

PROmet Migration Project

On-premise to AWS Public Cloud

3조 Presentation

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05. 검증 및 결과

사업 개요

PROcloud - PROmet 파트너

- PROmet의 클라우드 솔루션 파트너
- 기존 On-Premise 환경에서 퍼블릭 클라우드 마이그레이션 제공 업체
- 클라우드 컴퓨팅에 대한 전문적인 지식과 경험을 바탕으로 다양한 클라우드 서비스 제공

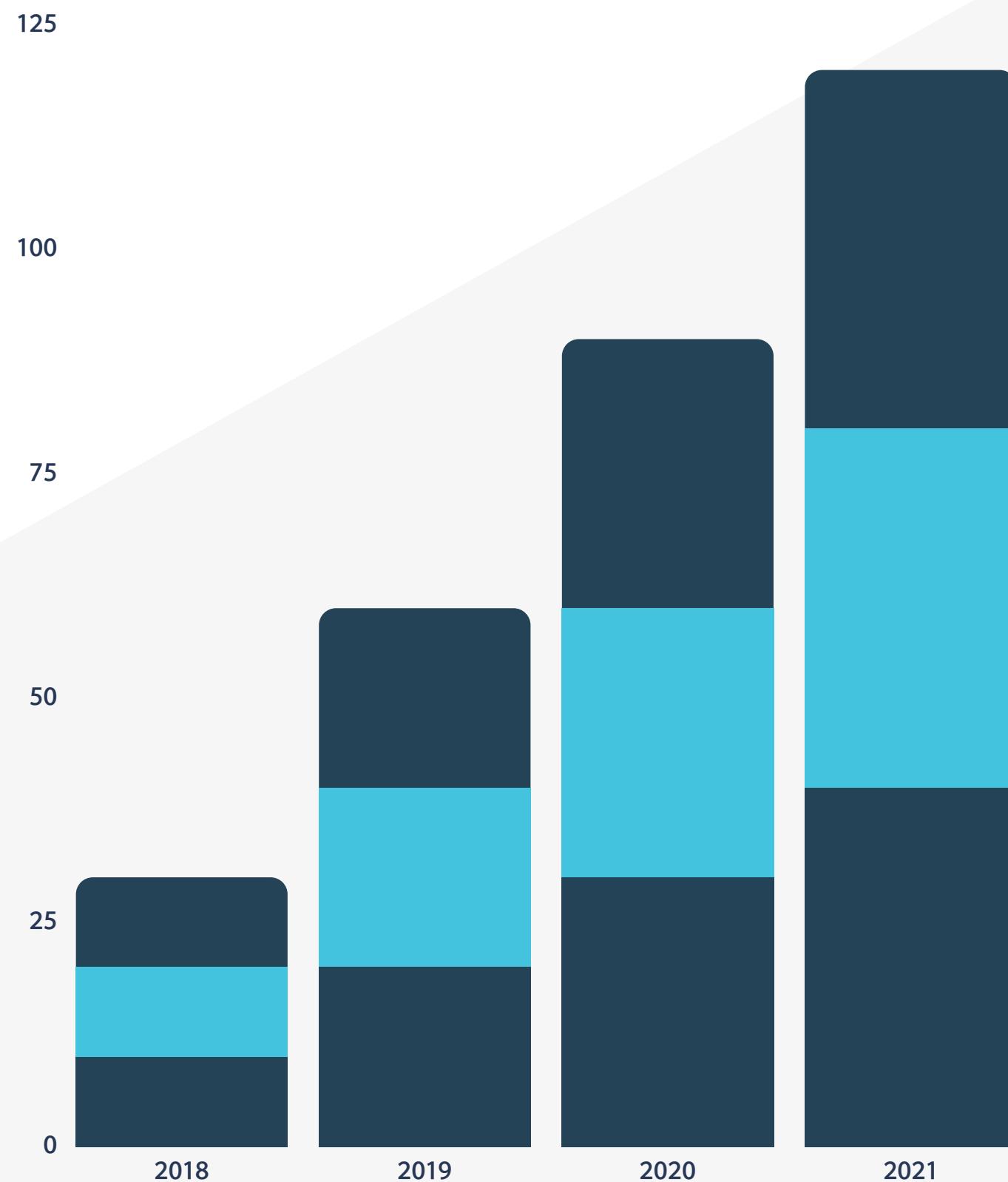


PROpartners

사업 개요

코로나 팬데믹 영향

- 팬데믹으로 인해 기업들이 경제적 우려
- 원격 근무와 디지털 업무 과중화로 인한 기업에서의 인재 차출
- 코로나 팬데믹 현상으로 인한 반도체 수급 이슈로 인해 네트워크 장비 딜리버리 지연



코로나 팬데믹 이후 이직률 급속 증
2021년 동기 대비 10.1% 증가

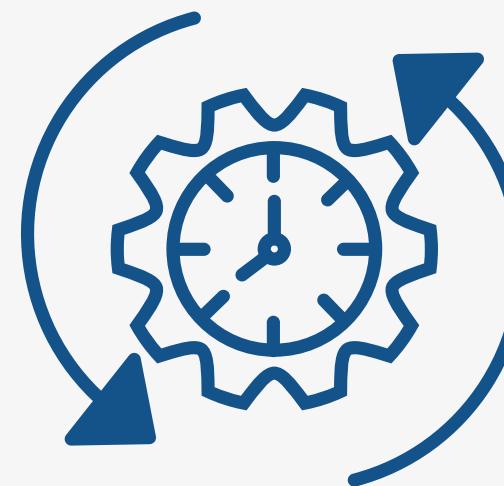
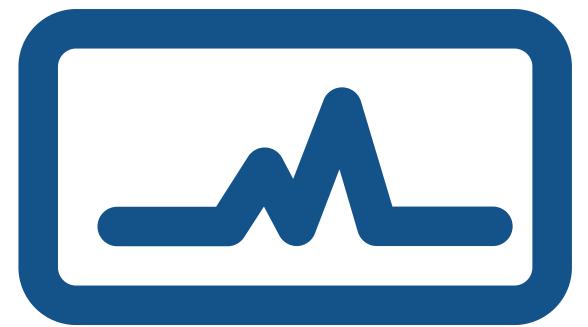
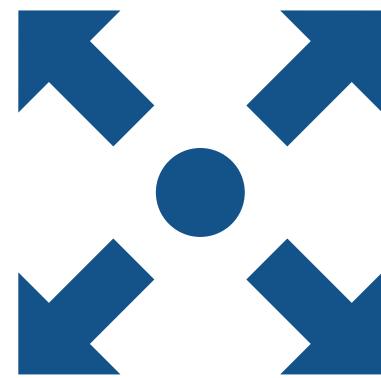
사업 개요

현재 PROmet

- 아직 플랫폼을 웹앱 서비스로 제공
- 근로자들을 파트너 기업과 연결해주는 역할
- 현재 온프레미스 인프라에서 서비스를 제공
- 회사 인력 부족을 인한 인프라 관리 우려
- PROmet 서비스는 이직률 상승함에 따라 갑작스런 트래픽 증가로 서버 다운타임 경험



요구사항



01

확장성

서버 자원을
유연하게 확장

02

안정성

모니터링 및 성능 이슈
신속하게 파악

03

보안성

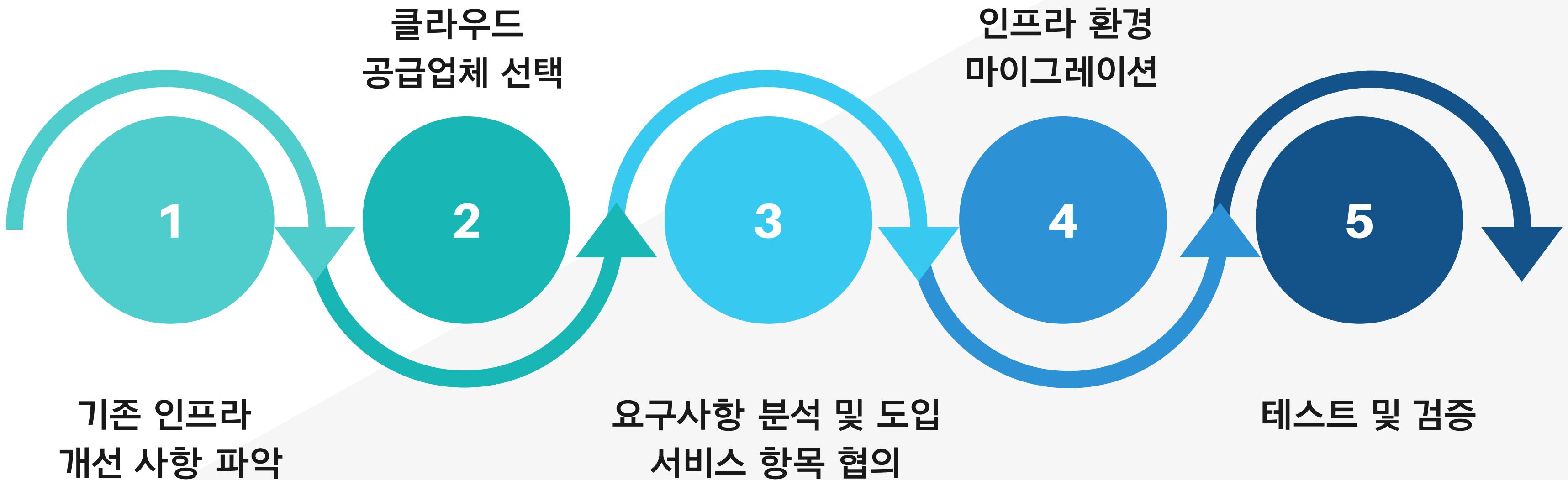
애플리케이션 서버의
외부 직접 접근 제한

04

효율성

코드 변환시 신속하고
안전한 배포

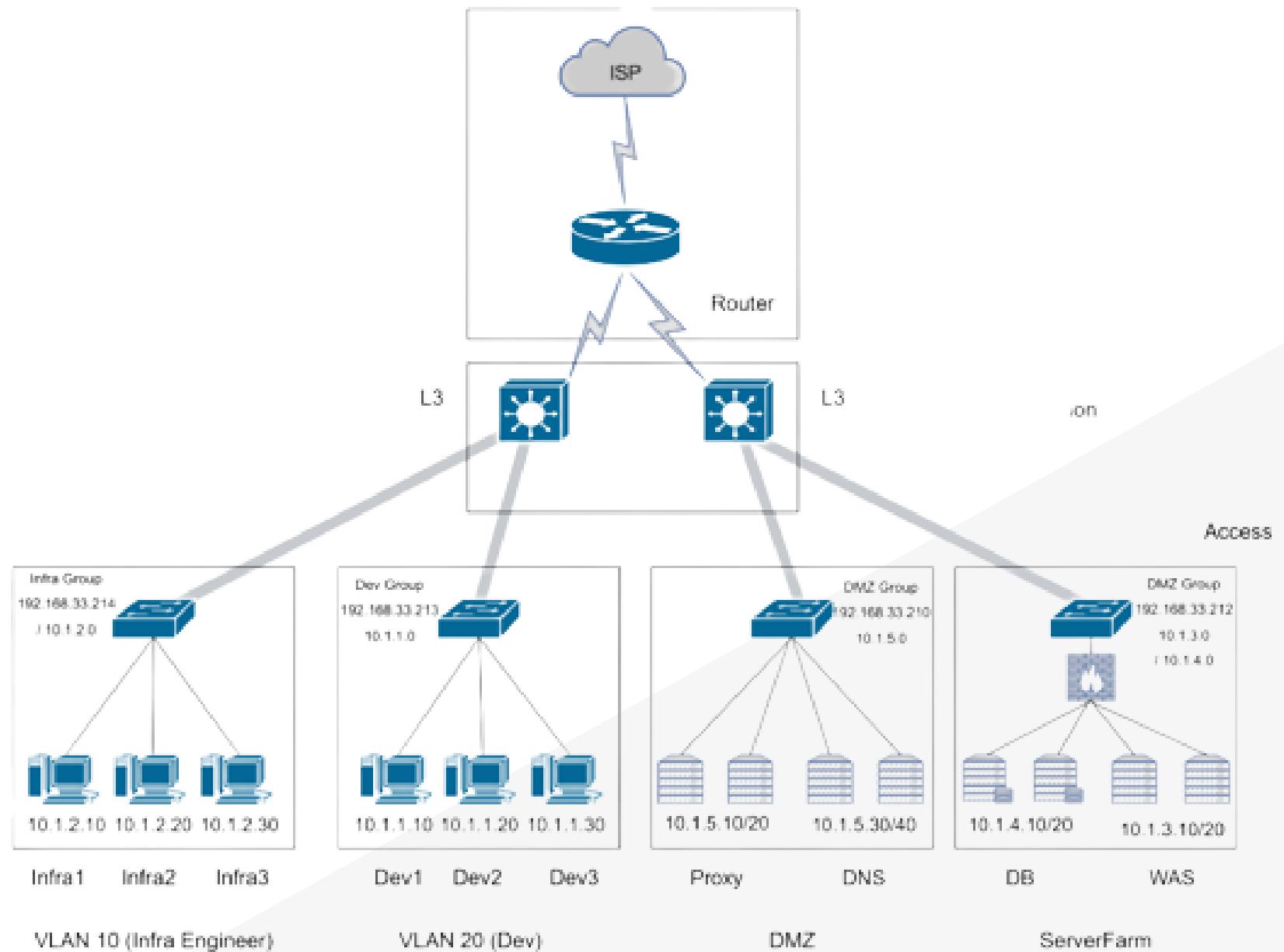
프로젝트 과정



프로젝트 일정



온프레미스 구조



기존 온프레미스 문제점

- On-Premise 환경에서의 웹 사이트 운영으로 인한 자원 확장성 이슈
- 실시간 모니터링 부재로 서버 장애 예방 및 사용자 경험 개선 불가능
- 웹 어플리케이션 기능 추가 및 특별 이슈 시 웹 서버에 지속적인 통합 및 배포 불가

