ❖ Customer Requirements
- ❖ Requirements Analysis





Customer Introduction



Annual Sales
1 Trillion (Won)



CCU
8M



Members
600M

KG Game is a Korean game company established in 2005 that mainly develops and operates MMORPG games. It has received great attention from users around the world after "LTK" was released in 2010. KG Game has developed, released and serviced a total of 20 games so far.

Scenario - Customer Requirements

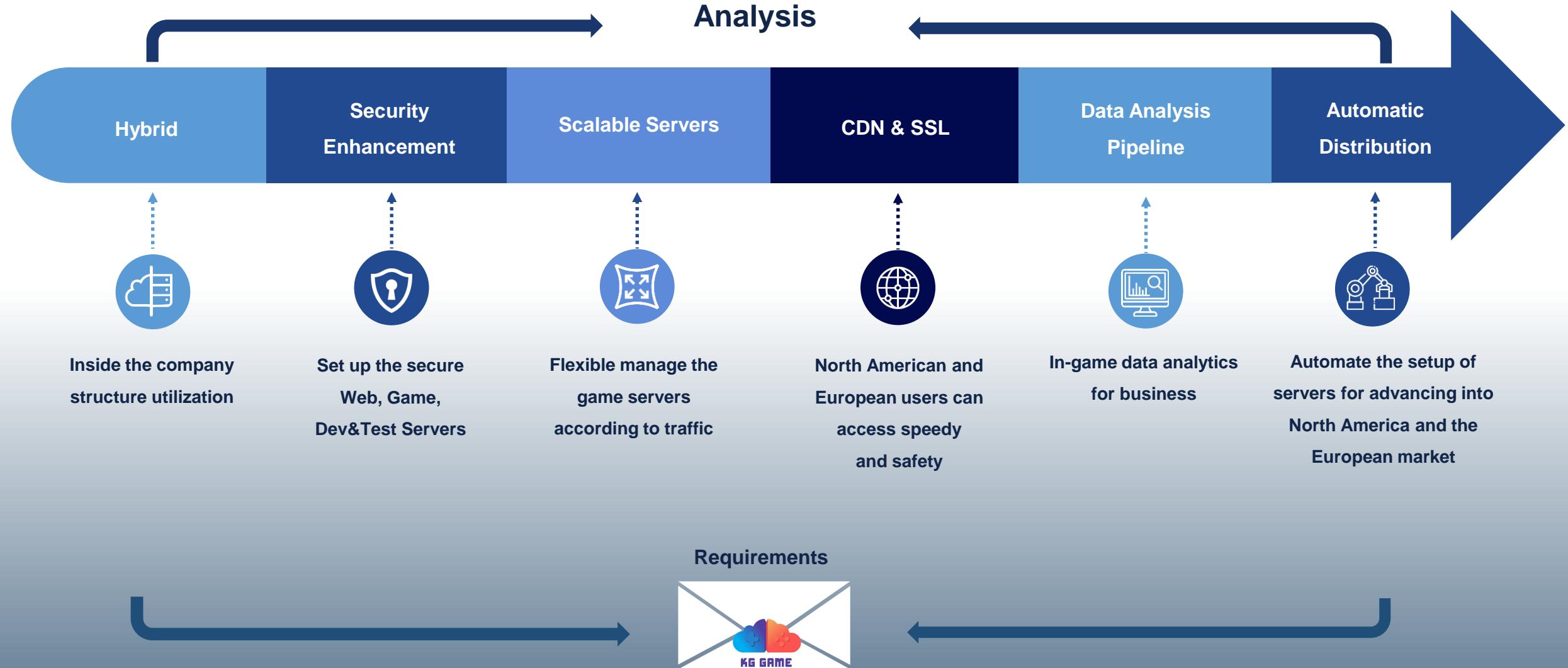


Difficult to estimate the traffic at the time of the game release.

Impossible to get the equipment specifications and the number of equipment.

Before the release of new games, all servers in the On-Premise environment will be migrated to the cloud.

