

# 멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

송지형

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# Speaker

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



현재 메가존클라우드에서 멀티클라우드 플랫폼 **SpaceONE** 백엔드 개발 리딩  
리눅스 파운데이션(LF) 정식 프로젝트 **Cloudforet** 메인테이너

KT - SK 플래닛 - 엔씨소프트에서  
클라우드 인프라 설계 및 통합 플랫폼 개발을 담당하였습니다.

\* *pycon 2017, 2019*

\* *openstack day 2016*

\* 패스트캠퍼스 강좌 및 대기업 클라우드/DevOps 강의 및 기술 자문

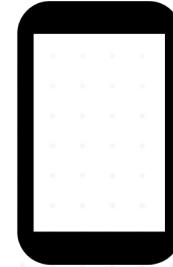
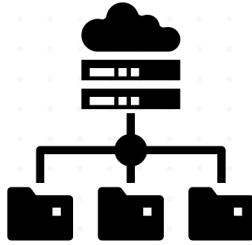
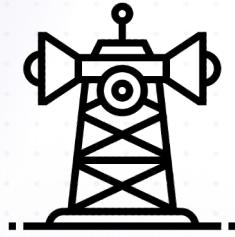
송지형

(bluese05@gmail.com)

# Cloudforet

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



다양한 산업군에서 겪었던 클라우드 경험들

디테일은 다르지만, 결국 비슷한 고민

클라우드를 넘어

IT 자원들을 어떻게 하면 효율적으로 관리할 수 있을까



개발

“인프라 현황”

“성능상 무리는 없는지”



운영

“인프라 자원 현황”

“장애 상황을 빠르게”



경영  
진

“매출 대비 인프라 비  
용”

“적절한 R&D 비용 측  
정”



재무

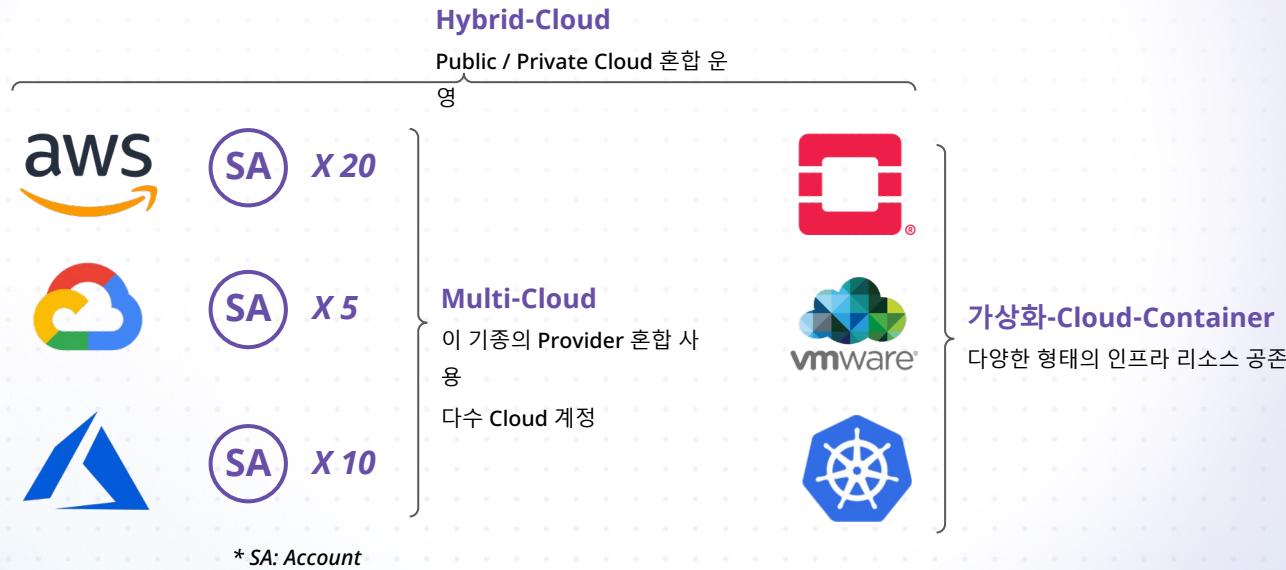
“과도한 클라우드 비용”

“미래 클라우드 비용 예  
측”

역할에 따라 IT 자원을 바라보는 뷰와 요구사항이 다른 어려움

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



클라우드 사용 패턴 다양화 되고 있는 현재

다양성 vs 운영의 복잡성

이런 이슈들을 효과적으로 해결하기 위해서는..