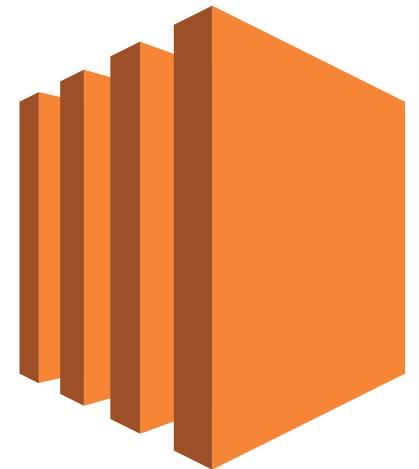
AWS 선택



클라우드 공급자 선택

- 클라우드 서비스 분야에서 시장 점유율이 가장 높은 대규모 퍼블릭 클라우드 서비스
- 전 세계에 24개의 리전을 보유, 높은 가용성과 안정성 보장
- 다양한 클라우드 서비스와 통합된 솔루션과 서비스를 제공하여 개발자와 기업의 클라우드 환경을 쉽게 구축하고 관리

환경 준비



EC2

가상 서버. 필요에 따라
크기, 용량, 운영 체제,
보안 등 다양한 요구
사항에 맞게 설정 가능



Route53

AWS DNS 서비스.
도메인 이름 등록 및
관리와 로드 밸런싱을
쉽게 가능



RDS

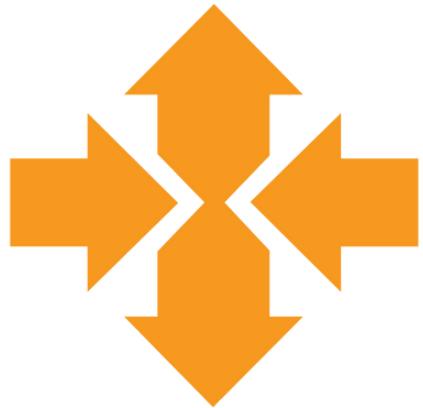
관리형 데이터베이스 서비
스. 서버 운영, 스토리지
관리, 데이터 백업 등 데이
터베이스 관리를 쉽게 가능



ALB

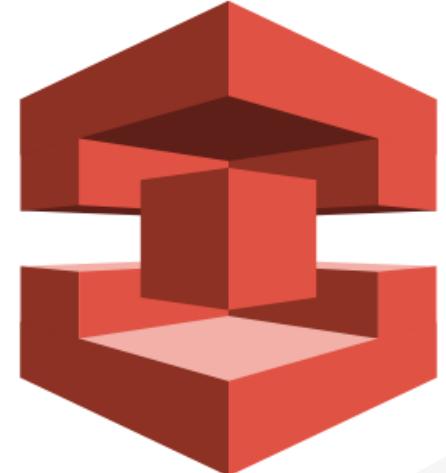
트래픽을 여러 EC2 인
스턴스로 분산 시켜주는
서비스. 다양한 라우팅
기능과 세션 관리 기능
을 제공

환경 준비



AutoScaling

인스턴스의 수를 자동으로 조정하여 애플리케이션의 가용성과 확장성을 개선하는 기술



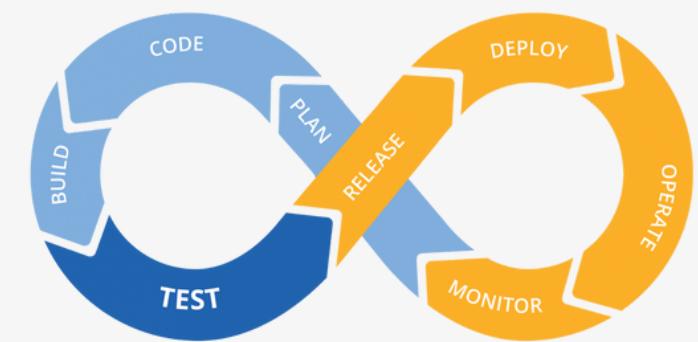
EFS

Elastic File System의 약자. 여러 EC2 인스턴스에서 공유할 수 있는 파일 스토리지 서비스



Monitoring

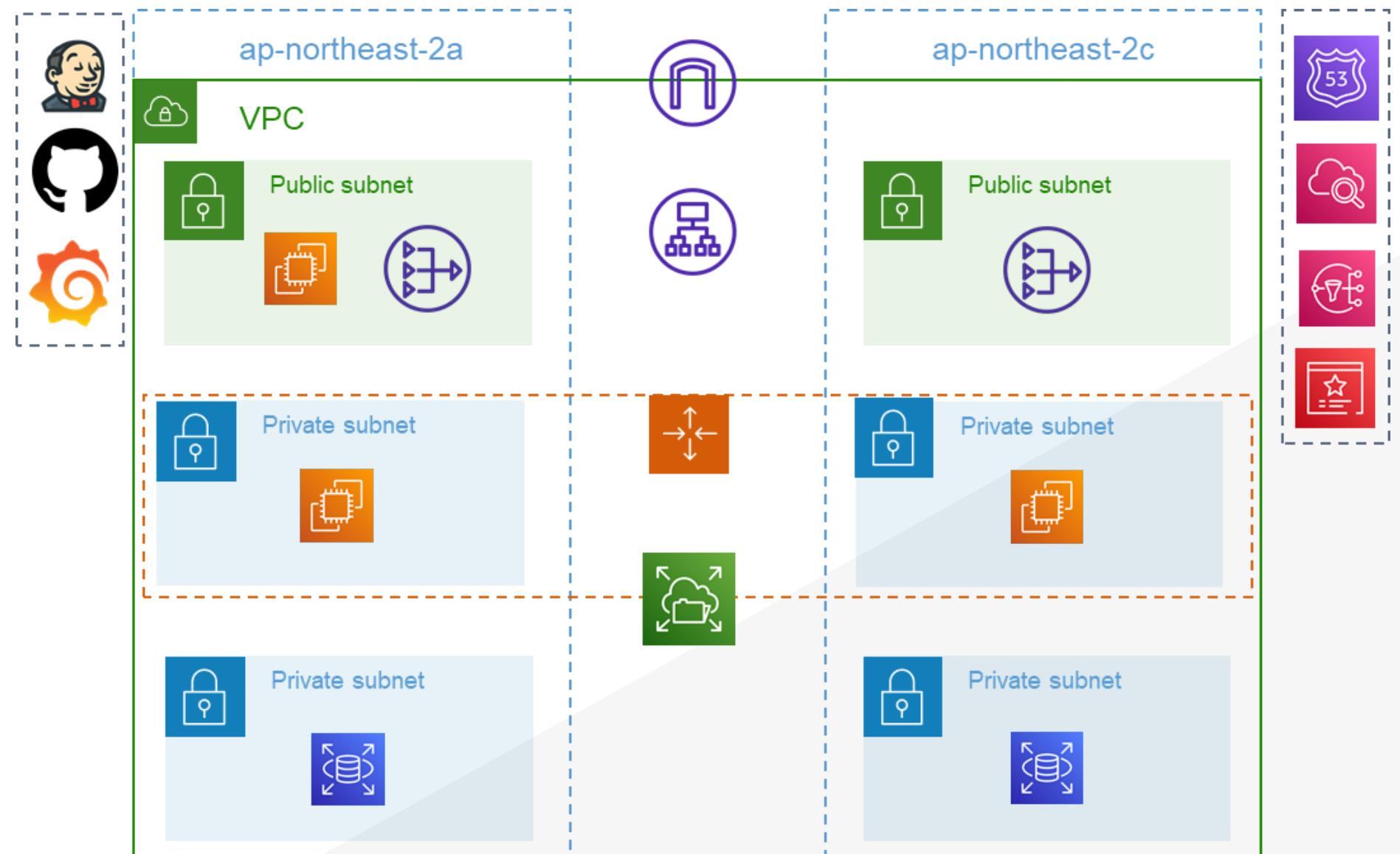
인프라 및 애플리케이션 리소스를 모니터링하고 로그와 메트릭 데이터를 수집하며, 경보를 설정



CI/CD

Jenkins를 사용하여 코드의 자동 배포를 수행. 효율적인 개발 진행

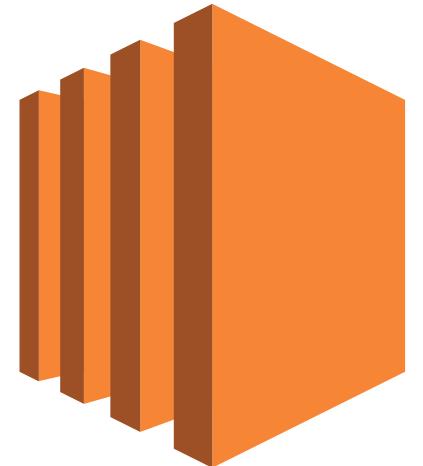
완성 토플로지



완성된 AWS Cloud 토플로지

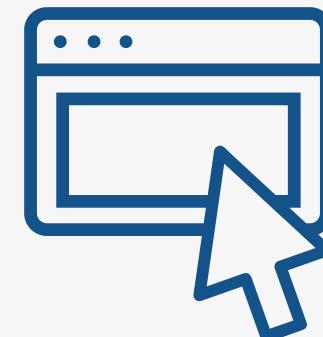
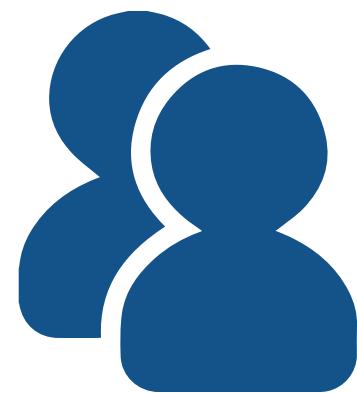
- Auto-scaling 그룹을 통해 자동으로 서버를 추가
- Bastion host를 사용해 VPC 내부 인스턴스에 접속할 수 있어서 보안성 향상
- CloudWatch과 Grafana를 통해 AWS 리소스를 실시간으로 모니터링
- SNS를 통해 프로세스 등에서 발생하는 이벤트를 감지 및 알림

AWS 도입



EC2

BastionHost와 웹서버 배포를 위한 EC2 인스턴스

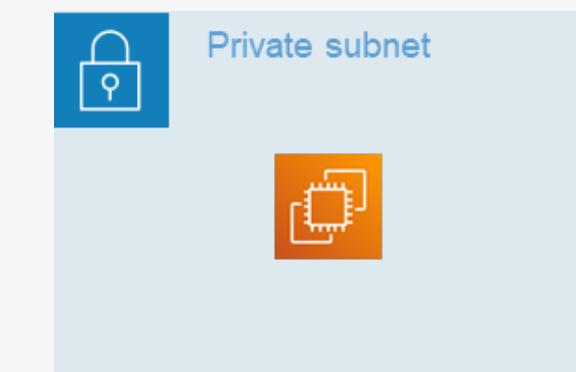
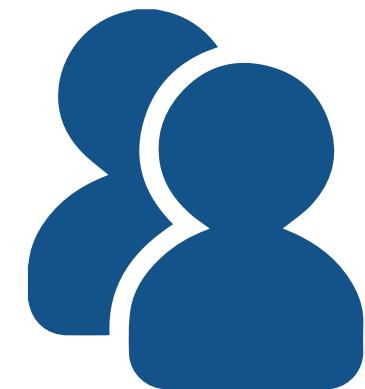