Scenario - Requirements Analysis

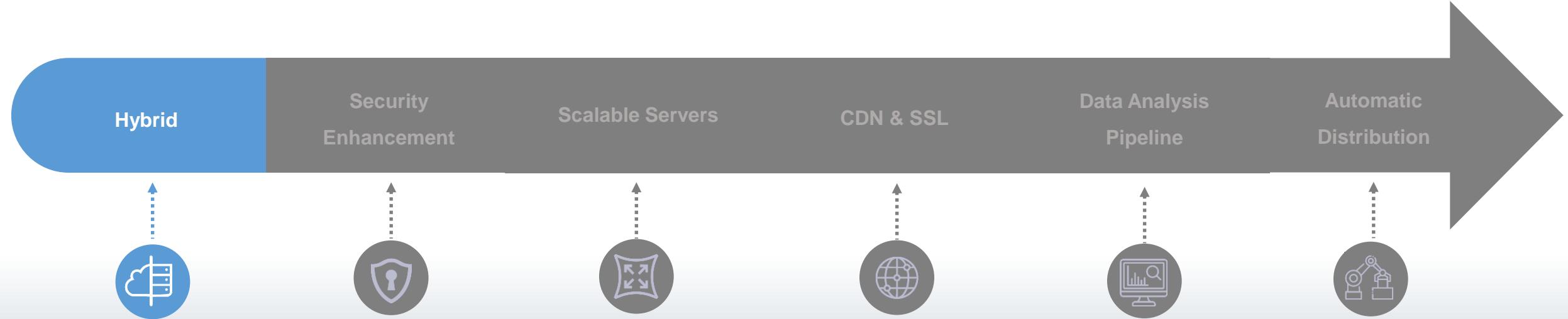


3. Solutions

- ❖ Solutions – Basic Services
- ❖ Recommended Services

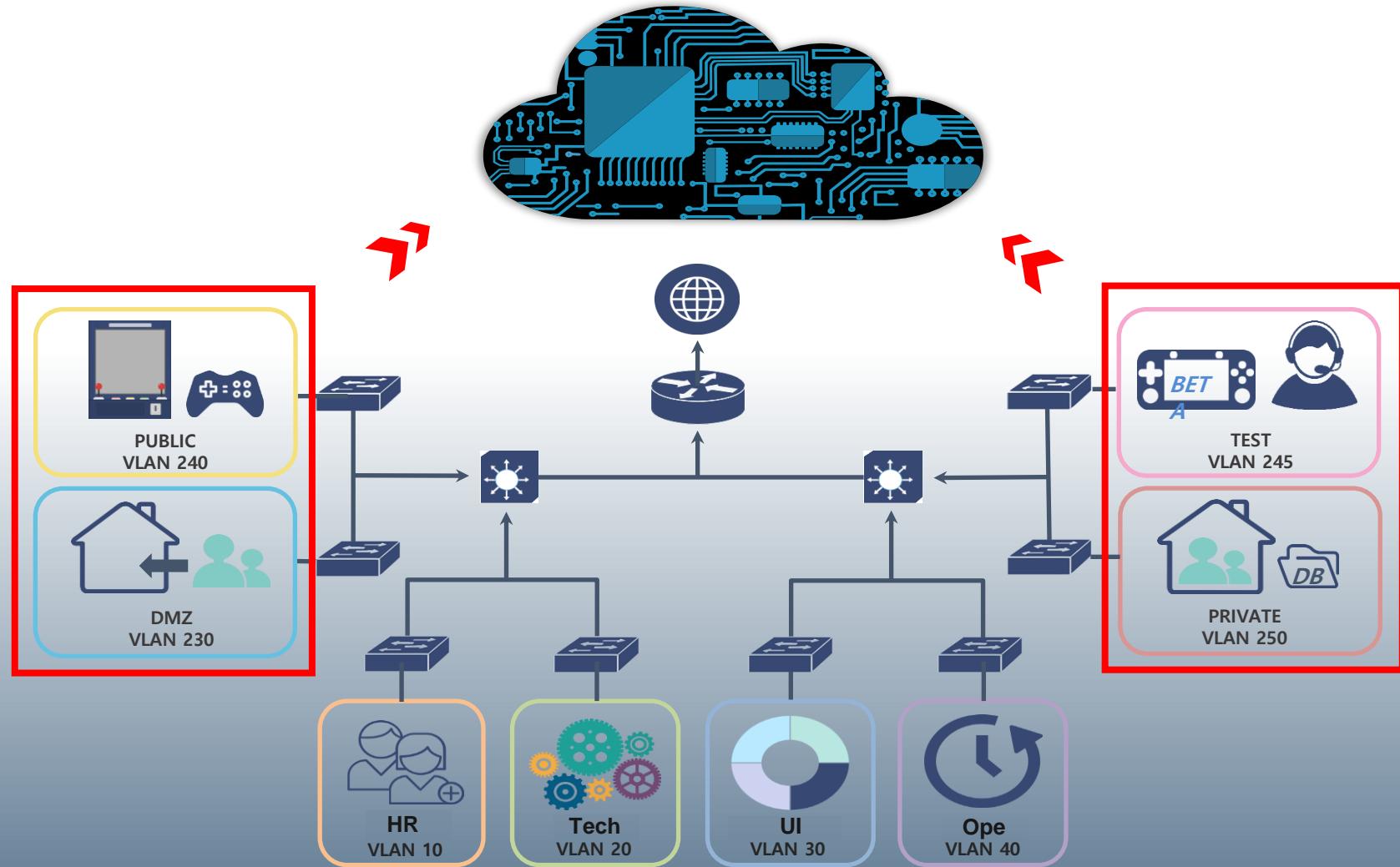


1. Solutions - Hybrid



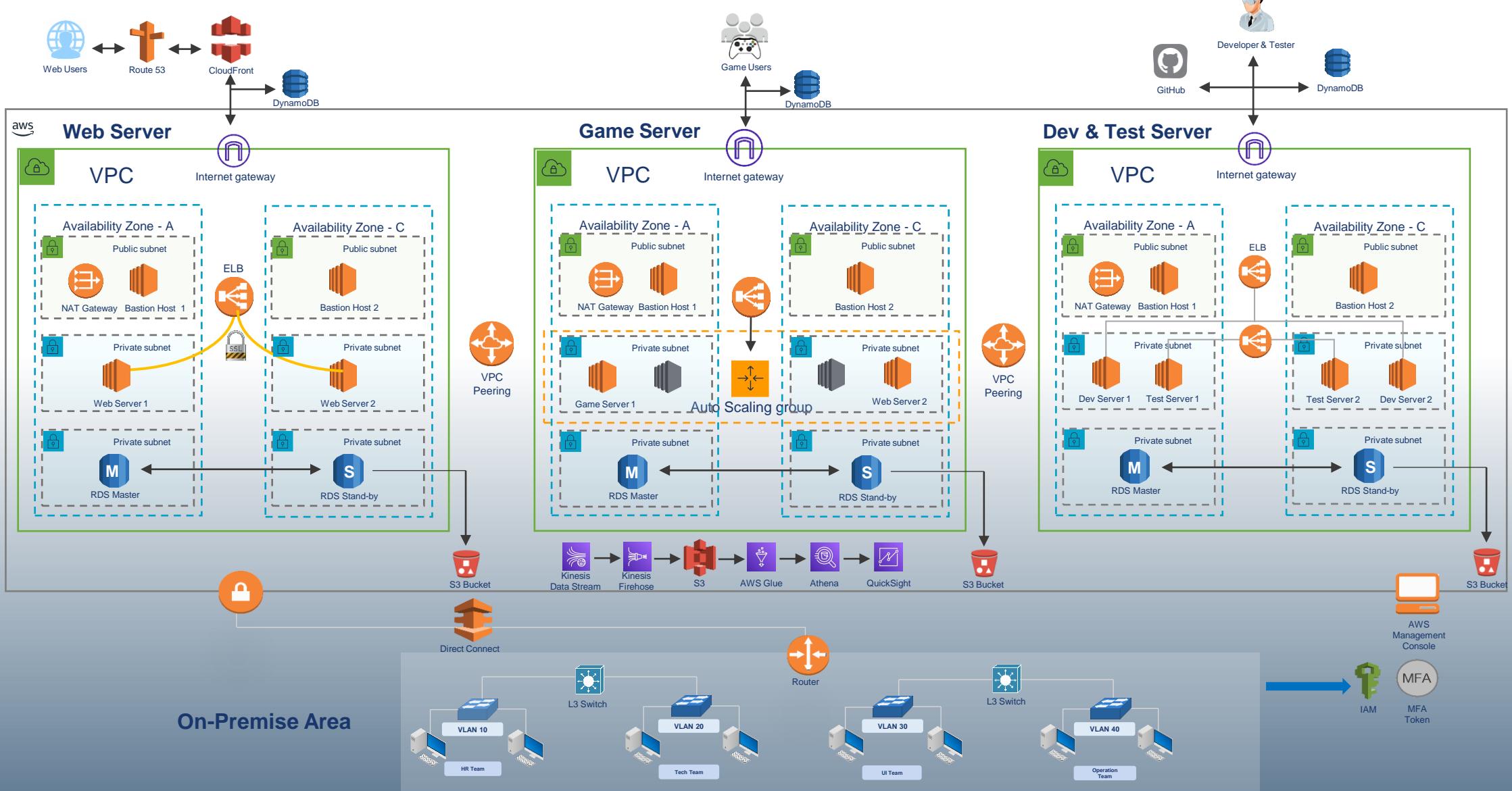
1. Solutions - Hybrid

On-Premise Topology

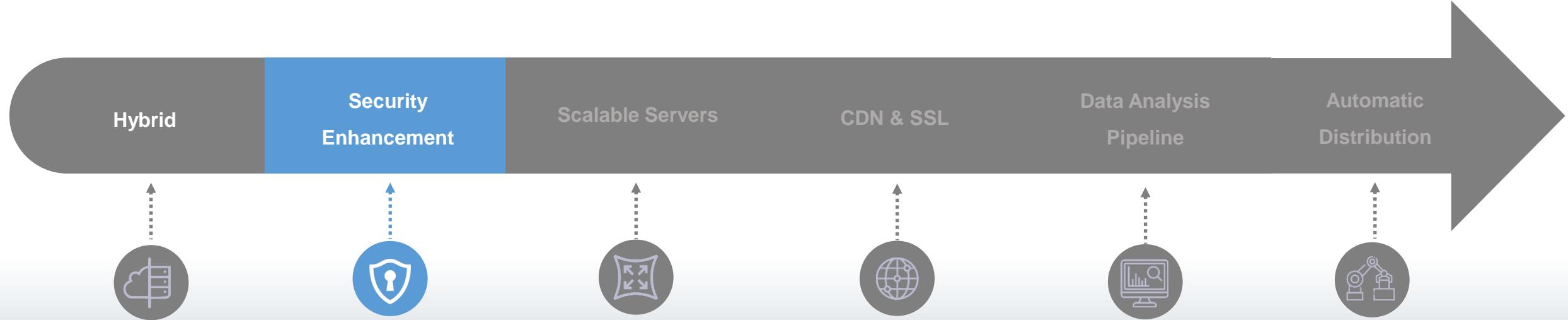


1. Solutions - Hybrid

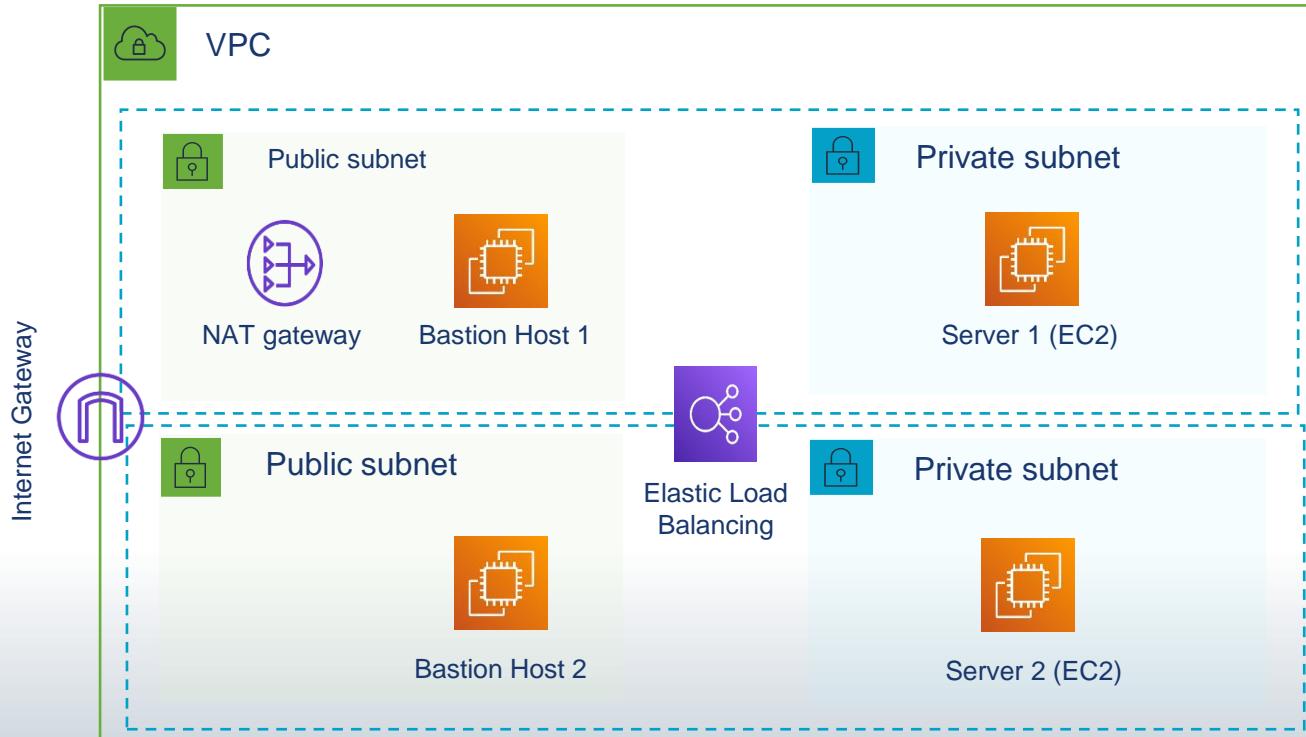
Hybrid Topology



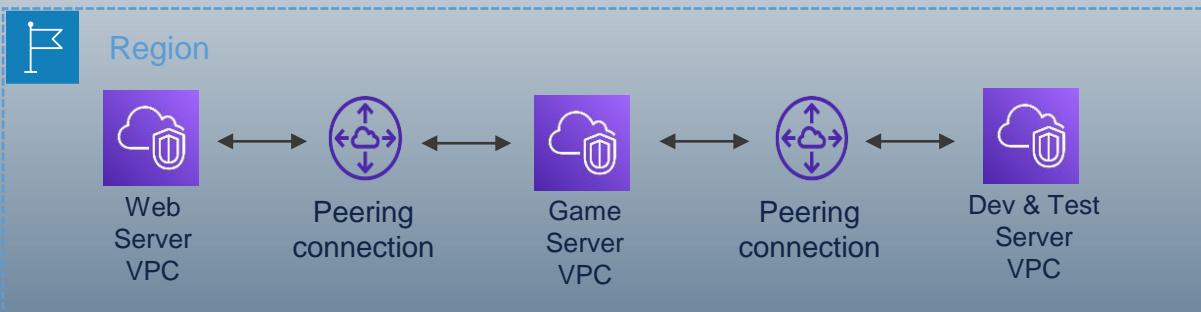
2. Solutions - Security Enhancement



2. Solutions - Security Enhancement



Elastic load balancing allows servers that need to be accessed from the Internet to be placed in a private subnet and it can defend against DDoS attacks.



Separate servers with VPCs for each function and connect VPCs with VPC peering to enable the internal network.

2. Solutions - Security Enhancement

EC2 > Instances > i-057749fe071fc726

Instance summary for i-057749fe071fc726 (KG_Web_Server_1) [Info](#)

Updated less than a minute ago

Instance ID i-057749fe071fc726 (KG_Web_Server_1)	Public IPv4 address -	Private IPv4 addresses 10.0.30.14
IPv6 address -	Instance state Running	Public IPv4 DNS
Private IPv4 DNS ip-10-0-30-14.ap-northeast-2.compute.internal	Instance type t2.micro	
VPC ID vpc-0a3d018ce3b9ccceb (KG_Web_VPC)	AWS Compute Opt Opt-in to AWS C	
Subnet ID subnet-0d76fb60ad6a05ddb (KG_Private_Subnet_DB_1_a)		

```
ubuntu@ip-10-0-1-184:~$ ssh 10.0.30.14
The authenticity of host '10.0.30.14 (10.0.30.14)' can't be established.
ECDSA key fingerprint is SHA256:IsGcRDFX3ZsHsmHxpVjAMlhW4JzR07V9K2m17LxuAdM.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.0.30.14' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 5.4.0-1045-aws x86_64)

ubuntu@ip-10-0-30-14:~$ ping 8.8.8.8 -c 3
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=100 time=32.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=100 time=32.6 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=100 time=32.7 ms

--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
```

All servers are created in a private subnet and the external connection is possible through NAT Gateway.