## 정보의 통합

언제든 원하는 데이터에 접근

## 공유

이러한 목표로 개발된 프로젝트입니다.



## cloudforet

멀티 클라우드 관리 플랫폼

AWS, Azure, Google Cloud 와 같은 퍼블릭 클라우드

Openstack (프라이빗 클라우드), Kubernetes 등

다양한 클라우드 자원의 **에셋(Asset)**, **비용**, **모니터링** **이벤트** 데이터를 통합 관리 플랫폼

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Features - Inventory Assets

멀티 클라우드 멀티 계정 자원 관리  
스케줄 기반 최신 리소스 업데이트  
데이터 쿼리 지원 (Console/API)  
데이터 필드 커스터마이징  
Excel Export 연계

The screenshot displays the SpaceONE Cloud Service Inventory interface. On the left, there's a sidebar with 'Favorites' (Distribution, Instance), 'Service Providers' (All, AWS, Google Cloud, Azure, Hyper Billing, Oracle Cloud, Alibaba Cloud), 'Service Categories' (Compute, Container, Database, Networking, Storage, Security, Analytics, Application Integration, Management), and 'Regions' (AWS Asia Pacific (Mumbai), AWS Asia Pacific (Singapore), AWS Asia Pacific (Seoul), AWS Asia Pacific (Sydney)). The main area shows 'All (0)' assets. A large arrow points from the bottom-left towards a detailed view of a specific server asset.

**Set columns**

**Attribute columns**

Search attribute columns: Search bar with placeholder 'Search attribute columns'.

Sort by: Recommendation, Alphabetical.

Column Name: Primary IP, Public IP, Account ID, Project, Last Collected, Instance ID, Key Pair, Cloud Service ID, Resource ID, Management State, Cloud Service Group, Cloud Service Type, Image, OS Type, OS Architecture.

Name	Instance Type	Core	Memory	Provider	Instance State	Availability Zone	OS	Primary IP	Public IP	Account ID
graceone-dev-supervisor-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2a	amazonefmx	172.16.18.48		5277000000000000000
graceone-dev-supervisor-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2c	amazonefmx	172.16.18.104		5277000000000000000
spaceone-dev-core-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2c	amazonefmx	172.16.18.113		5277000000000000000
spaceone-dev-core-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2a	amazonefmx	172.16.16.41		5277000000000000000
spaceone-dev-core-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2c	amazonefmx	172.16.18.178		5277000000000000000
trep-mongo-tation-stg-unit2	t3.xlarge	4	16	AWS	Stopped	ap-northeast-2c	linux	10.0.2.185		5277000000000000000
file master	t3.xlarge	4	16	AWS	Stopped	ap-southeast-1c	amazonefmx	10.0.100.209		5277000000000000000
file all-in-one	t3.xlarge	4	16	AWS	Stopped	ap-southeast-1a	amazonefmx	10.0.100.209		5277000000000000000
spaceone-dev-spin-dedicated-node	t3.xlarge	4	16	AWS	Running	ap-northeast-2a	amazonefmx	172.16.14.57		5277000000000000000

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Features - Inventory Assets

### 클라우드 리소스 모니터링

수집 결과 기반 리소스 정보 변경 기록 저장



spaceone-dev-core-node t3.xlarge 4  
tmp-mongodb-bastion-stg-amz12 t2.xlarge 4

Details Tag Related Member History Monitoring

History (5)

All Month 2022 Search

2022/10/29 23:08 Updated 1 security\_group [...]

2022/10/25 23:06 Updated 1 security\_group [...]

2022/10/24 23:04 Updated 1 security\_group [...]

2022/10/21 06:47 Updated 1 disks [...]

2022/10/13 23:00 Created 52 name account instance\_type in\_addresses

Changes (1)