AWS 도입

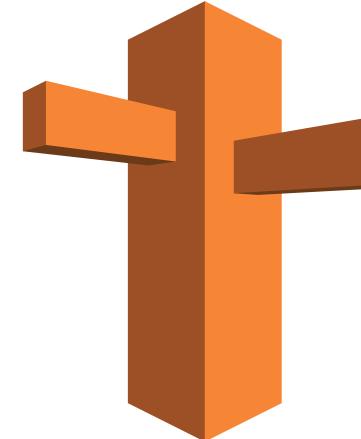


ALB

부하 분산 및 프록시 서버 역할인 ALB

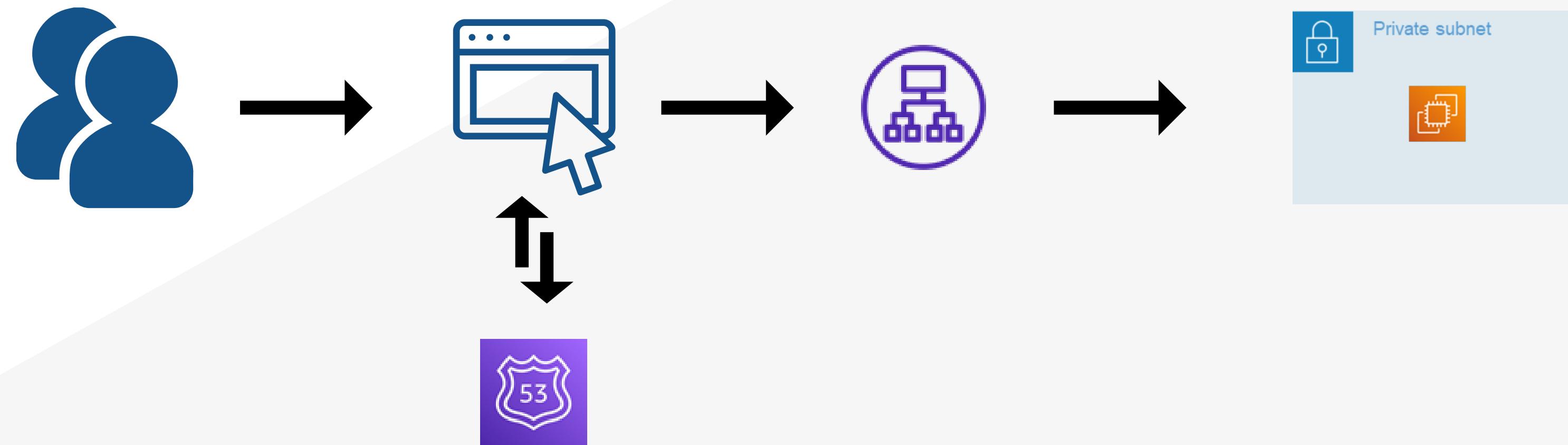


AWS 도입

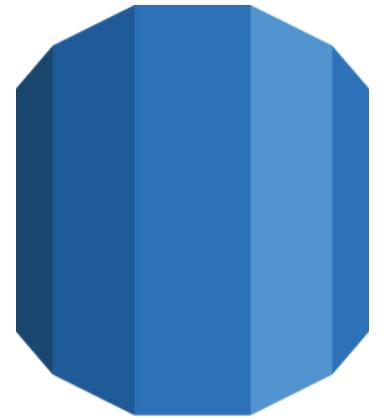


Route53

도메인 네임서버 역할 및 도메인 이름 제공 서비스

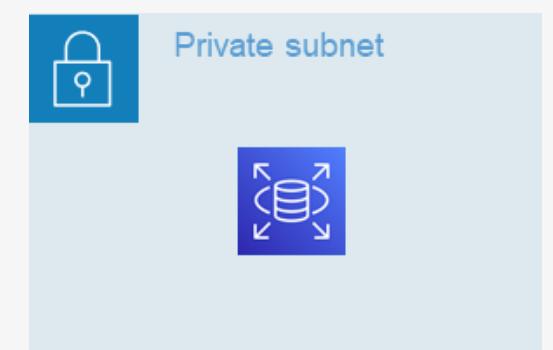
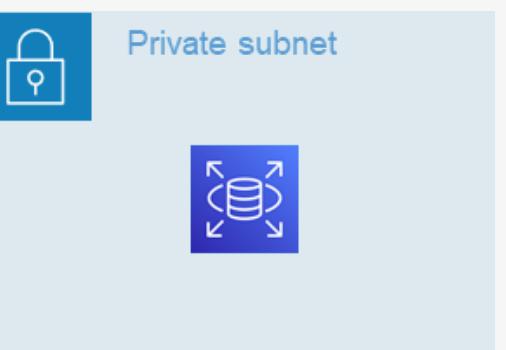
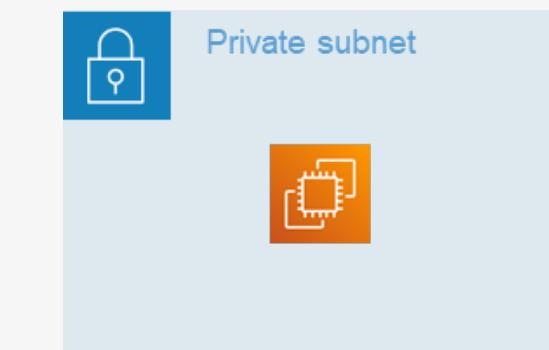
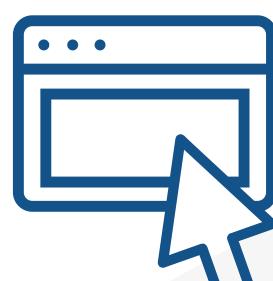
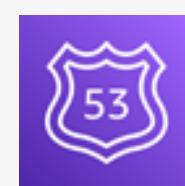
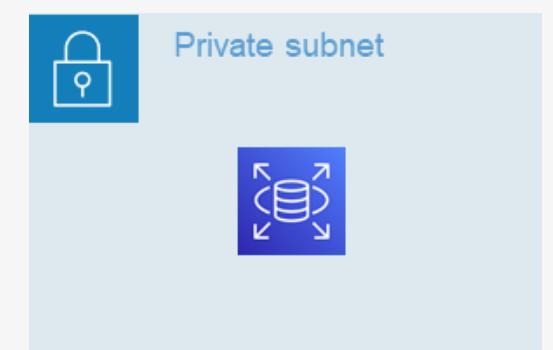
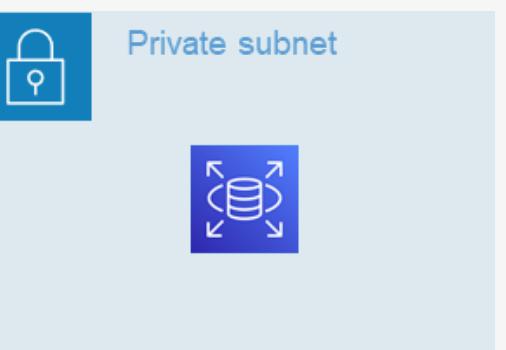
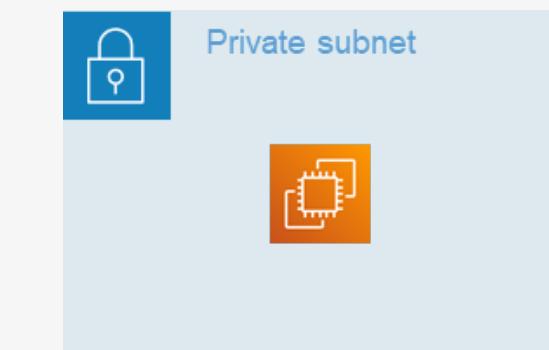
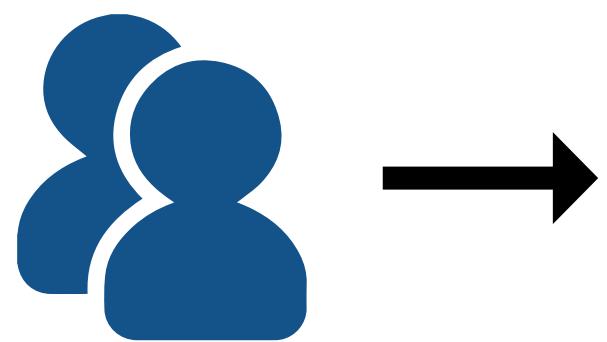


AWS 도입

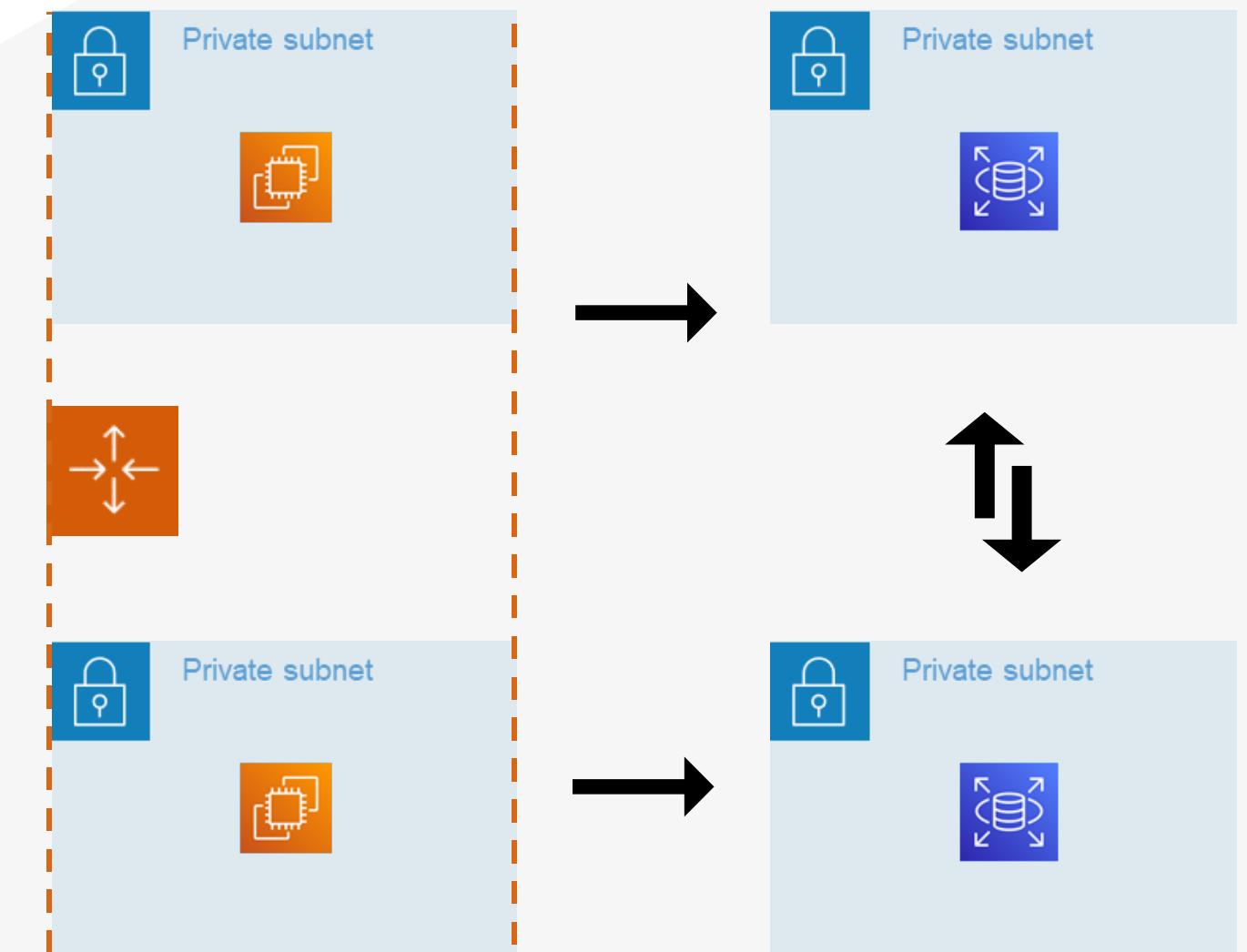
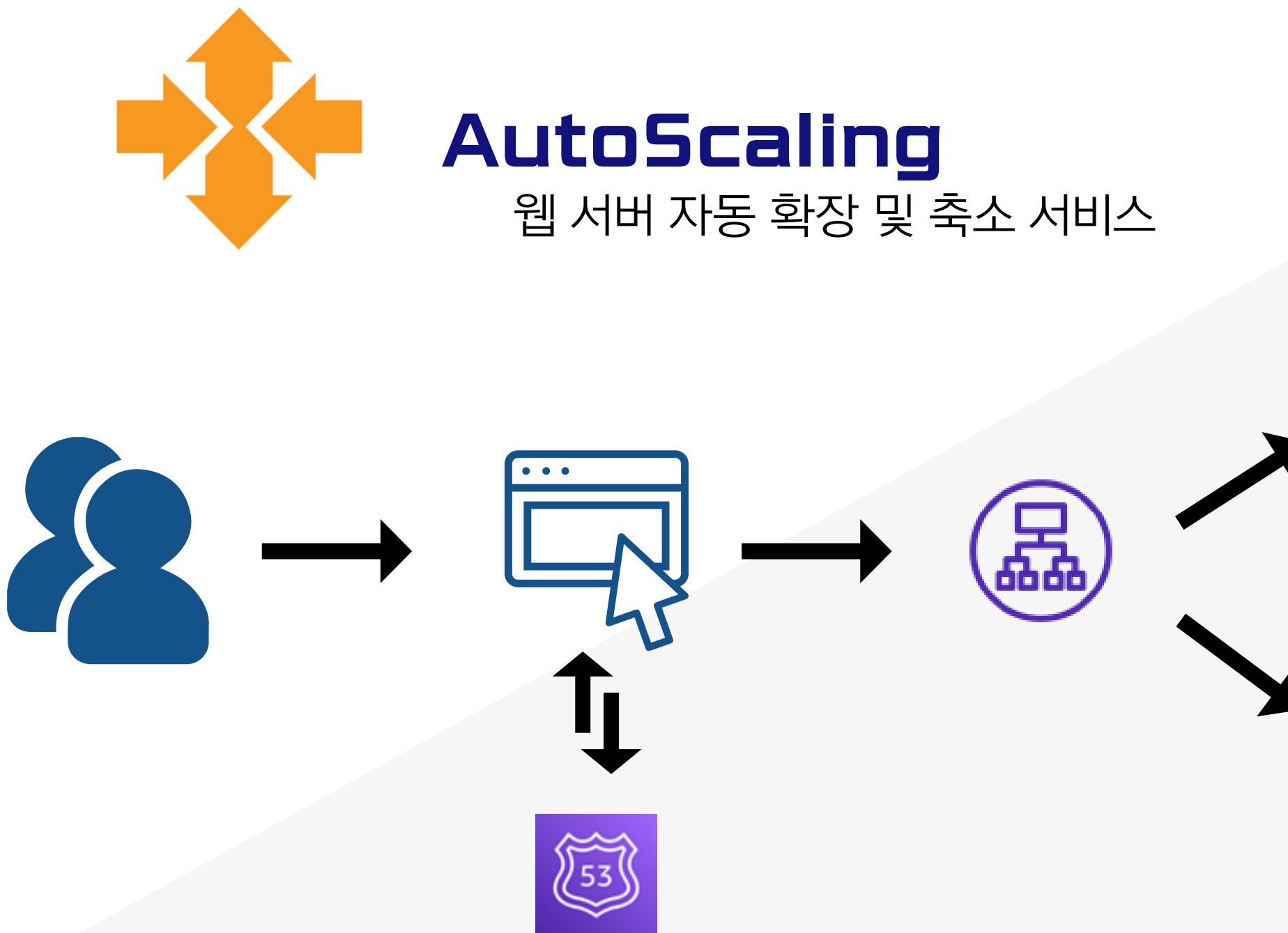