Your VPC peering connection (pcx-0892d299dd94c5e24 / KG-WEB-DevTest) has been established.
To send and receive traffic across this VPC peering connection, you must add a route to the peered VPC in one or more of your VPC route tables. [Info](#)

Modify my route tables now X

Peering connections (3) [Info](#)

Filter peering connections

Name	Peering connection ID	Status
KG-GAME-Dev...	pcx-0f75694caf9ffe0e3	Active
KG-WEB-DevTest	pcx-0892d299dd94c5e24	Active
KG-WEB-GAME	pcx-0505918cd059b39e6	Active

```
ubuntu@ip-10-0-1-184:~$ ping 30.0.10.56 -c 3
PING 30.0.10.56 (30.0.10.56) 56(84) bytes of data.
64 bytes from 30.0.10.56: icmp_seq=1 ttl=64 time=0.493 ms
64 bytes from 30.0.10.56: icmp_seq=2 ttl=64 time=0.539 ms
64 bytes from 30.0.10.56: icmp_seq=3 ttl=64 time=0.558 ms

--- 30.0.10.56 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2055ms
rtt min/avg/max/mdev = 0.493/0.530/0.558/0.027 ms
ubuntu@ip-10-0-1-184:~$
```

Snapshots Lifecycle Manager [New](#)

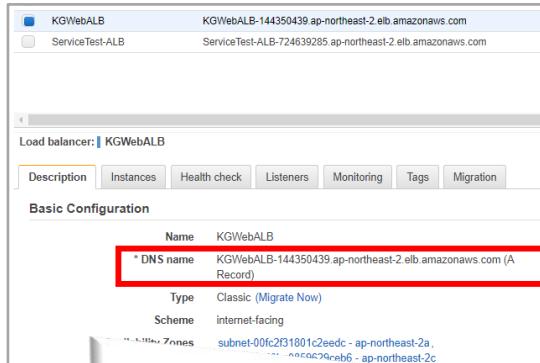
Instance ID i-000c59a4fa1261e7a (KG_Test_Server_1)

Public IPv4 address -

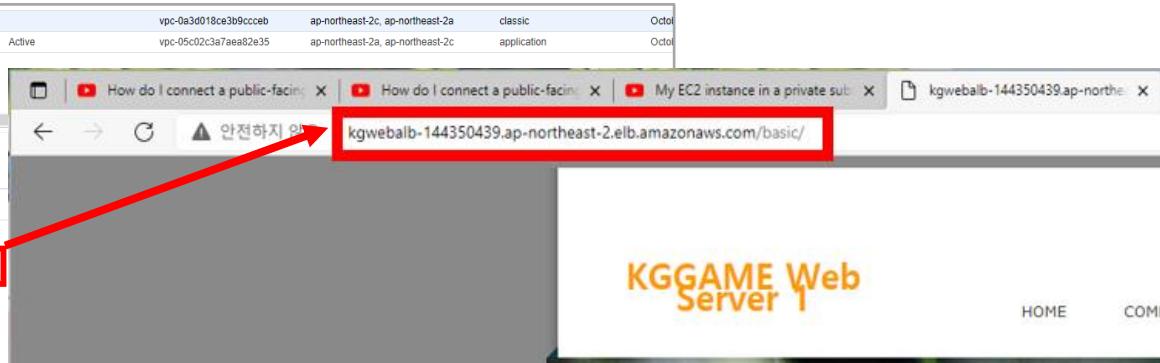
Private IPv4 addresses 30.0.10.56

VPCs are connected with VPC peering, an internal network is possible after setting.

2. Solutions - Security Enhancement



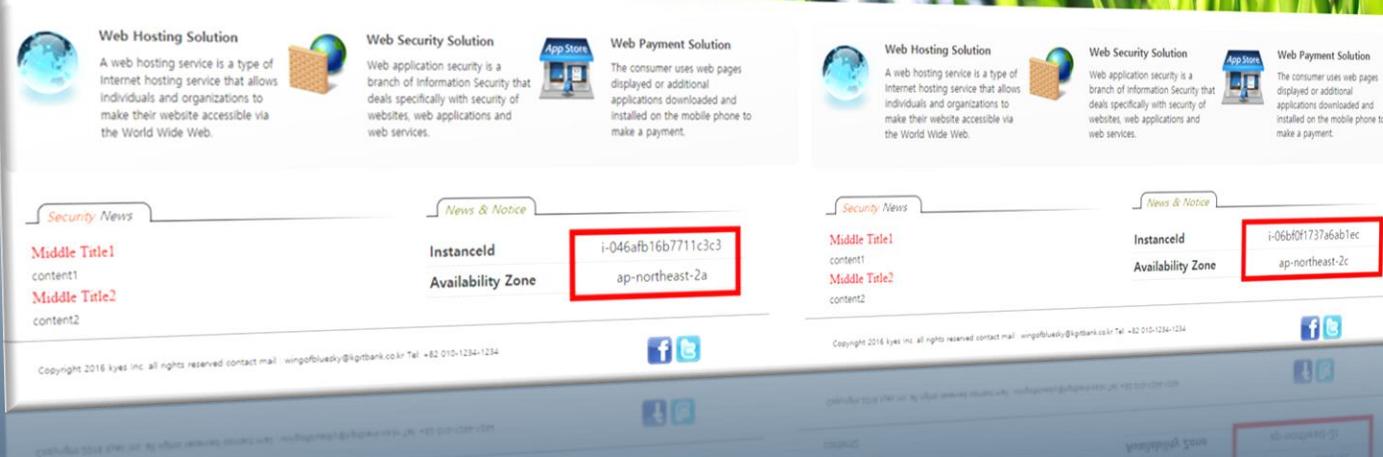
A screenshot of the AWS CloudWatch Metrics interface. It shows a line graph of CPU usage percentage over a 1-hour period. The Y-axis ranges from 0% to 100%, and the X-axis shows time intervals. The CPU usage fluctuates between 10% and 20% throughout the hour.



A screenshot of the AWS Elastic Load Balancing (ELB) console. It lists two load balancers: 'KGWebALB' and 'ServiceTest-ALB'. 'KGWebALB' is selected and shown in more detail. The 'Basic Configuration' section shows the DNS name 'KGWebALB-144350439.ap-northeast-2.elb.amazonaws.com' highlighted with a red box. A red arrow points from this box to the browser window below.



A screenshot of a web browser window. The address bar contains the URL 'kgwebalb-144350439.ap-northeast-2.elb.amazonaws.com/basic/'. A red box highlights a warning message in the address bar: '안전하지 않아' (Insecure). The main content of the page is a 'KGGAME Web Server' logo.

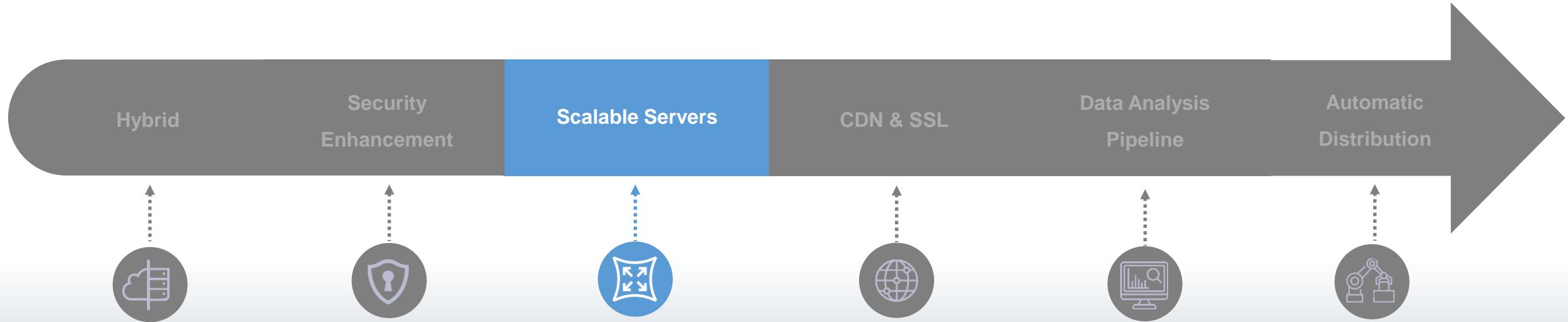


A screenshot of a website with a repeating pattern of identical pages. Each page features a 'KGGAME Web Server' logo at the top, followed by a navigation menu with links for 'HOME', 'COMPANY', 'SOLUTIONS', and 'CUSTOMER CENTER'. Below the menu is a large image of green grass. The bottom section of the page contains several service descriptions and a news feed. Red boxes highlight specific details: 'Web Hosting Solution' and 'Web Security Solution' on the left, and 'Web Payment Solution' and 'Web Hosting Solution' on the right. In the news feed, 'Instanceld' and 'Availability Zone' are highlighted with red boxes.