Changed Keys data - disks

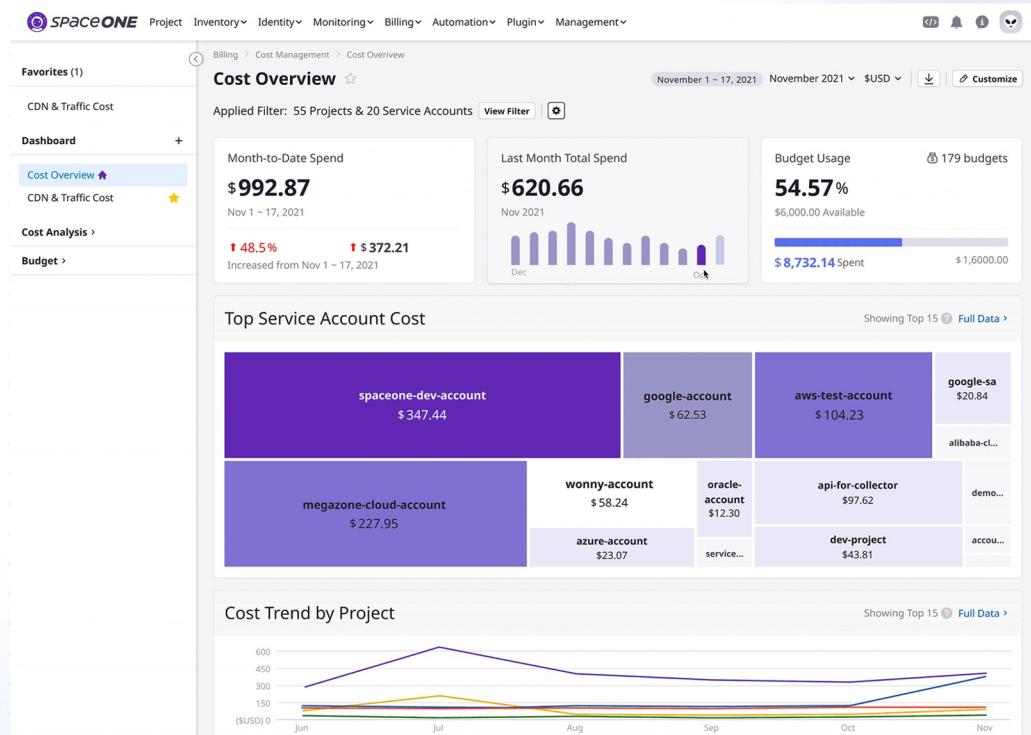
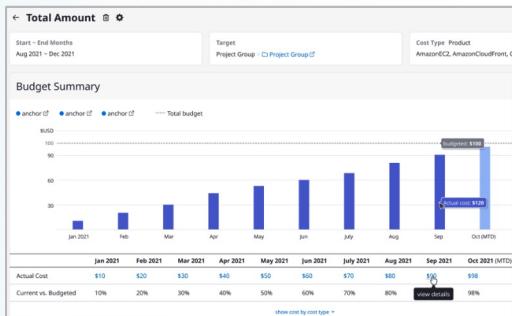
Previous	Changed
1 {	1 {
2 "device": "/dev/xvda",	2 "device": "/dev/xvda",
3 "device_index": 1,	3 "device_index": 6,
4 "disk_type": "EBS",	4 "disk_type": "EBS",
5 "size": 100,	5 "size": 100,
6 "tags": {}	6 "tags": {}
7 "encrypted": false,	7 "encrypted": false,
8 "iops": 3000,	8 "iops": 3000,
9 "volume_id": "vol-07109a65c97e5fa2c",	9 "volume_id": "vol-07109a65c97e5fa2c",
10 "volume_type": "gp3"	10 "volume_type": "gp3"
11 }	11 }
12 },	12 },
13 },	13 },
14 },	14 },
15 "device": "/dev/xvdba",	15 "device": "/dev/xvdba",
16 "device_index": 0,	16 "device_index": 0,
17 "disk_type": "EBS",	17 "disk_type": "EBS",
18 "size": 16,	18 "size": 16,
19 "tags": {}	19 "tags": {}
20 "encrypted": false,	20 "encrypted": false,
21 "iops": 3000,	21 "iops": 3000,
22 "volume_id": "vol-009ac35fa9425fd83",	22 "volume_id": "vol-009ac35fa9425fd83",
23 "volume_type": "gp3"	23 "volume_type": "gp3"
24 }	24 }
25 }	25 }
26 }	26 }

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Features - Cost Explorer

상세 클라우드 비용 데이터 제공  
데이터 다각도 Pivot/Drilldown  
커스텀 대시보드 지원  
자원 예산 관리



# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Features - Alert Manager

통합 인시던트 관리  
다양한 종류 이벤트 수신 및 Rule 기반 Notification

### Add Webhook

Name:

Type:

API Direct	AWS SNS	Docker Hub
Grafana	Jenkins	Jira
Terraform Cloud	Zabbix	Prometheus

Pushed Event:

Pushed Event Details:

2022-10-28 [INFO] New image tag(1.10.3-rc3.20221028.172426) has been pushed to pyengine/console to pyengine/console