RDS

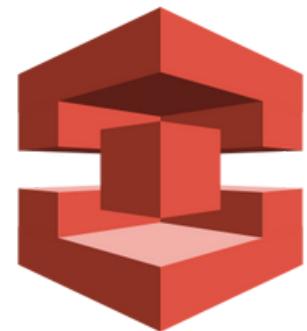
AWS의 관계형 데이터베이스 서비스



AWS 도입

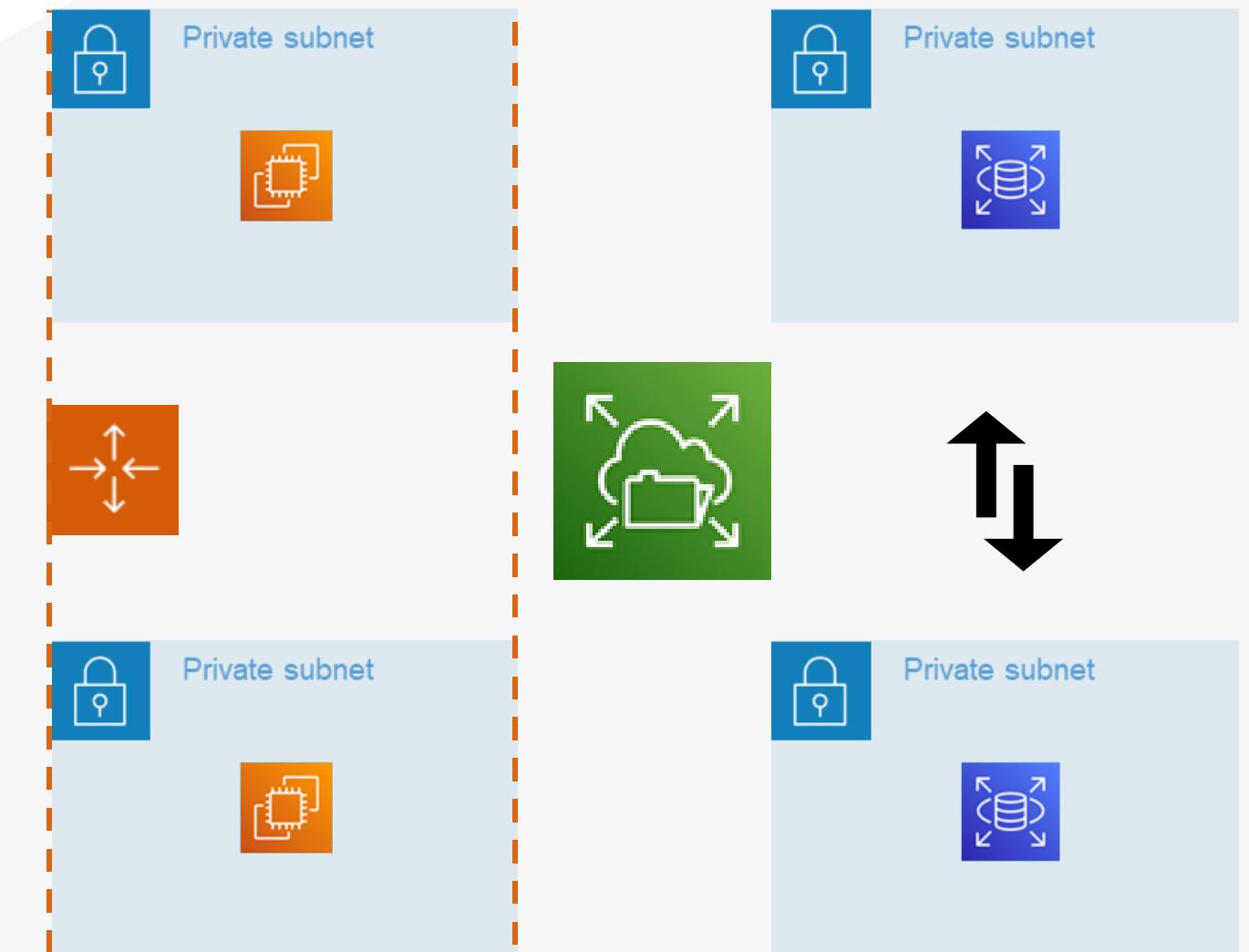
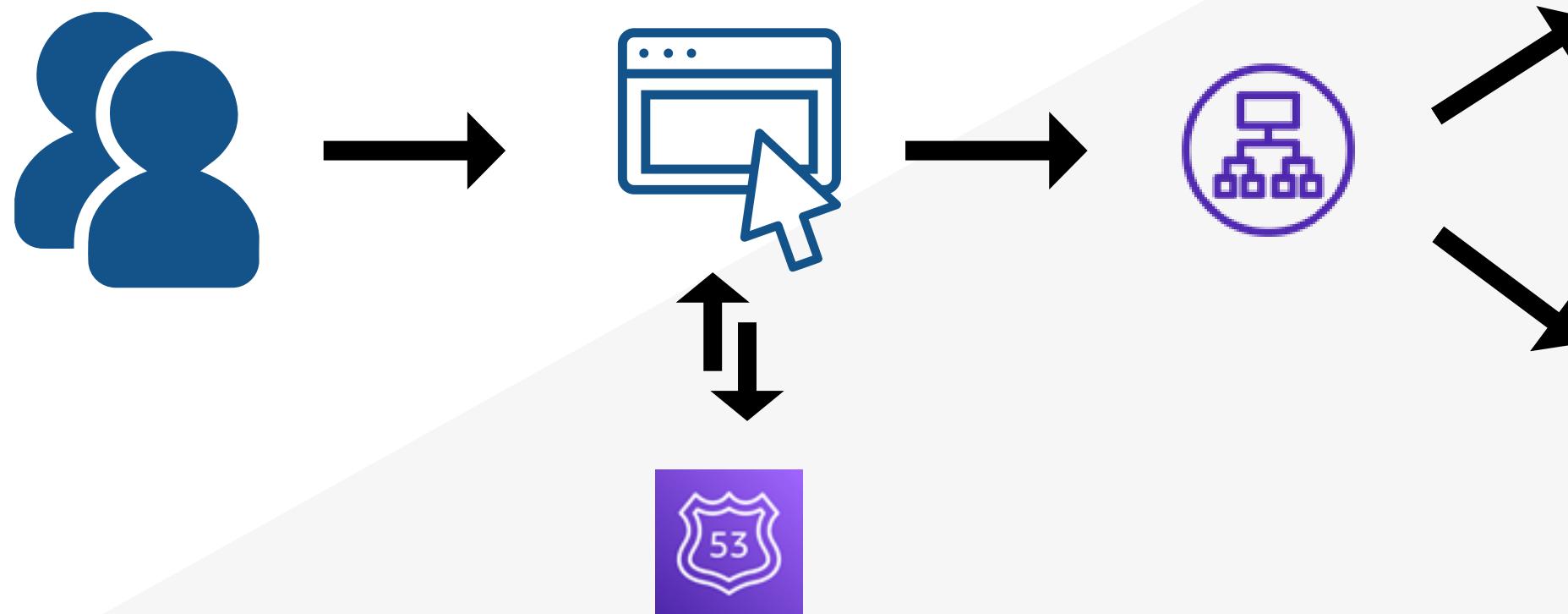