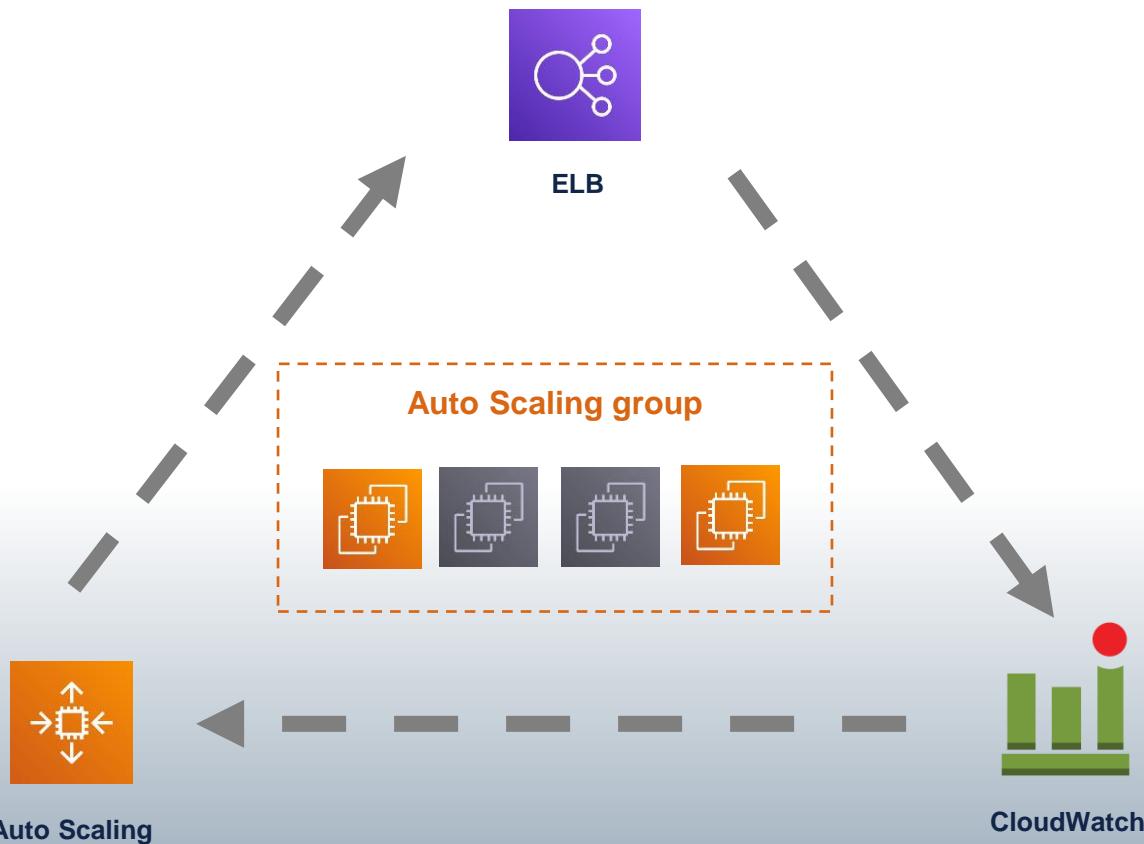
Elastic Load Balancing (ELB)

The traffic is distributed in a round-robin algorithm.

3. Solutions - Scalable Servers



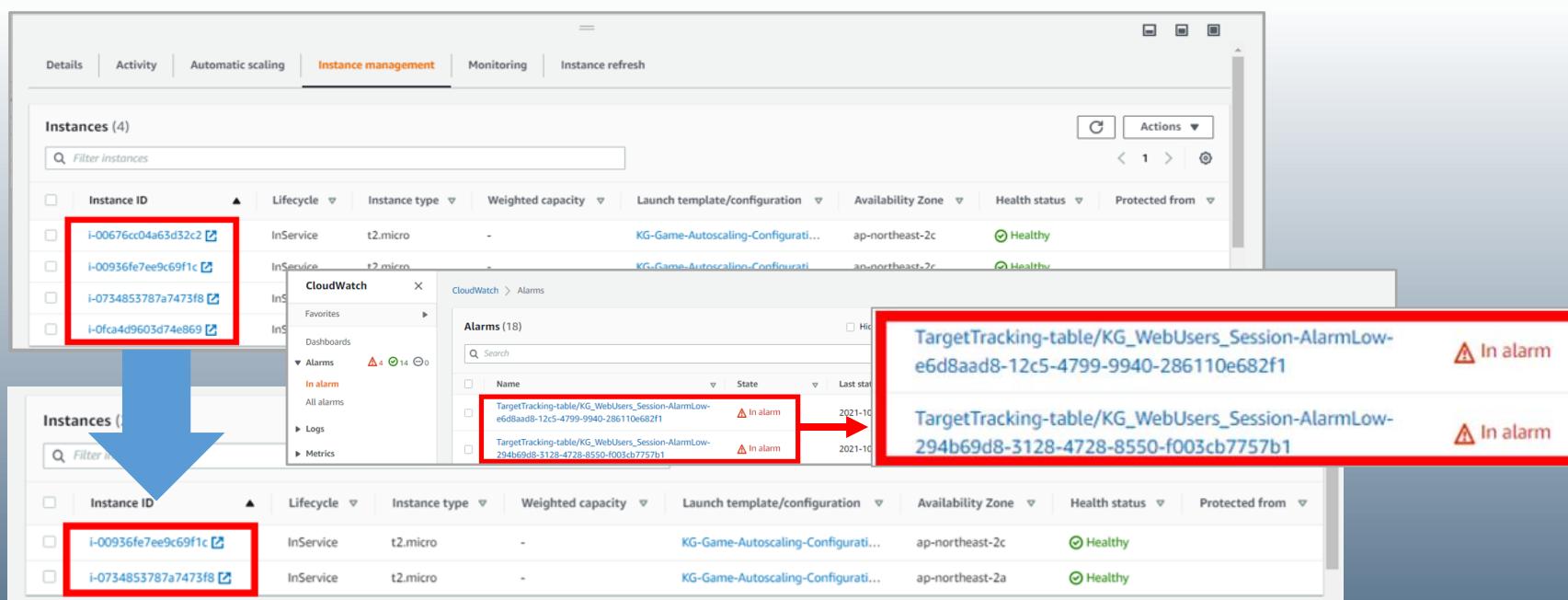
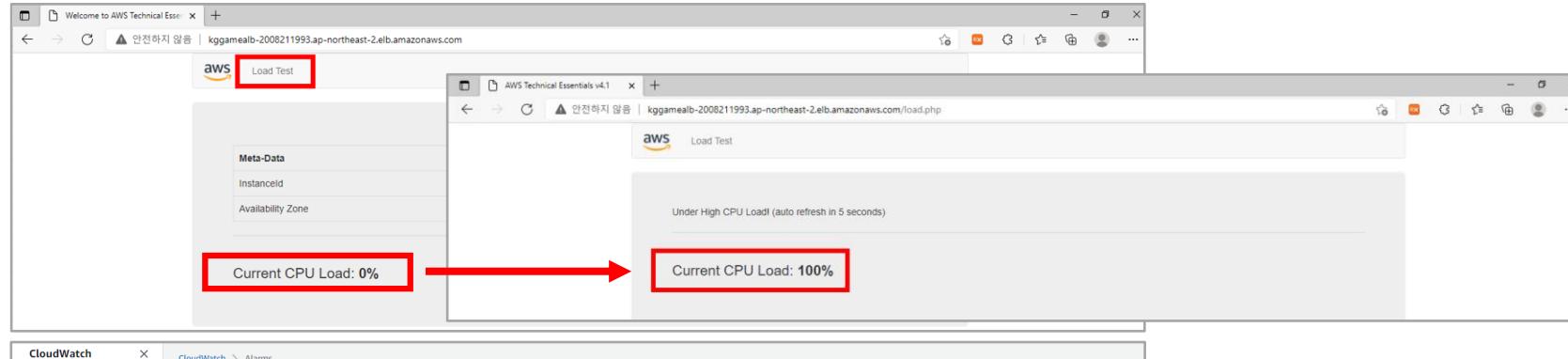
3. Solutions - Scalable Servers



Auto Scaling

Provides optimal service by automatically creating and deleting additional EC2 instances according to traffic and conditions.