New image tag(1.10.3-rc3.20221028.172426) has been pushed to pyengine/console

Alert Manager > Alert > alert-61d41ff6380

### New image tag(1.10.3-rc3.20221028.172426) has been pushed to pyengine/console #155822

Status: Triggered (Low) Assigned to: [Assign] Duration: 2d 16h 6m

Description: New image tag(1.10.3-rc3.20221028.172426) has been pushed to pyengine/console

Rule: --

Severity: AAA Escalation Policy: AAA Project: プロジェクト 글로벌-이전기/자체 Change: Triggered By: docker Resource Name: Status Update: New Update Pushed Event: Details

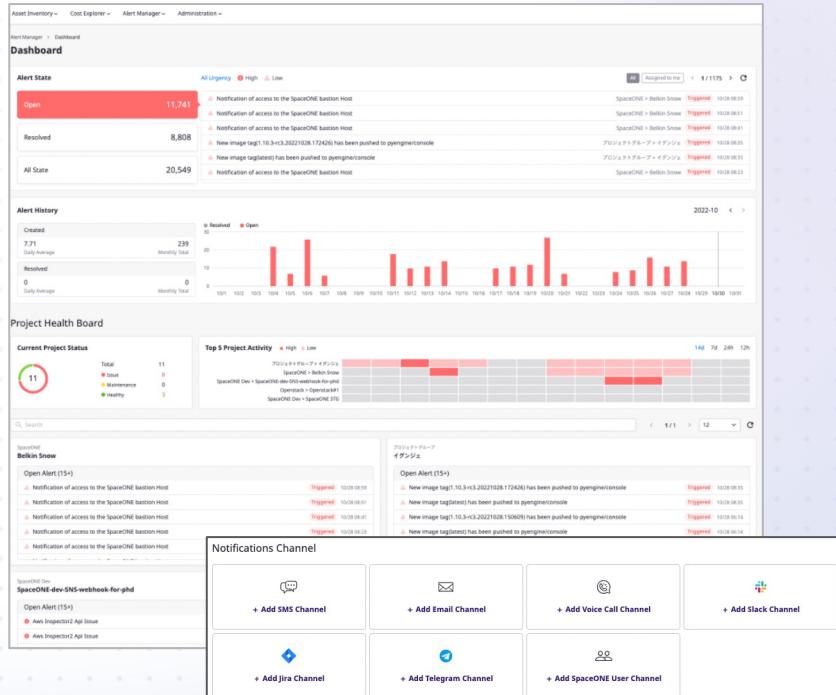
Responder: [Step 1] L1 (Correct) Note: [Compose]

[SpaceONE User] BY TEST ON pyengine@me.co.kr [SpaceONE Dev] Docker Snow [SpaceONE Dev] Docker Snow Channel: ON

Additional Responder (0)

Note:

Project Dependency: No Dependency



# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

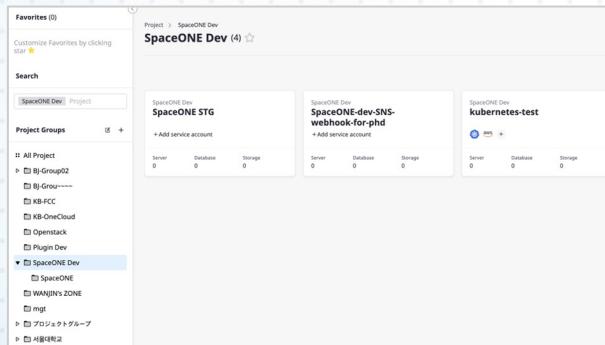
## Features - IAM

자체 RBAC 기반 API 인증/권한 처리

Domain - Project - User - Role - Policy

계층 권한 관리

콘솔 페이지 기반 접근 제어 설정 가능



← Project Manager Access View Only

Type  
(Managed Policy)

ID  
policy-managed-project-manager

Description

Permission

```
1 identity.Domain.get
2 identity.Domain.list
3 identity.Endpoint.list
4 identity.Provider.get
5 identity.Provider.list
6 identity.Provider.stat
7 identity.ServiceAccount.+
8 identity.ProjectGroup.+
9 identity.Project.+
10 identity.Policy.get
11 identity.Policy.list
12 identity.Policy.stat
13 identity.Role.get
14 identity.Role.list
15 identity.Role.stat
16 identity.RoleBinding.get
17 identity.RoleBinding.list
18 identity.RoleBinding.stat
19 identity.User.update
20 identity.User.find
21 identity.User.sync
22 identity.User.get
23 identity.User.list
24 identity.User.stat
25 identity.APIKey.+
26 secret.Secret.create
27 secret.Secret.update
28 secret.Secret.delete
29 secret.Secret.update_data
30 secret.Secret.get
31 secret.Secret.list
32 secret.Secret.stat
33 secret.TrustedSecret.get
34 secret.TrustedSecret.list
35 secret.TrustedSecret.stat
36 secret.SecretGroup.+
37 repository.Repository.get
```