AWS 도입

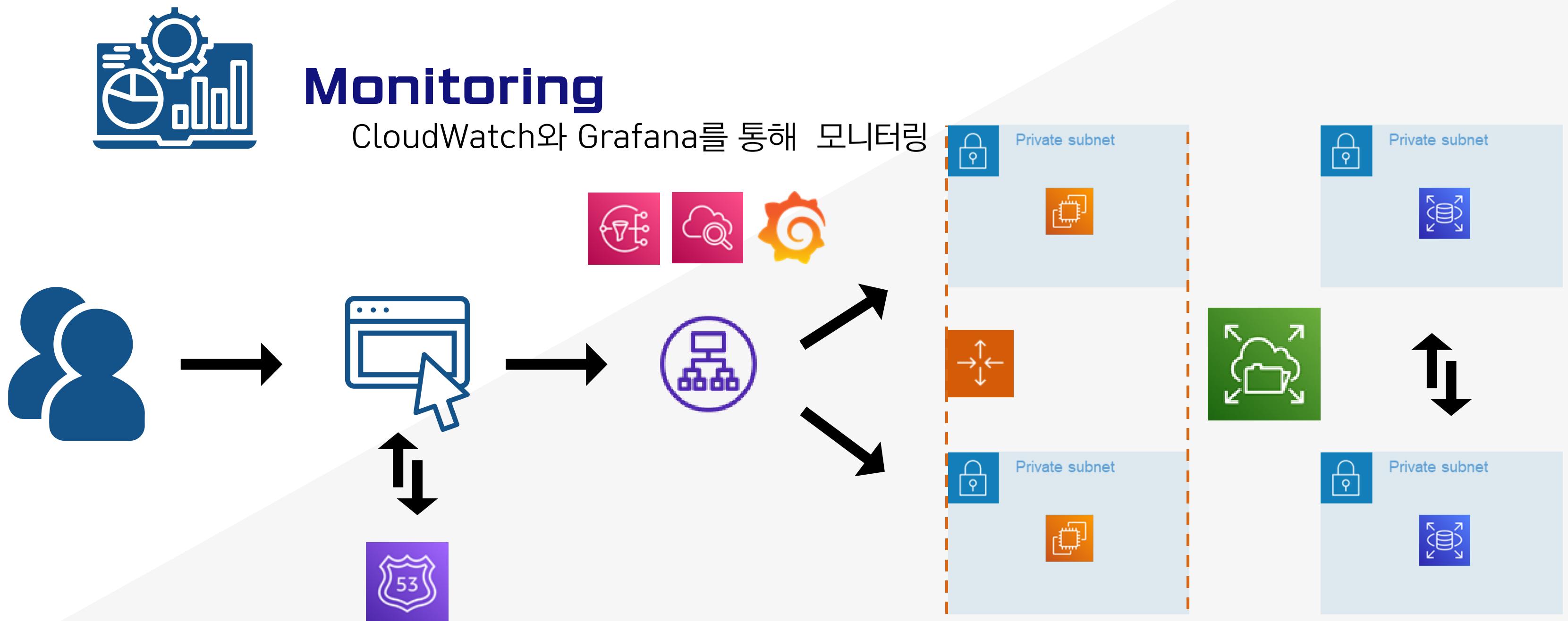


EFS

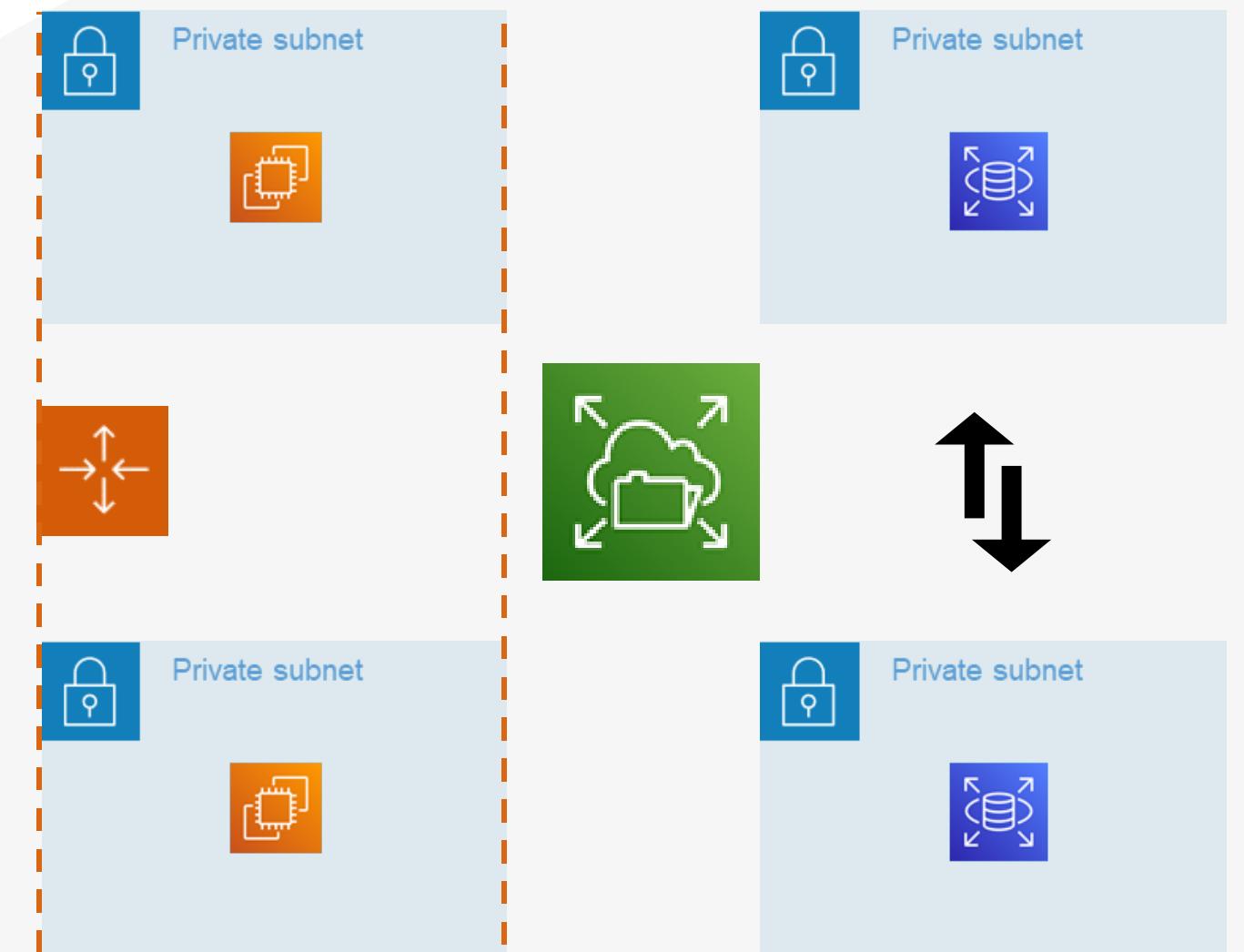
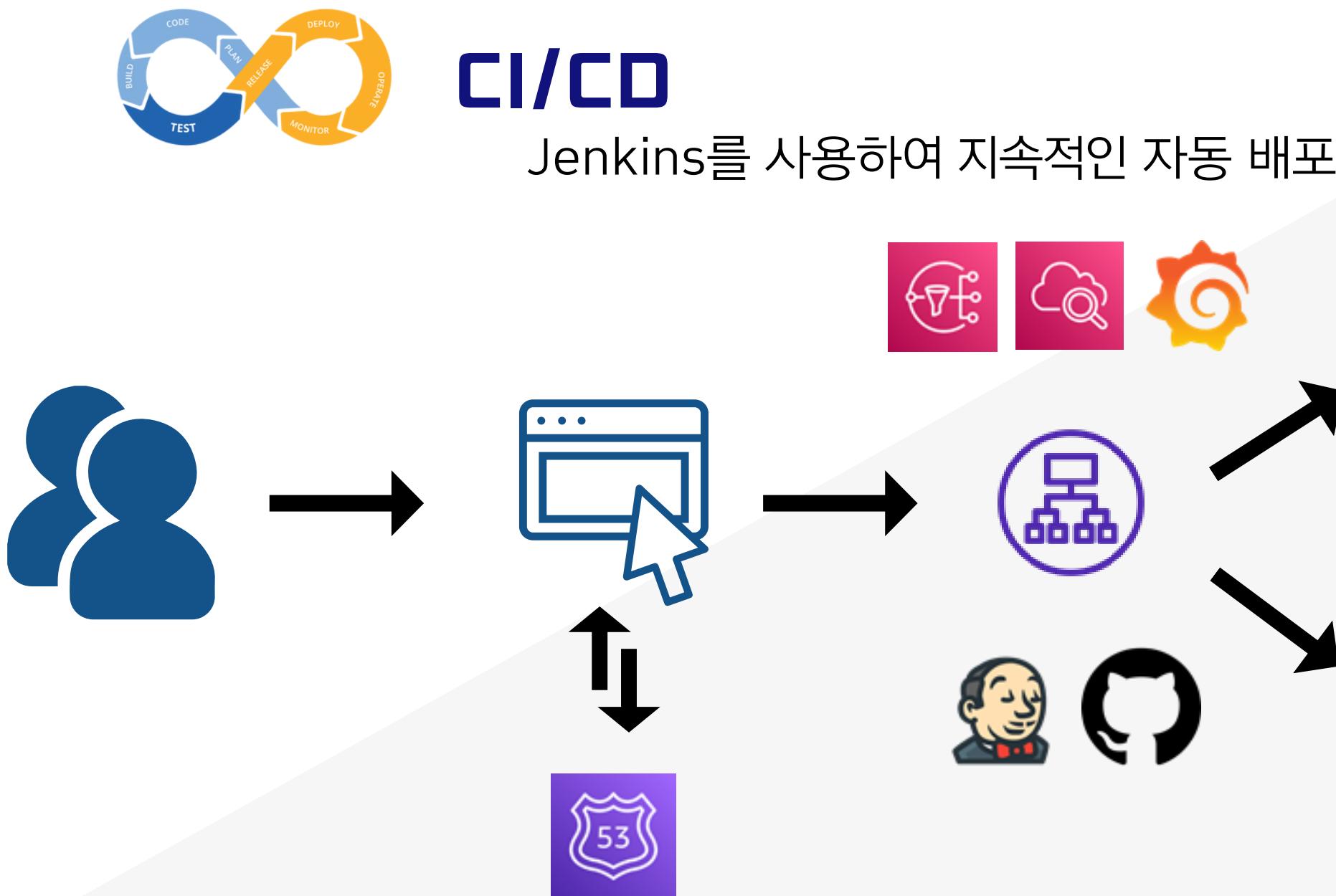
NAS 형식 파일 시스템 스토리지 서비스



AWS 도입



AWS 도입

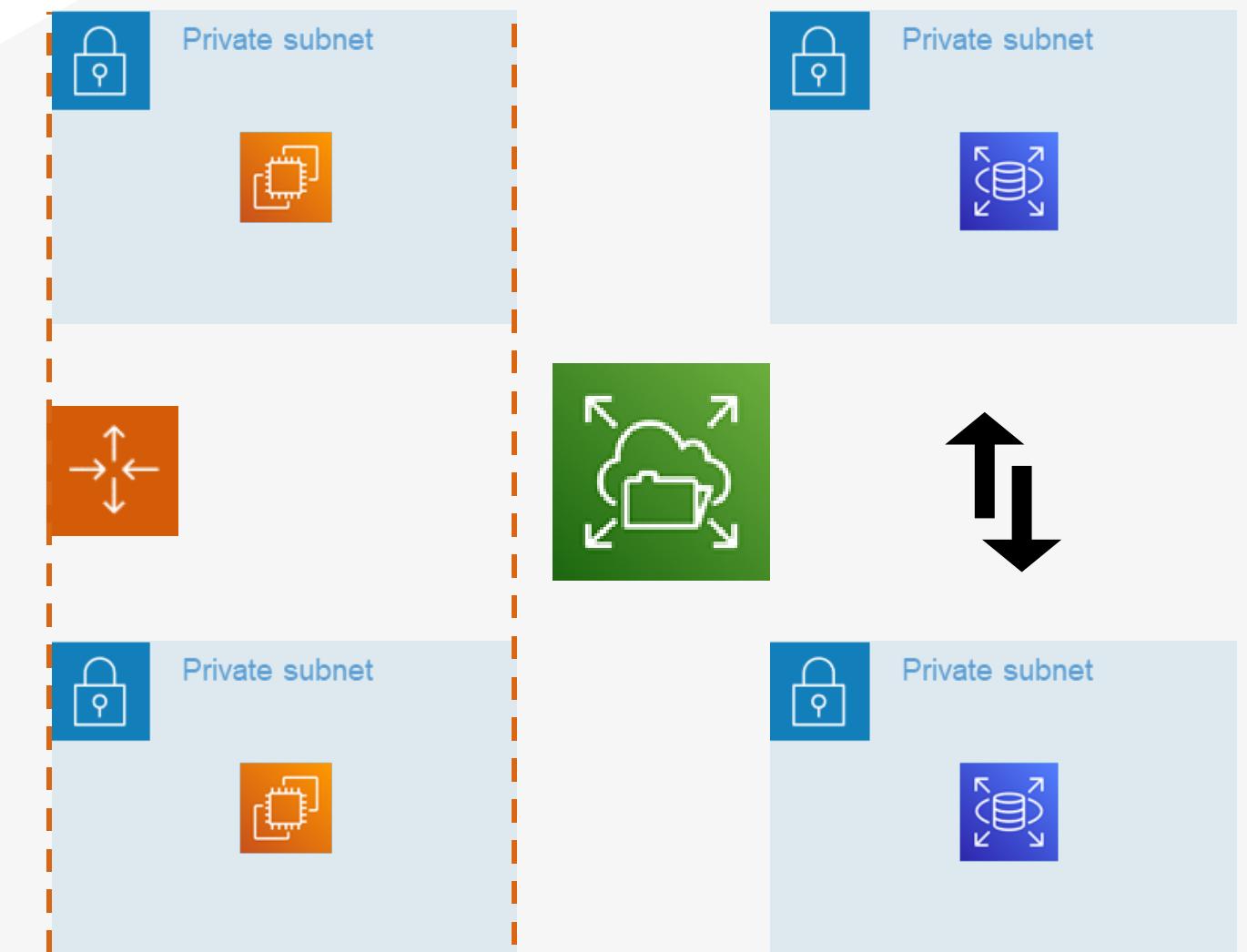
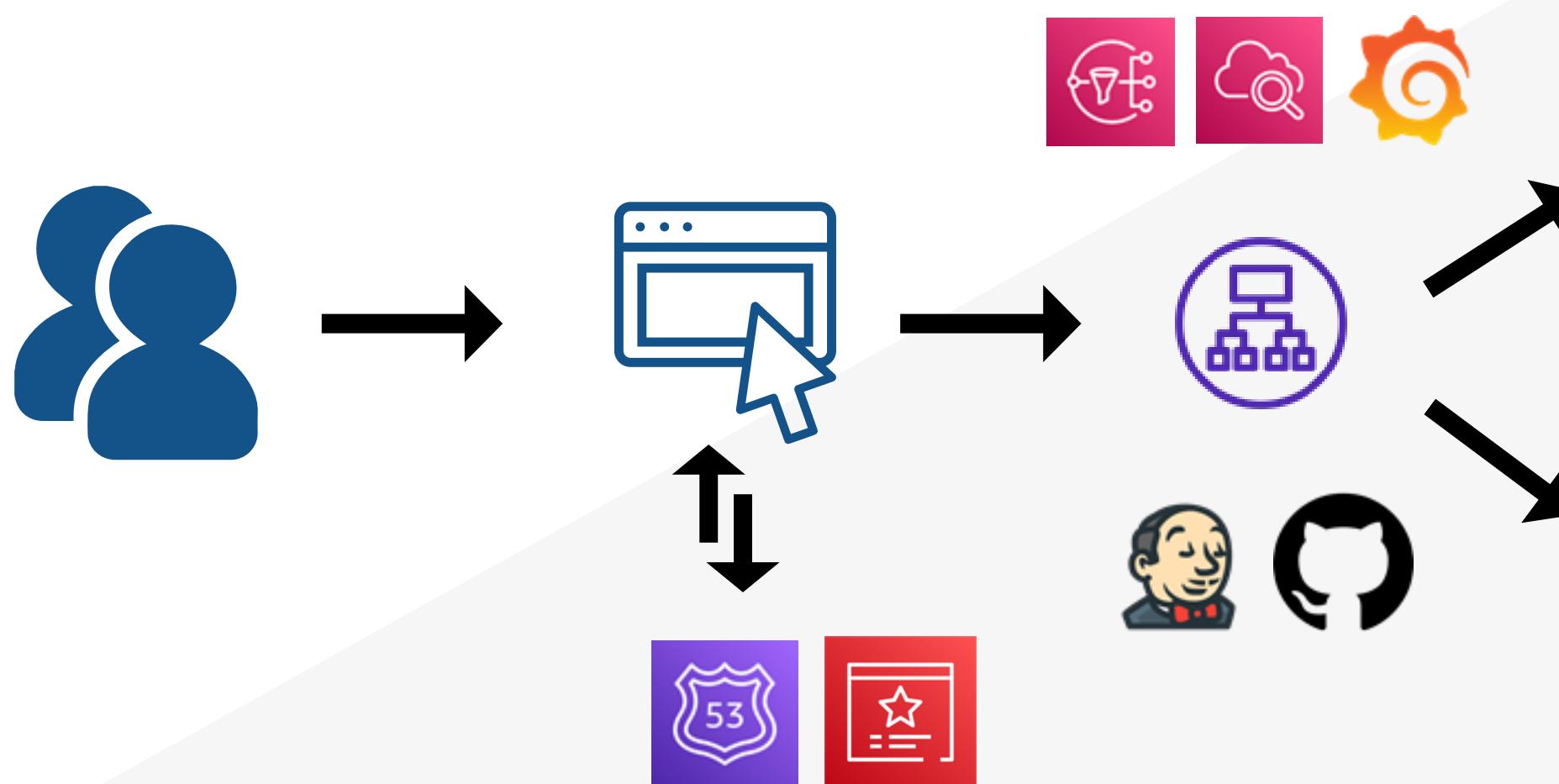