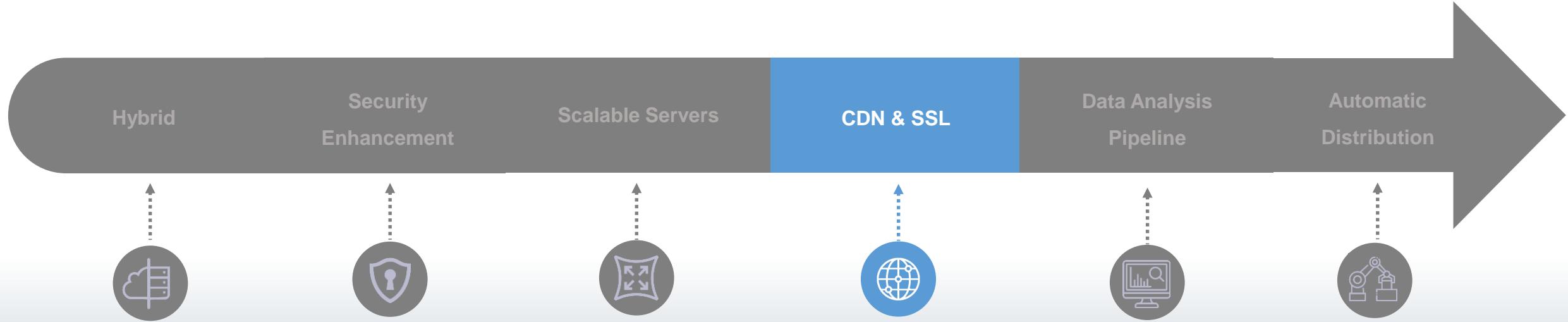
3. Solutions - Scalable Servers



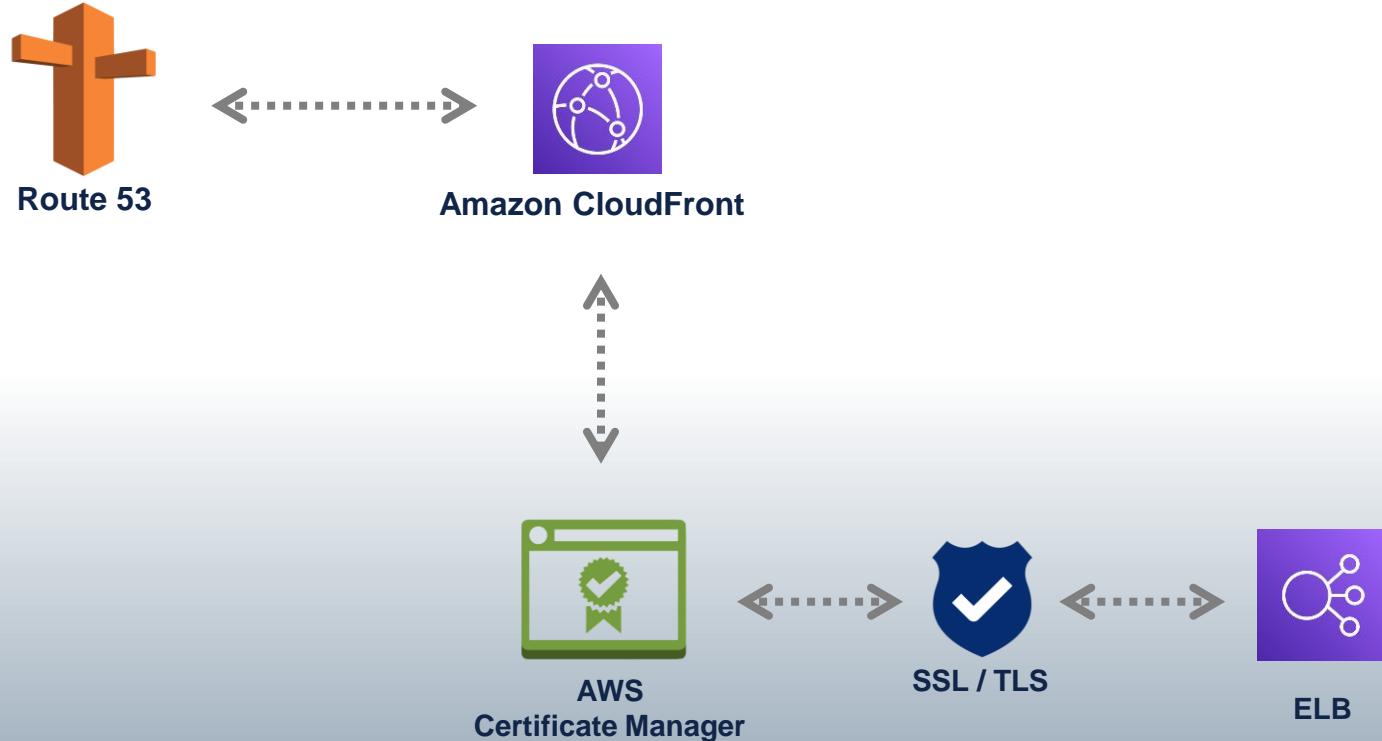
After clicking the load test, the CPU was rising rapidly, an “**AlarmHigh**” appeared in CloudWatch and the instances were scaled up from 2 to 4.

After closing the "Load Test" page, an “**AlarmLow**” appeared in CloudWatch. The number of instances decreased from 4 to 2 again after 20 minutes.

4. Solutions – CDN & SSL



4. Solutions – CDN & SSL



Route 53

Register new domains or import existing domains

ACM

Request certificates or import certificates

CloudFront

Create distribution for CDN Service

4. Solutions – CDN & SSL

Introducing the new AWS Certificate Manager experience
We are continuously improving the new experience and adding features. [Let us know what you think.](#)

AWS Certificate Manager > Certificates > Import certificate

Step 1 Input certificate details

Step 2 Add Tags

Step 3 Review and import

CloudFront > Distributions > create

Create distribution

Origin

Origin domain: www.ga1me2cloud3.online (highlighted with red box)

Protocol: HTTPS only (highlighted with red box)

Records (5) DNSSEC signing Hosted zone tags (1)

Records (5) Info

Record name	Type	Routing	Differences	Value/Route traffic to
ga1me2cloud3.online	A	Simple	-	d22wx5587qqud.cloudfront.net. ns-1411.awsdns-48.org. ns-902.awsdns-48.net. ns-398.awsdns-49.net. ns-1648.awsdns-14.co.uk.
ga1me2cloud3.online	NS	Simple	-	

Input certificate details

Certificate details: https://www.ga1me2cloud3.online/basic/ (highlighted with red box)

Certificate body: -----BEGIN CERTIFICATE----- MIIGjCCBhAg... (partial PEM content)

Certificate private key: -----BEGIN RSA PRIVATE KEY----- MIIEpAIBAAQ... (partial RSA private key content)

Certificate chain: (empty)

Origin path - optional info: Enter a URL path to append to the origin domain for origin requests. (highlighted with red box)

Name: www.ga1me2cloud3.online (highlighted with red box)

Add custom header - optional: CloudFront includes this header in all requests that it sends to your origin. (highlighted with red box)

Enable Origin Shield: No (highlighted with red box)

Records (5) DNSSEC signing Hosted zone tags (1)

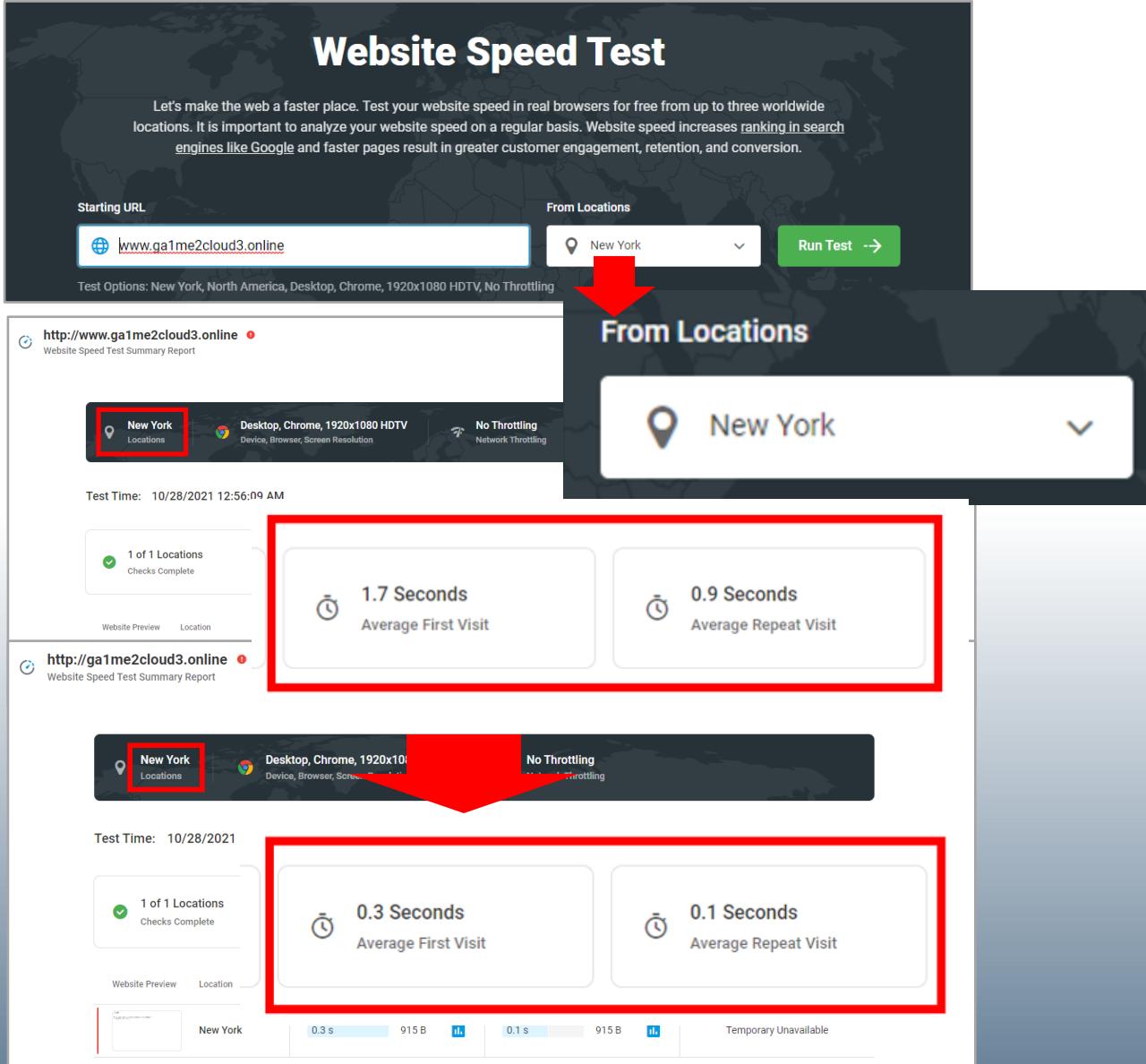
Records (5) Info

Record name	Type	Routing	Differences	Value/Route traffic to
ga1me2cloud3.online	A	Simple	-	d22wx5587qqud.cloudfront.net. ns-1411.awsdns-48.org. ns-902.awsdns-48.net. ns-398.awsdns-49.net. ns-1648.awsdns-14.co.uk.
ga1me2cloud3.online	NS	Simple	-	

Allow HTTPS on ELB after registering SSL/TLS certificate in ACM.

Register in Route 53 with an A record after creating a distribution in CloudFront.