← Edit Role

Base Information

Name  
Project Manager

Description (optional)

Role Type  
User (Invited projects only)

Page Access

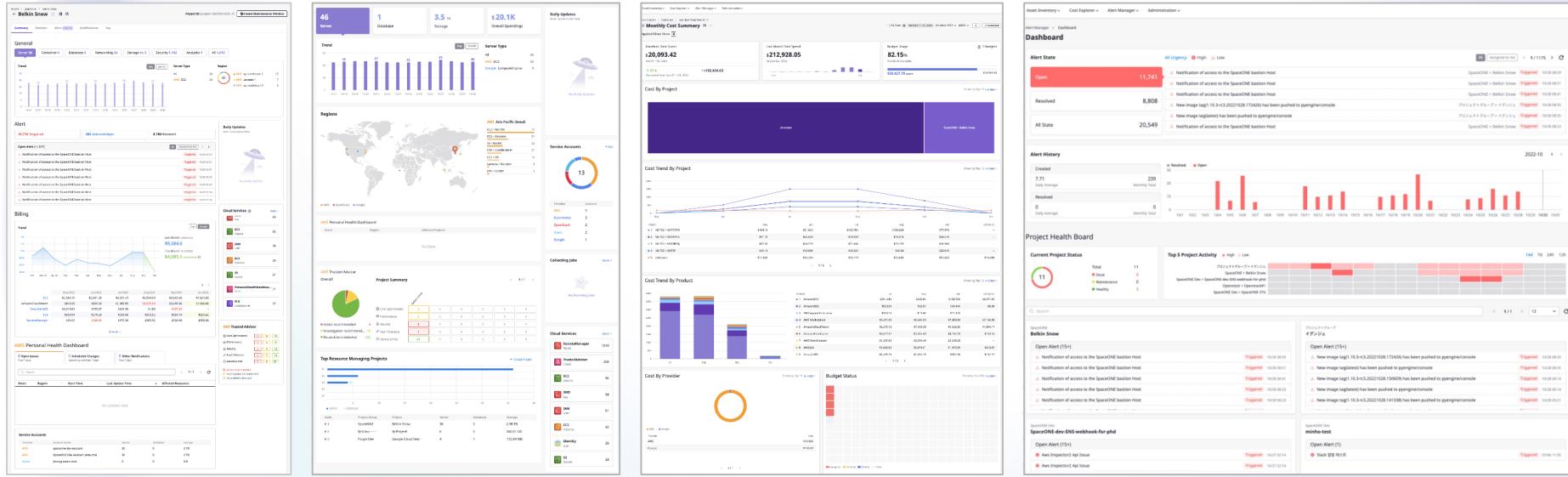
Menu	Permission
All	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Project	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Asset Inventory	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Cloud Service	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Server	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Collector	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Service Account	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage
Cost Explorer	<input type="checkbox"/> View <input checked="" type="checkbox"/> Manage

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Console & CLI & API

유려하고 사용자 친화적 UI/UX 콘솔



## Features - Console & CLI & API

**SpaceCTL : Cloudforet CLI (API Fully Supported)**

Installation easily (pip)

API Key 를 활용한 CLI 권한 처리

Task 기반 CLI 작업 연계 처리 기능 (*Motivated from Ansible*)

My Page > My Account > Access with API & CLI

### API Key

+ Create API Key Action Able to create API key up to 2.