AWS 도입

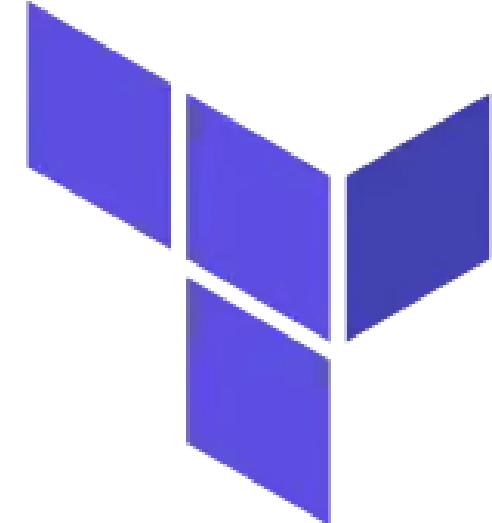


보안

ACM을 활용하여 SSL/TLS 적용



코드형 인프라

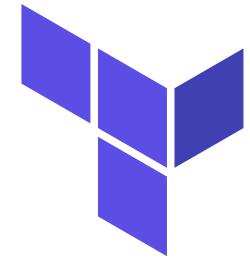


Terraform

오픈소스 툴 활용

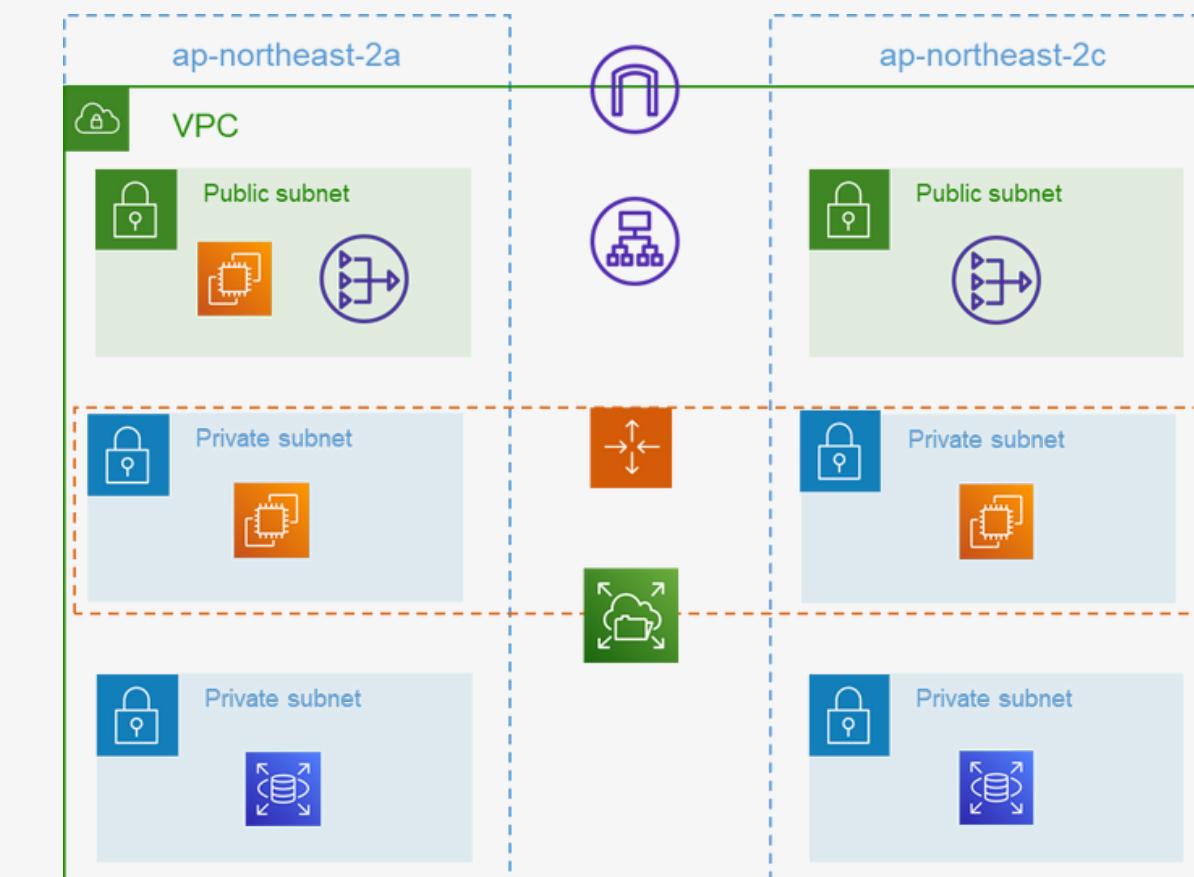
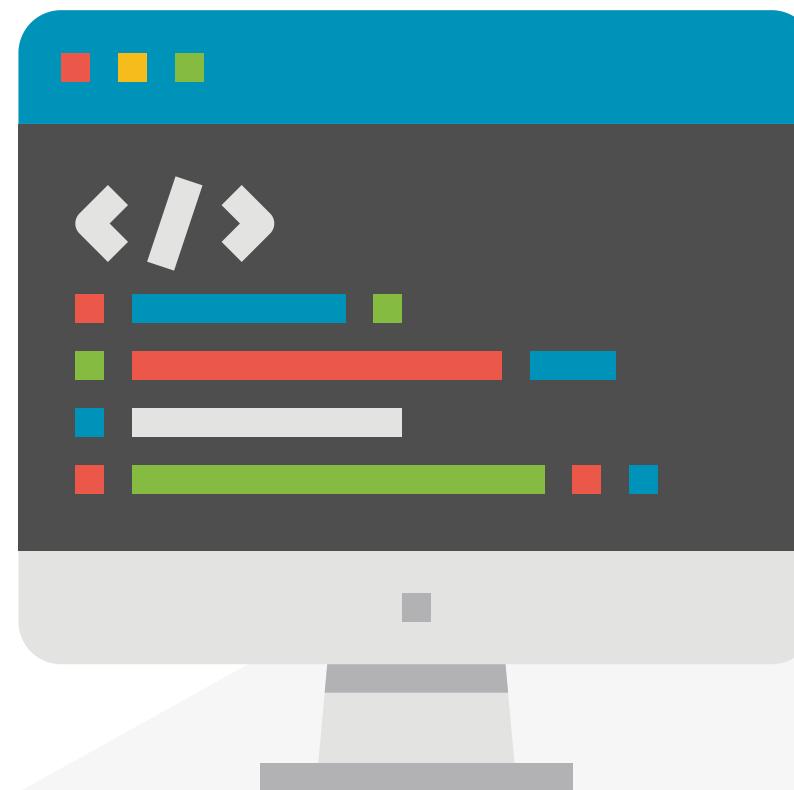
- 이전에 만든 인프라를 코드 형태로 다른 프로젝트에서 동일한 인프라 아키텍처를 빠르고 쉽게 구축
- 자동화된 프로비저닝을 지원하여 인프라 생성 시간을 단축
- 인프라 코드 변경 내용을 추적하고 인프라를 쉽게 복원

코드형 인프라

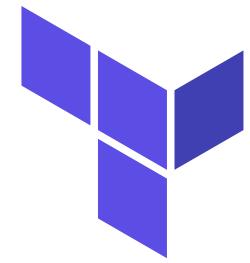


Terraform

Infrastructure as Code 형태 구현



코드형 인프라



Terraform

GitHub 사용하여 테라폼 코드 업로드 및 관리



Cloud migration project using IaC

aws 3-tier-architecture terraform

Readme 0 stars 1 watching 0 forks

No releases published

File	Description	Time
.gitignore	first commit	12 hours ago
.terraform...	first commit	12 hours ago
README....	'doc'	11 hours ago
alb.tf	first commit	12 hours ago
asg.tf	first commit	12 hours ago
bastion_k...	first commit	12 hours ago
ec2.tf	first commit	12 hours ago
efs.tf	first commit	12 hours ago

검증 및 결과

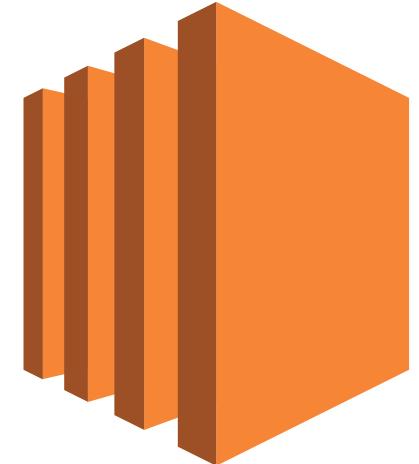


EC2

BastionHost와 웹서버 EC2 생성

<input type="checkbox"/>	BastionHost	i-08adc0f6f5490f63a	✓ Running	+ Q	t2.micro	⋮
<input type="checkbox"/>	WebServer	i-0a437c8a902591a2e	⌚ Pending	+ Q	t2.micro	⋮

검증 및 결과



EC2

BastionHost쪽 SSH로 연결 및 WebServer쪽 BastionHost으로서 연결

To run a command as administrator
See "man sudo_root" for details

```
ubuntu@ip-10-0-1-21:~$  
ubuntu@ip-10-0-1-21:~$ ssh -i key.pem ubuntu@10.0.3.25
```

To run a command as administrator
See "man sudo_root" for details

```
ubuntu@ip-10-0-3-25:~$
```

검증 및 결과



ALB

ALB 생성 후 ALB DNS를 통해 웹사이트 방문 실행

A screenshot of a web browser window. The address bar shows a red warning icon followed by the URL "alb-webserver-428924170.ap-northeast-2.elb.amazonaws.com".

PROMET

Name	DNS name	State
ALB-WebServer	ALB-WebServer-42892417...	Provisioning

검증 및 결과



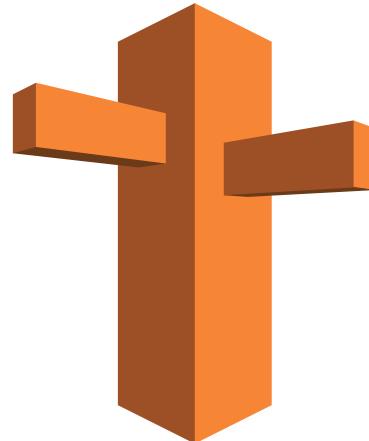
Route53

도메인 네임의 Hosted Zone 생성

The screenshot shows the 'Hosted zone details' page for the domain 'promet.space'. The domain is listed as 'Public' with an 'Info' link. On the right, there are buttons for 'Delete zone', 'Test record', and 'Compliance'. The page displays the following information:

Hosted zone details	
Hosted zone name	promet.space
Hosted zone ID	Z051997312EL670T2TDCY
Description	-
Query log	-
Type	Public hosted zone
Record count	-
Name servers	ns-715.awsdns-25.net ns-437.awsdns-54.com ns-1281.awsdns-32.org ns-1880.awsdns-43.co.uk

검증 및 결과



Route53

Hosted Zone의 레코드들 추가

▼ Record 1

Record name | Info .promet.space

Keep blank to create a record for the root domain.

Alias

Route traffic to | Info

▼ Record 1

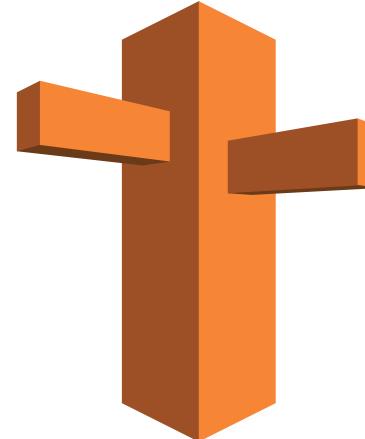
Record name | Info .promet.space

Keep blank to create a record for the root domain.