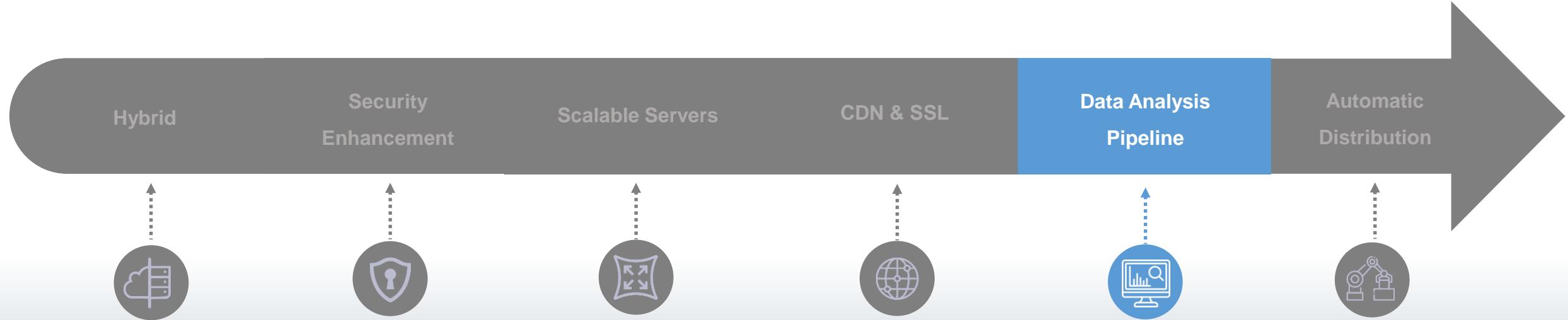
4. Solutions – CDN & SSL



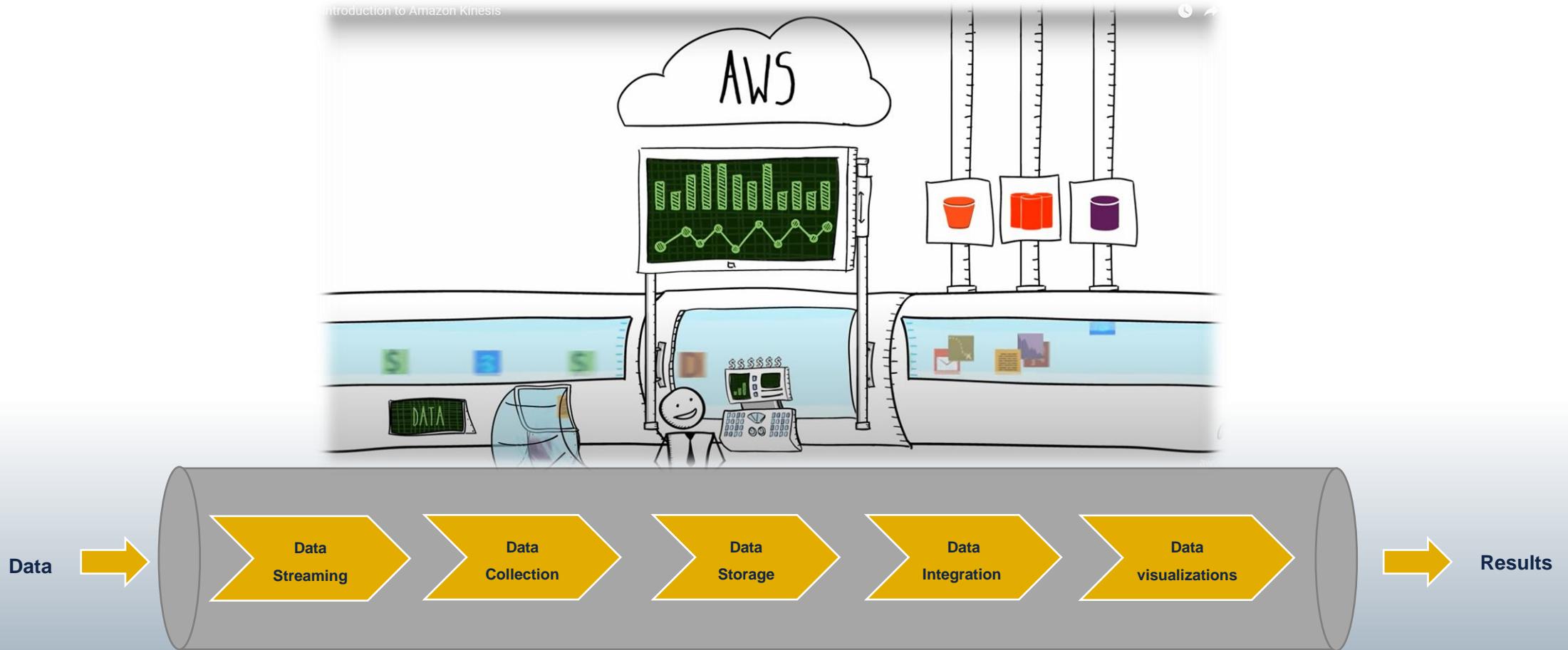
CloudFront – AWS Edge Location Service

When connecting to the domain from New York before setting up, the "Average first visit" speed was 1.7 seconds, but after setting up CloudFront, the "Average first visit" speed up to 0.3 second.

5. Solutions - Data Analysis Pipeline

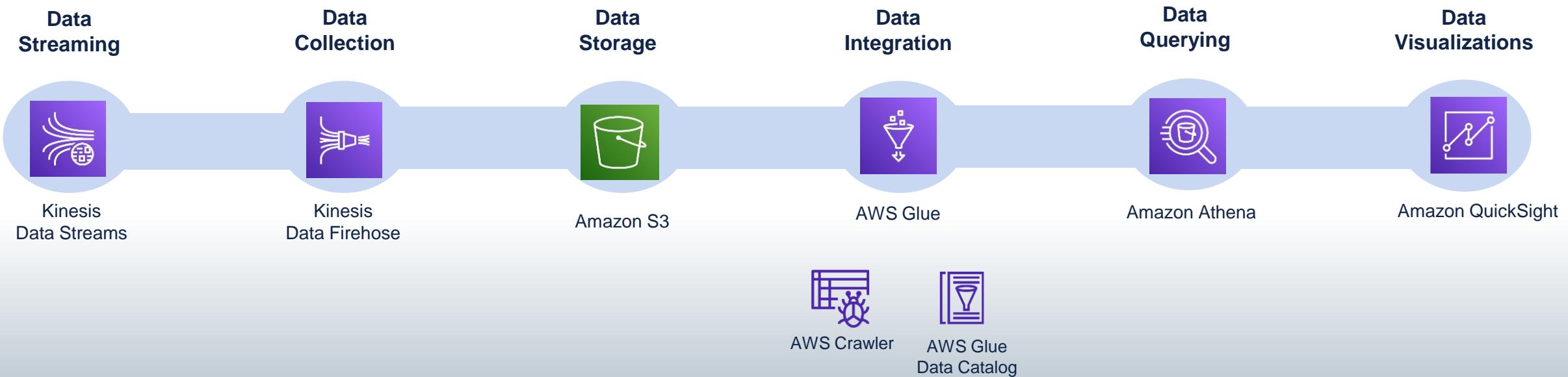


5. Solutions - Data Analysis Pipeline



- AWS + Data Analytics = Improve the Game Service Quality.
- Data can be easily analyzed by departments such as data engineers, marketing teams and can be used for business strategy.
- Various analyzes such as in-game events, daily login rewards, and demand for paid items can be easily performed.

5. Solutions - Data Analysis Pipeline



5. Solutions - Data Analysis Pipeline

The screenshot shows the AWS Kinesis Data Stream and Delivery Stream configuration interface. It includes:

- Data stream summary:** Shows the status as Active.
- Delivery stream details:** Shows the destination as Amazon S3, source as Amazon Kinesis Data Streams, ARN as arn:aws:firehose:ap-northeast-2:483843322360:delivery-stream/kinesis-firehose-demo, and creation time as October 30, 2021, 23:05 GMT+9.
- Test with demo data:** A button to ingest simulated data.
- Delivery stream metrics:** A JSON configuration snippet:

```
{  "cloudwatch.emitMetrics": true,  "firehose.endpoint": "https://firehose.ap-northeast-2.amazonaws.com",  "flows": [    {      "filePattern": "/var/log/cadabra/*.log",      "deliveryStream": "kinesis-firehose-demo"    }  ]}
```
- Amazon S3 Account snapshot:** Total storage 208.8 KB, Object count 13, Avg. object size 16.1 KB.
- Buckets (4) Info:** A table showing four buckets, with one named "kinesis-demo-20211030" highlighted with a red border.

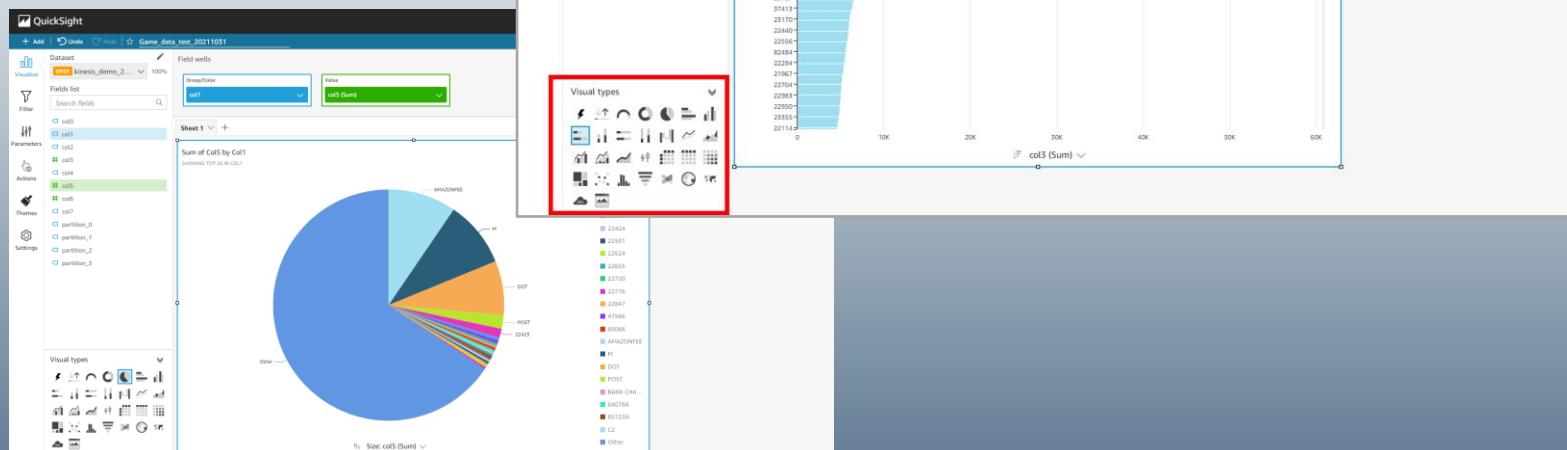
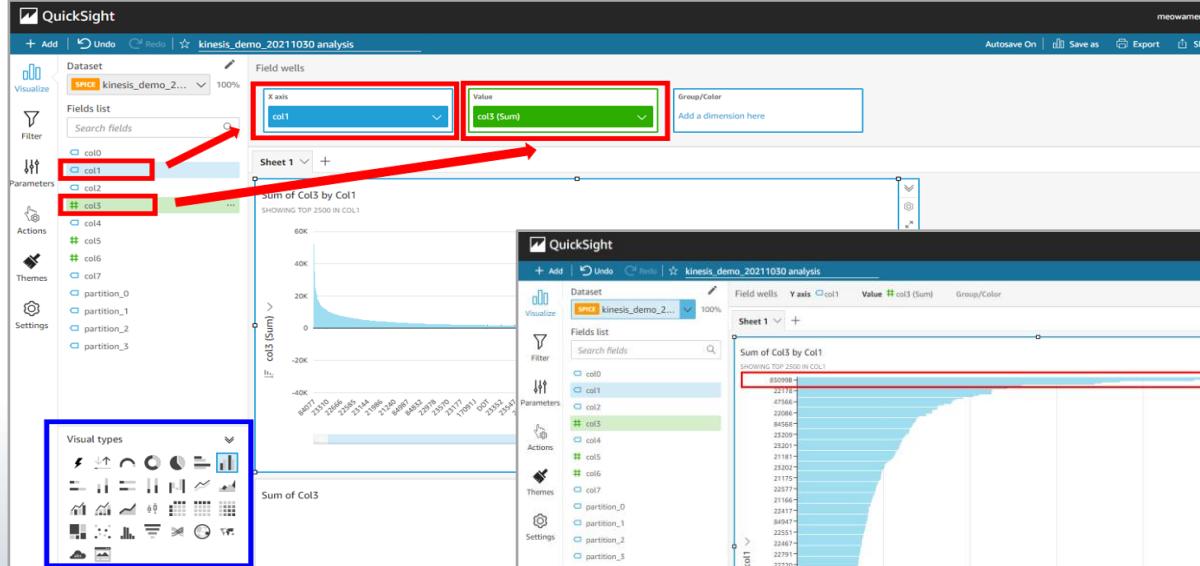
Kinesis Data Streaming & Kinesis Firehose

After installing Kinesis Agent on the server, make attach settings in the configuration file.

5. Solutions - Data Analysis Pipeline

Crawlers A crawler connects to a data store, progresses through a prioritized list of classifiers to determine the schema for your data, and then creates metadata tables in your data catalog.

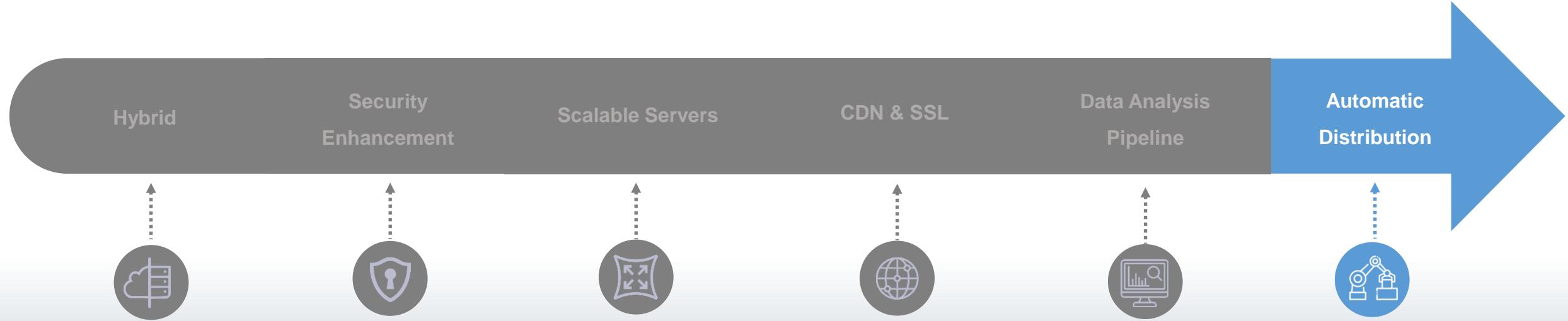
User preferences
Showing: 1 - 1 < > ⓘ
Add crawler Run crawler Action Filter by tags and attributes
Name Schedule Status Logs Last runtime Median runtime Tables updated Tables added
gamedata_test Ready 0 secs 0 secs 0 0



QuickSight

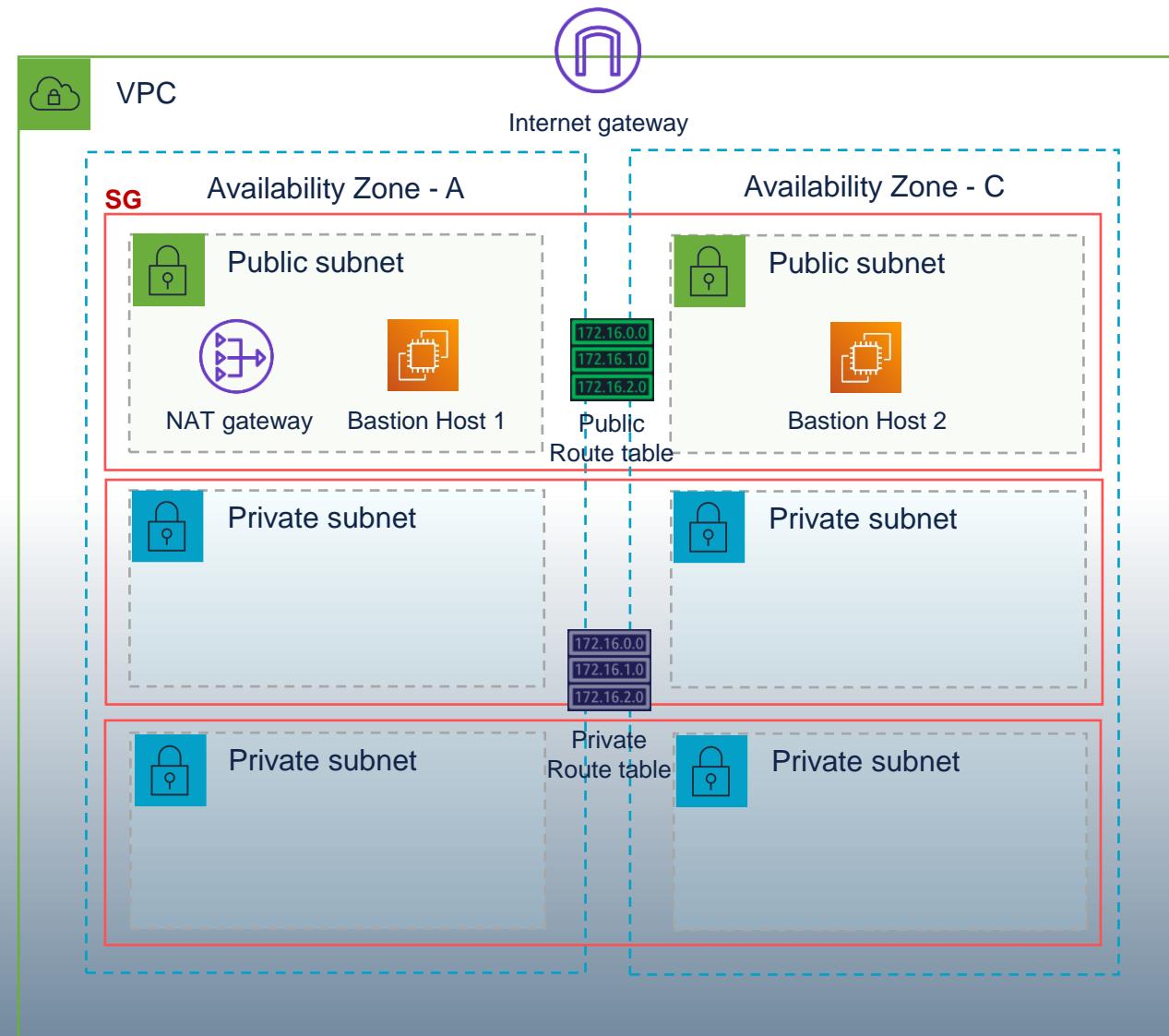
Data can be visualized in various forms.
It is possible to identify the items that users purchase the most from the sample data.

6. Solutions – Automatic Distribution



6. Solutions – Automatic Distribution

Parameters & Conditions



6. Solutions – Automatic Distribution

The screenshots demonstrate the automatic distribution of CloudFormation stacks across regions:

- CloudFormation Events:** Shows multiple stacks in progress (CREATE_IN_PROGRESS) across different regions.
- CloudFormation Stack Details:** Shows the 'KG-Game-Server-CloudFormation' stack has completed its creation (CREATE_COMPLETE).
- VPC Subnets:** Shows a list of subnets across multiple regions, all in an available state.

CloudFormation

In case of advancing to North America and Europe at the request of the customer, we have configured it so that it can be automatically distributed with the same configuration in other regions, and all are in a state of normal execution.

1. Recommended Services – AWS Trusted Advisor



Based on usage over the past 7 days for RDS, Redshift, Route 53, ELB, EIP, etc with relatively low utilization, recommendations will be provided that let you review, terminate, or delete resources in the Trusted Advisor console.