Alias

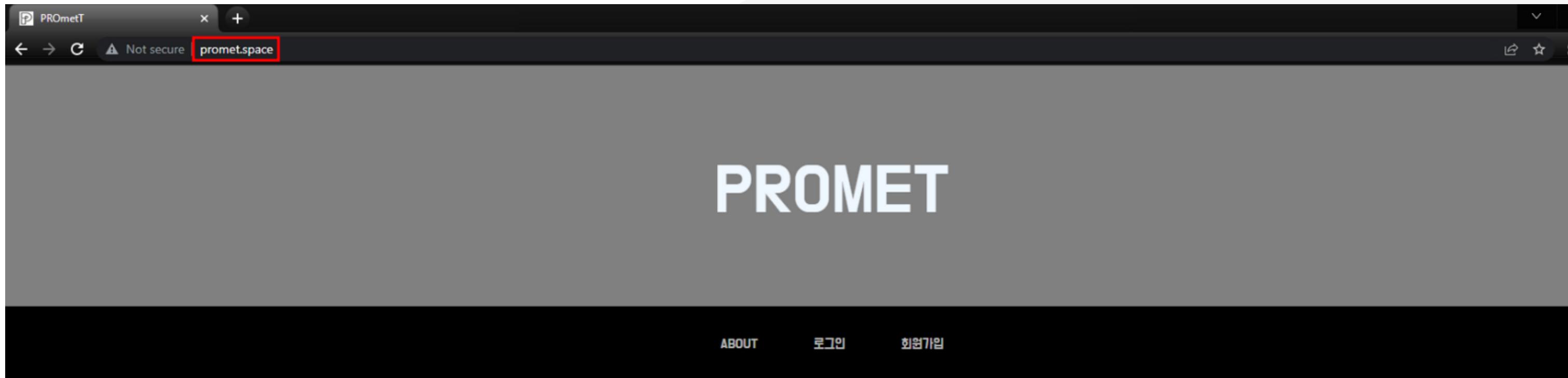
Route traffic to | Info

검증 및 결과

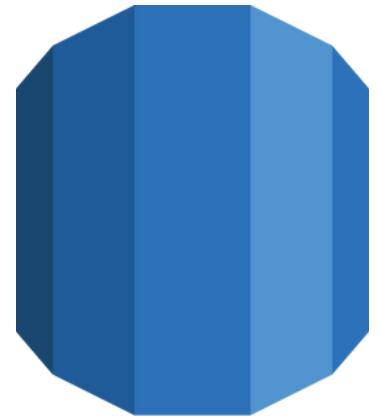


Route53

도메인 이름으로 웹사이트 접근시 결과 확인



검증 및 결과

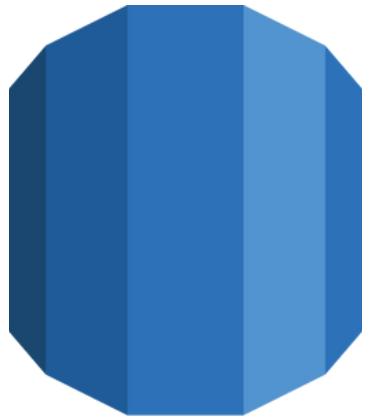


RDS

RDS MariaDB Master과 Replica 생성 확인

DB identifier	Role	Engine	Region & AZ	Size	Status
promet-db-1	Primary	MariaDB	ap-northeast-2a	db.t3.micro	Modifying
promet-db-2	Replica	MariaDB	ap-northeast-2c	db.t3.micro	Creating

검증 및 결과



RDS

BastionHost에서 DB 접근 테스트

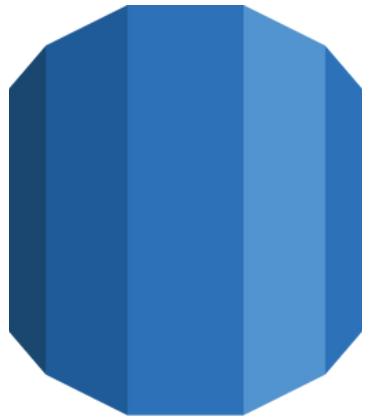
```
ubuntu@ip-10-0-1-21:~$ mysql -h promet-db-1.cayi9unj85zk.ap-northeast-1.rds.amazonaws.com -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 121
Server version: 5.5.5-10.6.11-MariaDB-log managed by https://aws.amazon.com/mysql/
Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input.

mysql> 
```

검증 및 결과



RDS

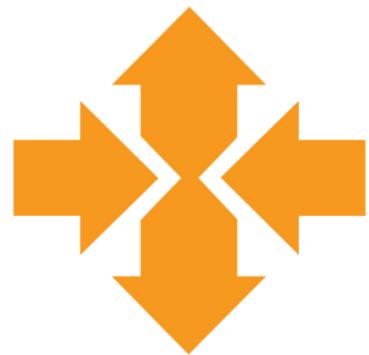
WebServer에서 DB 접근 테스트

```
ubuntu@ip-10-0-3-25:~$ mysql -h promet-db-1.cayi9unj85zk.ap
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 125
Server version: 5.5.5-10.6.11-MariaDB-log managed by https://
Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current
mysql>
```

검증 및 결과

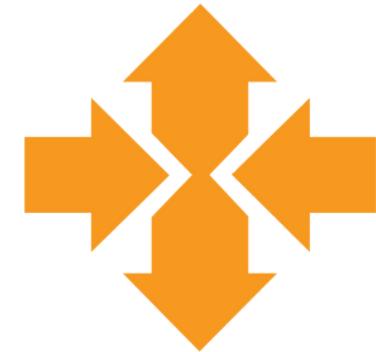


AutoScaling

Auto Scaling Group 생성 전 Launch Template 추가

Launch template ID	Launch template name	Default version	Latest vers
lt-0368753c8588695b7	PROmet-Temp	1	1

검증 및 결과



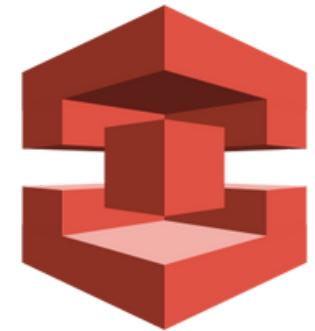
AutoScaling

AutoScalingGroup 생성 및 자동으로 웹서버 생성 결과 확인

Name	Launch template/configuration	Instances	Status	De
ASG-PROmet	PROmet-Temp Version Default	0	Updating capacity...	1

-	i-0f22f8d9f7fb9fb25	Running	t2.micro	2/2 checks passed	No alarms	+	ap-northeast-2c
BastionHost	i-08adc0f6f5490f63a	Running	t2.micro	2/2 checks passed	No alarms	+	ap-northeast-2a
WebServer	i-0a437c8a902591a2e	Running	t2.micro	2/2 checks passed	No alarms	+	ap-northeast-2a

검증 및 결과



EFS

Standard Elastic 파일 스토리지 생성

○	-	fs- 0cf32899e05cc0 14	✓ Encrypted	6.00 KiB	6.00 KiB	0 Bytes
---	---	-----------------------------	-------------	----------	----------	---------

검증 및 결과



EFS

웹서버쪽에서 EFS 마운트 작업후 확인

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/root	7.6G	2.7G	4.9G	36%	/
tmpfs	484M	0	484M	0%	/dev/shm
tmpfs	194M	856K	193M	1%	/run
tmpfs	5.0M	0	5.0M	0%	/run/lock
/dev/xvda15	105M	6.1M	99M	6%	/boot/efi
10.0.3.41:/	8.0E	130M	8.0E	1%	/home/ubuntu/mnt
tmpfs	97M	4.0K	97M	1%	/run/user/1000

검증 및 결과

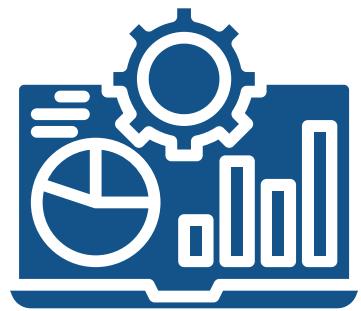


EFS

웹서버쪽에서 EFS 마운트 작업후 확인

```
ubuntu@ip-10-0-3-25:~$ ls /home/ubuntu/mnt
django
ubuntu@ip-10-0-3-25:~$ ls /home/ubuntu/mnt/django/
PROmet myprojectenv
ubuntu@ip-10-0-3-25:~$ ls /home/ubuntu/mnt/django/
PROmet/      myprojectenv/
ubuntu@ip-10-0-3-25:~$ ls /home/ubuntu/mnt/django/PROmet/
README.md  base    db.sqlite3  media   requirements.txt  templates
acc       config  manage.py  news    static           test.py
```

검증 및 결과



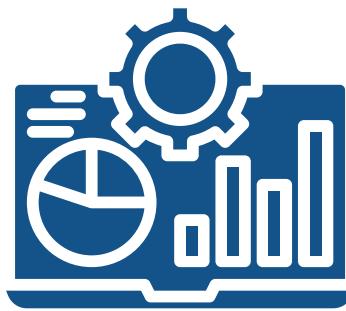
Monitoring

CloudWatch과 SNS 설정 후 Stress 테스트 결과

Name	State	Last state update	Conditions	Actions
RISK!	Insufficient data	2023-03-14 20:01:37	CPUUtilization > 60 for 1 datapoints within 1 minute	Actions enabled

Name	State	Last state update	Conditions	Actions
RISK!	In alarm	2023-03-14 19:59:36	CPUUtilization > 60 for 1 datapoints within 1 minute	Actions enabled

검증 및 결과



Monitoring

이메일로 통해 SNS 알람받는 것 확인

Primary Promotions 7 new Social 13 new
AWS Notifications, Kiwi.com, Gr...

★ AWS Notificat... 2 New ALARM: "RISK!" in Asia Pacific (Seoul) - You are receiving this email because your Amazon CloudWatch Alarm "RISK!" in the A...

You are receiving this email because your Amazon CloudWatch Alarm "RISK!" in the Asia Pacific (Seoul) region has entered the ALARM state, because "Threshold Crossed: 1 out of the last 1 datapoints [23.633212929517455 (14/03/23 10:34:00)] was greater than the threshold (1.0) (minimum 1 datapoint for OK -> ALARM transition)." at "Tuesday 14 March, 2023 10:39:53 UTC".

View this alarm in the AWS Management Console:
<https://ap-northeast-2.console.aws.amazon.com/cloudwatch/deeplink.js?region=ap-northeast-2#alarmsV2:alarm/RISK%21>

Alarm Details:

- Name: RISK!
- Description:
- State Change: OK -> ALARM
- Reason for State Change: Threshold Crossed: 1 out of the last 1 datapoints [23.633212929517455 (14/03/23 10:34:00)] was greater than the threshold (1.0) (minimum 1 datapoint for OK -> ALARM transition).
- Timestamp: Tuesday 14 March, 2023 10:39:53 UTC
- AWS Account: 880441279174
- Alarm Arn: arn:aws:cloudwatch:ap-northeast-2:880441279174:alarm:RISK!

검증 및 결과



Monitoring

Grafana 툴에 CloudWatch metric 추가 후 데시보드 확인

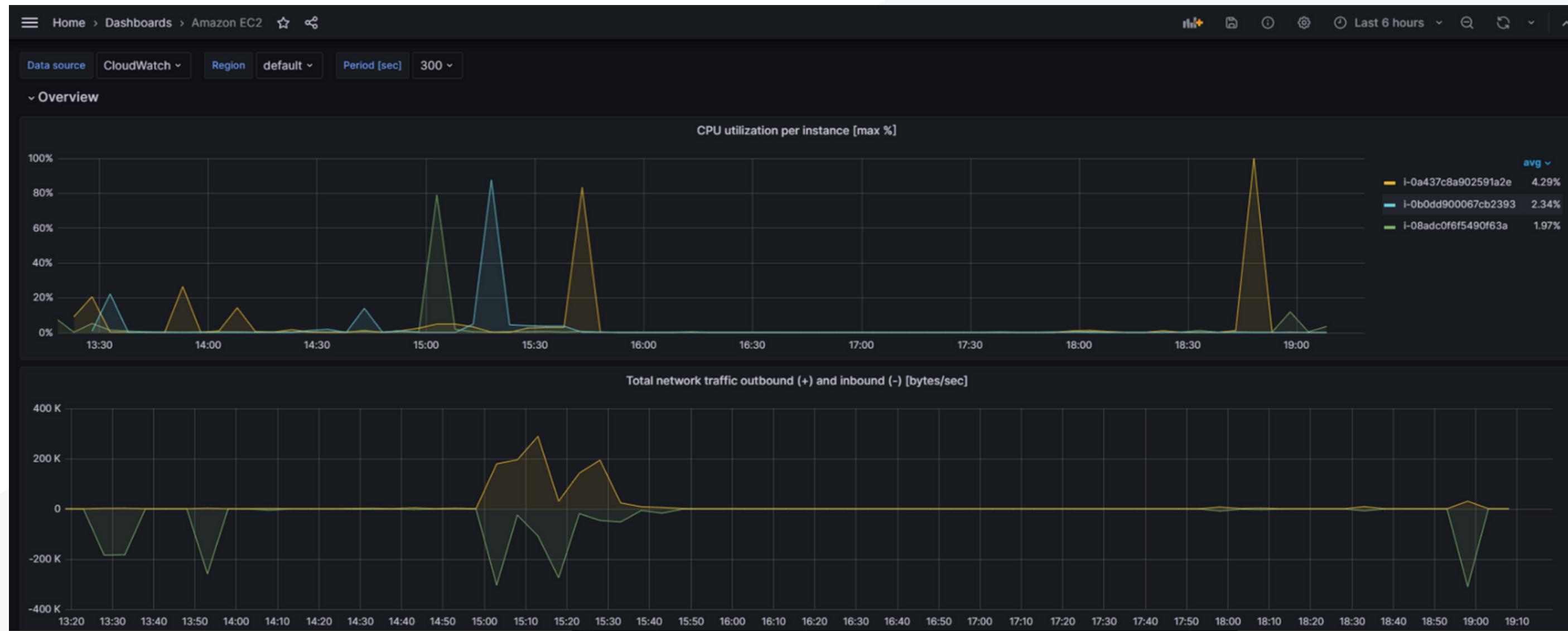
The screenshot shows the Grafana 'Dashboards' interface. At the top, it says 'Create and manage dashboards to visualize your data'. Below that is a search bar labeled 'Search for dashboards' and a 'Filter by tag' dropdown. A 'Starred' checkbox is also present. The main area displays a tree view of dashboard categories. The 'General' category is expanded, revealing two items: 'Amazon CloudWatch Logs' and 'Amazon EC2', both of which are also expanded. The 'Amazon CloudWatch Logs' item has a red rectangular box drawn around it, and the entire 'General' category node is also highlighted with a red box. The 'Amazon EC2' item also has a red rectangular box drawn around its node.