1. Recommended Services – AWS Trusted Advisor

1

“Cost Optimization Checks” execution

2

Review the cost reduction recommendations

3

Prioritize resource clean up based on the most savings

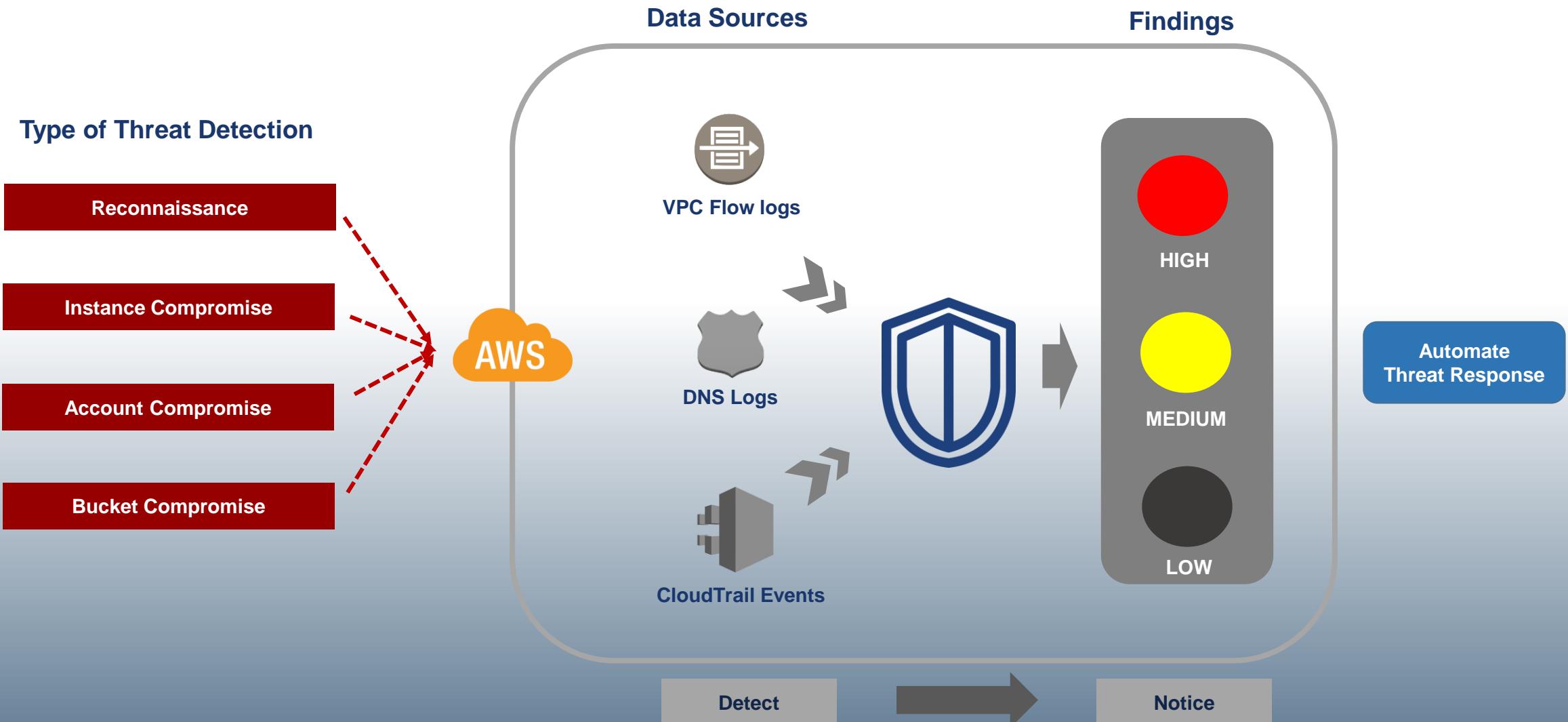
The screenshot shows the 'Cost Optimization' section of the AWS Trusted Advisor interface. At the top, there's a summary icon with a dollar sign, showing 7 green checkmarks, 2 orange warning icons, and 0 red error icons, with a total potential monthly savings of \$1,243.19. Below this is a 'Filter by tag' section with 'Tag Key' and 'Tag Value' input fields, and 'Apply filter' and 'Reset' buttons. To the right is a 'View' dropdown set to 'All checks'. The main area is titled 'Cost Optimization Checks' and lists two items:

- Amazon EC2 Reserved Instances Optimization**: Checks your Amazon Elastic Compute Cloud (Amazon EC2) computing consumption history and calculates an optimal number of Partial Upfront Reserved Instances. A message states: "Monthly savings of up to \$503.94 (53.2%) might be available with optimal Reserved Instance use." This message is highlighted with a red border.
- Low Utilization Amazon EC2 Instances**: Checks the Amazon Elastic Compute Cloud (Amazon EC2) instances that were running at any time during the last 14 days and alerts you if the daily CPU utilization was 10% or less and network I/O was 5 MB or less on 4 or more days. A message states: "12 of 15 Amazon EC2 instances have low average daily utilization. Monthly savings of up to \$739.25 might be available by minimizing underutilized instances." This message is also highlighted with a red border.

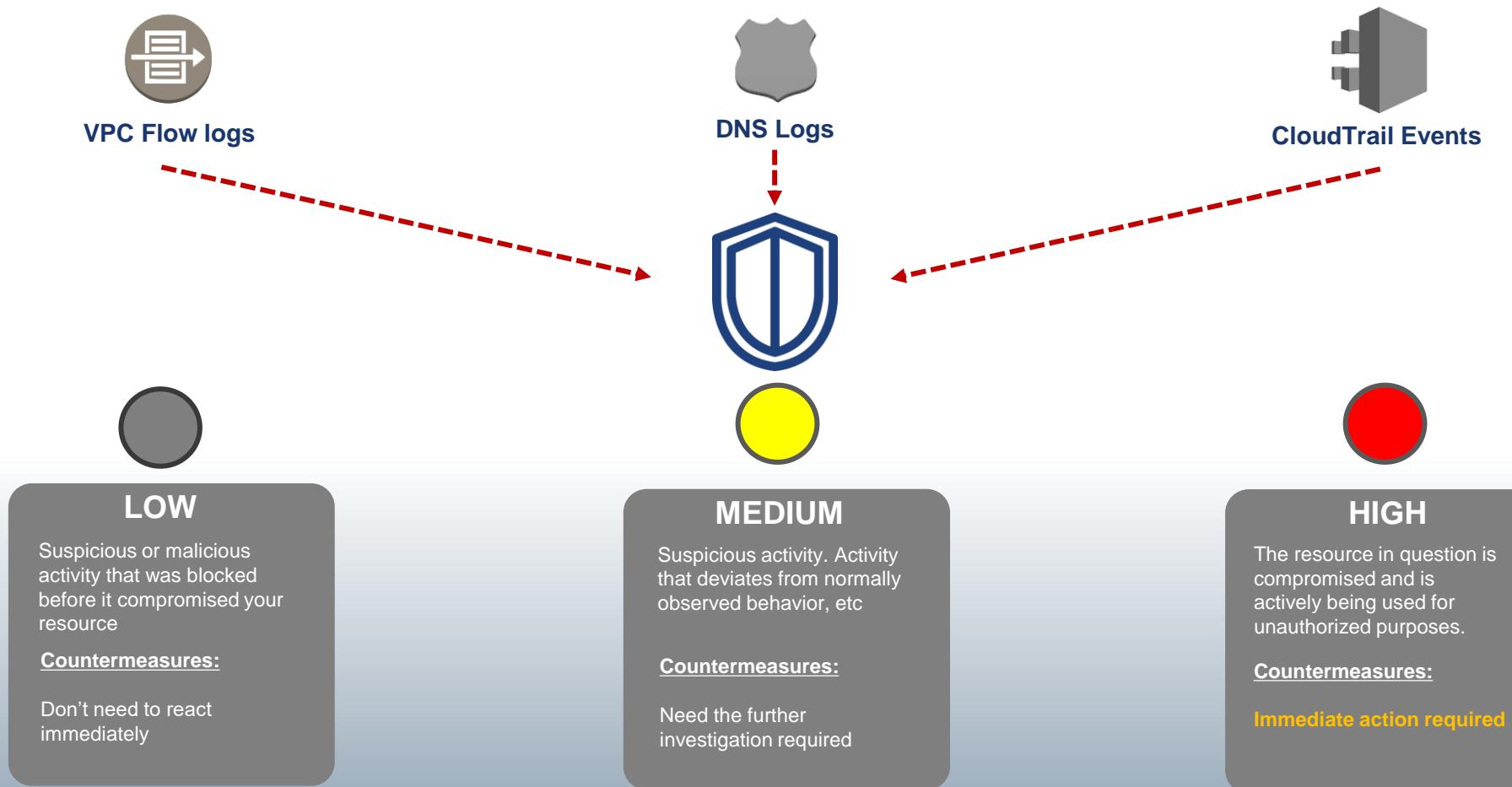
Below these items, there are sections for 'AWS Lambda Function Optimizations' and 'Amazon ECS Container Optimizations', each with their own messages and red highlights. The entire screenshot has a dark blue gradient background.

2. Recommended Services – Amazon GuardDuty

Intelligent Threat Detection Service



2. Recommended Services – Amazon GuardDuty



Amazon GuardDuty is a threat detection service that continuously monitors for malicious activity and anomalous behavior to protect your AWS accounts, workloads, and data stored in Amazon S3.

2. Recommended Services – Amazon GuardDuty Customers



Goldman
Sachs

COMCAST

FINRA

NETFLIX



AUTODESK

twilio

Blackboard

ATLASSIAN

mapbox

WEBROOT

INSTRUCTURE

4. Environment

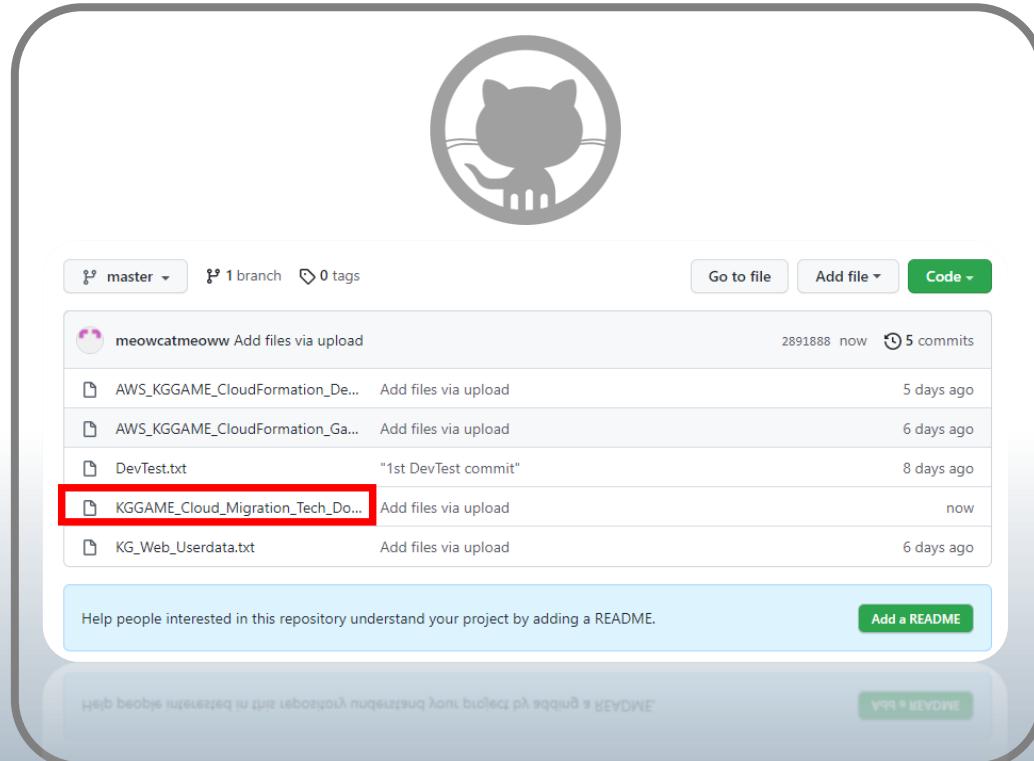
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- ❖ GitHub – Tech Documentation



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