검증 및 결과

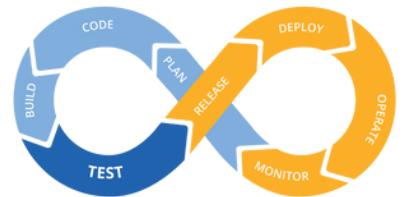


Monitoring

Grafana 실시간 모니터링 페이지 확인



검증 및 결과

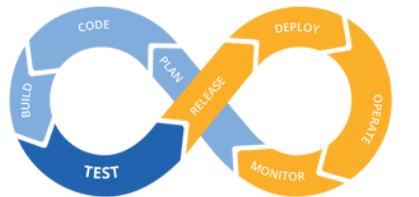


CI/CD

Jenkins job 생성 및 Github Webhook 연결 확인

S	W	Name ↓
		PROmetCI-CD
Webhooks allow external services to be notified when certain events happen. When triggered, Jenkins will send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide .		
http://54.180.128.159:8080/github-webhook/push (push)		

검증 및 결과



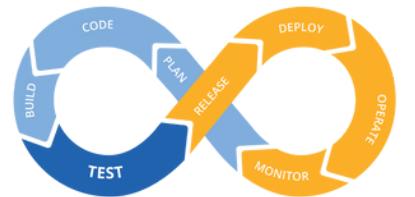
CI/CD

불필요한 정보 상태 확인

A screenshot of a web browser window. The title bar says 'PROmet' and the address bar shows 'Not secure | promet.space/news/'. The main content area displays two dark gray boxes with white text. The left box is titled '효과적 채용' and contains the quote: "기업의 핵심 포지션 채용일수록 PROmet 를 씁니다. 인재풀 수준이 높아 전부 스카웃하고 싶을 정도예요." The right box is titled '채용 솔루션' and contains the quote: "공고만 내고 기다려서는 채용하지 못할 분들을 먼저 발굴해 빠르게 닦을 수 있어요." Below these boxes, there is a red-bordered box containing the text '관련 뉴스'. To the right of this box, a code editor shows a snippet of HTML/CSS with line numbers 222 through 227. Line 225 contains the text '관련 뉴스' which is highlighted with a red border.

```
222     </div>
223     <div>
224         <br>
225         <p class="align-self-center" style="text-decoration: none; color: aliceblue; align-self: center;">관련 뉴스</p>
226     </div>
227 </div>
```

검증 및 결과



CI/CD

관련 코드 수정 후 Github push시 자동배포 확인

A screenshot of a web browser window. The address bar shows 'Not secure | promet.space/news/'. Below the address bar are two dark-themed cards, each with the 'PROmet' logo at the top.

PROmet

효과적 채용

“기업의 핵심 포지션 채용일수록 PROmet를 씁니다. 인재풀 수준이 높아 전부 스카웃하고 싶을 정도에요.”

PROmet

채용 솔루션

“공고만 내고 기다려서는 채용하지 분들을 먼저 발굴해 빠르게 닿을 수 있어요.”

222 </div>
223 </div>
224

검증 및 결과

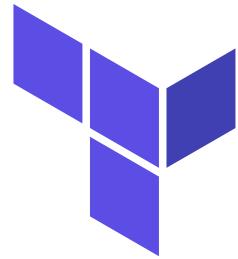


보안

SSL/TLS 적용 확인

A screenshot of a web browser window displaying the PROMET website. The browser's address bar shows the URL 'prometSpace'. A red box highlights the status bar at the bottom left of the browser window, which displays the message 'Connection is secure'. Below this, the main content area of the browser shows the PROMET logo and navigation links for 'ABOUT', '경과', and '성과'. The PROMET website itself has a dark background with white text.

검증 및 결과



Terraform

보안그룹 및 EC2 인스턴스 생성 확인

The screenshot shows two main sections of the AWS CloudFormation console:

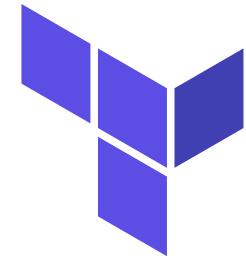
Security Groups (6)

Name	Security group ID	Security group name	VPC ID	Description	Owner
Bastion Host SG	sg-00c7afb047b382c3c	terraform-202304020...	vpc-09849a05327da443b	Managed by Terraform	880441279174
Database SG	sg-0266279a1aa9				
ALB SG	sg-03e9d7fc9bcb				
EFS SG	sg-089fe1907fb9e				
WebServer SG	sg-0164ed5ad9c21				

Instances (4)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
ASG-PROmet	i-09b052fa0cd832817	Running	t2.micro	Initializing	No alarms	ap-northeast-2c	-
Bastion Host	i-0ec3f2476090fd0ac	Running	t2.micro	2/2 checks passed	No alarms	ap-northeast-2a	-
Web Server	i-0554b4301728880a4	Running	t2.micro	2/2 checks passed	No alarms	ap-northeast-2a	-

검증 및 결과



Terraform

Application Load Balancer 및 대상 그룹 생성 확인

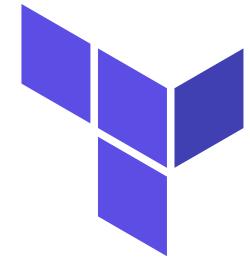
The screenshot shows two tabs of the AWS CloudFormation console:

- Target groups (1)**: A table with one item:

Name
alb-g20230402074245679900000001
- Registered targets (3)**: A table with three items:

Instance ID	Name	Port	Zone	Health status	Health status details
i-0554b4301728880a4	Web Server	80	ap-northeast-2a	unhealthy	Health checks failed
i-0554b4301728880a4	Web Server	80	ap-northeast-2a	unhealthy	Health checks failed
i-0554b4301728880a4	Web Server	80	ap-northeast-2a	unhealthy	Health checks failed

검증 및 결과



Terraform

Amazon Image 및 시작 템플릿 생성 확인

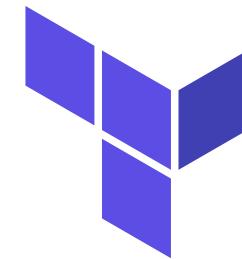
The screenshot shows two separate AWS CloudFormation console pages. The top page displays the 'Amazon Machine Images (AMIs)' section with one item listed:

Name	AMI ID	AMI name	Source	Owner	Visibility
-	ami-0aa11f76d43d848bf	webserver-ami	880441279174/webserver-ami	880441279174	Private

The bottom page displays the 'Launch templates' section with one item listed:

Launch template ID	Launch template name	Default version	Latest version
lt-0a6db6173d8580ba1	PROmet-Temp.2023040207462472120000000b	1	1

검증 및 결과



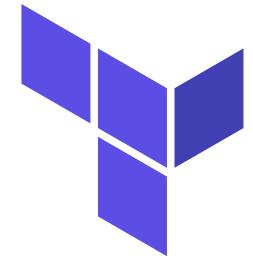
Terraform

Auto Scaling Group과 RDS 데이터베이스 생성 및 확인

The screenshot shows two separate AWS management console pages. The top page displays the 'Auto Scaling groups' section with one item listed. The bottom page displays the 'Databases' section of the RDS service, showing two database instances: 'terraform-20230402074248336800000007' (Primary) and 'promet-db-read-replica-0' (Replica). Both databases are in the 'Available' status.

DB identifier	Role	Engine	Region & AZ	Size	Status	Actions
terraform-20230402074248336800000007	Primary	MariaDB	ap-northeast-2a	db.t2.micro	Available	3 Actions
promet-db-read-replica-0	Replica	MariaDB	ap-northeast-2c	db.t2.micro	Available	-

검증 및 결과



Terraform

Elastic File System 생성 및 Output 출력 확인

File systems (1)								
<input type="button" value="Create file system"/>								
<input type="text"/> Filter by property values								
Name	File system ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard-IA / One Zone-IA	Provisioned Throughput (MiB/s)	File system state	Create time
<input type="radio"/> EFS-PROmet	fs-0686d03bb b2465a6e	Encrypted	6.00 KiB	6.00 KiB	0 Bytes	-	Available	Sun, 2023 07/4

Apply complete! Resources: 45 added, 0 changed, 0 destroyed.

Outputs:

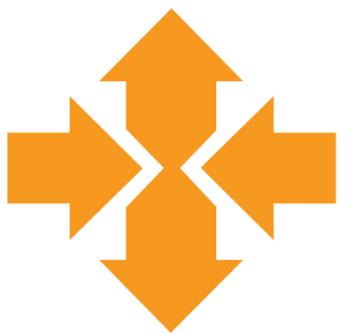
```
lb_dns_name = "ALB-Web-503934434.ap-northeast-2.elb.amazonaws.com"
```

향상된 기능



실시간 모니터링

AWS Cloudwatch metric를 받아 Grafana 대시보드에 실시간 출력



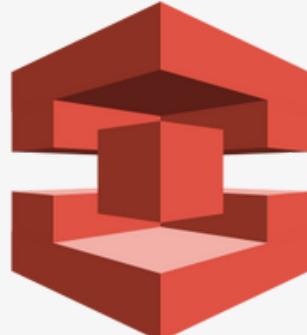
Auto Scaling 그룹

AWS Auto Scaling을 사용하여 인스턴스를 필요에 따라 자동으로 확장



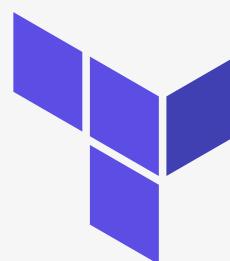
CI/CD

Jenkins와 Github을 활용하여 지속적인 통합 및 배포



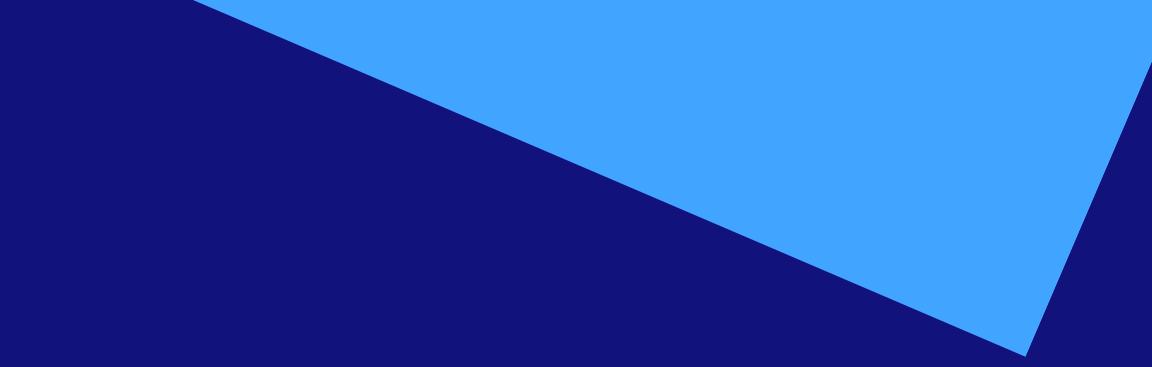
관리형 파일 시스템

AWS EFS를 통하여 데이터의 안정성과 효과적인 관리



코드형 인프라 구현

Hashicorp Terraform를 사용하여 Infrastructure as a Code 형태 구성



감사합니다