API Key ID	State	Created
api-key-600c454619ad	Enabled	2022-07-12 04:53:03

### Endpoints

Service	Name	Version	Endpoint
inventory	Inventory Service	grpc+ssl://inventory.api.dev.spaceone.dev:443/v1	
monitoring	Monitoring Service	grpc+ssl://monitoring.api.dev.spaceone.dev:443/v1	
statistics	Statistics Service	grpc+ssl://statistics.api.dev.spaceone.dev:443/v1	
notification	Notification Service	grpc+ssl://notification.api.dev.spaceone.dev:443/v1	

```
+ spacectl list inventory.CloudServiceType --minimal
```

cloud_service_type_id	name	provider	group	service_code	is_primary	is_major	resource_type
cloud-svc-type-7fd1443039ff1	API	aws	APIGateway	AmazonApigateway	True	True	inventory.CloudService
cloud-svc-type-0e468de6037f3	Certificate	aws	CertificateManager	AmazonCertificateManager	True	True	inventory.CloudService
cloud-svc-type-0e26388793653	Distribution	aws	CloudFront	AmazonCloudfront	True	True	inventory.CloudService
cloud-svc-type-0e0d19308e3	Host	aws	CloudFront	AmazonCloudfront	True	True	inventory.CloudService
cloud-svc-type-0e26388793653	Connection	aws	DirectConnect	AWSDirectConnect	True	True	inventory.CloudService
cloud-svc-type-83c279fde2c1	DirectConnectGateway	aws	DirectConnect	AWSDirectConnect	True	True	inventory.CloudService
cloud-svc-type-43dfff113236	LAG	aws	DirectConnect	AWSDirectConnect	True	True	inventory.CloudService
cloud-svc-type-4dc20adda38	VirtualPrivateGateway	aws	DirectConnect	AWSDirectConnect	True	True	inventory.CloudService
cloud-svc-type-f3467357599	Cluster	aws	DocumentDB	AmazonDocDB	True	True	inventory.CloudService
cloud-svc-type-b4674b654c36	ParameterGroup	aws	DocumentDB	AmazonDocDB	True	True	inventory.CloudService
cloud-svc-type-94c13b2710e	SubnetGroup	aws	DocumentDB	AmazonDocDB	True	True	inventory.CloudService
cloud-svc-type-e5832d950490	Table	aws	DynamoDB	AmazonDynamoDB	True	True	inventory.CloudService
cloud-svc-type-7e59fd225e7f	AMI	aws	EC2	AmazonEC2	True	True	inventory.CloudService
cloud-svc-type-a332b3798e80	AutoScalingGroup	aws	EC2	AmazonEC2	True	True	inventory.CloudService
cloud-svc-type-d6d431a9534	EIP	aws	EC2	AmazonEC2	True	True	inventory.CloudService
cloud-svc-type-3f90a68ec95d	Instance	aws	EC2	AmazonEC2	True	True	inventory.CloudService
cloud-svc-type-f90b4f9580f3	LaunchConfiguration	aws	EC2	AmazonEC2	True	True	inventory.CloudService
cloud-svc-type-abc877f2df1	LaunchTemplate	aws	EC2	AmazonEC2	True	True	inventory.CloudService

```
+ service_health_dashboard spacectl apply shd.yaml
```

```
TASK [Init Time] ****
TASK [List Cloud Service Type] ****
TASK [List Service Health Dashboard] ****
(DEBUG) =>
□
```

# Cloudforet

# 멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

# Features - Console & CLI & API

## 500 여개가 넘는 API 제공 (gRPC)

**Cloud Service**

A CloudService is data of an "instance" of a "resource". A CloudService follows the pre-created classification system of a CloudServiceType and indicates the property value of the "resource".

Package : spacetech.apisinventory.v1

**CloudService**

**CloudService Methods:**

Method	Request	Response
create	CreateCloudServiceRequest	CloudServiceInfo
update	UpdateCloudServiceRequest	CloudServiceInfo
delete	DeleteCloudServiceRequest	people protocol:Empty
get	GetCloudServiceRequest	CloudServiceInfo
list	CloudServiceQuery	CloudServiceInfoList
stat	CloudServiceCloudQuery	google protobuf:Struct

**create**

**POST /inventory/cloudservices**

Creates a new CloudService. A CloudService instance is created based on data including the resource's attribute values. When creating, the classification information defined by CloudServiceType is used to determine which CloudService instance has service metadata when it is the collection history for the instance by plugin.

Type	Request	Message
Request	CreateCloudServiceRequest	CloudServiceInfo
Response		

**Request Example** **Response Example**

```
{
  "cloud_service_type": "app",
  "parent_id": "1234567890-1234-0987-6543-210987654321",
  "name": "MyApp",
  "account": "1234567890-1234-0987-6543-210987654321",
  "ip_addresses": [{}],
  "data": {
    "label": "WebServer",
    "value": "192.168.1.101"
  },
  "tags": [
    "tag1", "tag2", "tag3"
  ],
  "location": {
    "region_name": "ap-northeast-1",
    "availability_zone": "az1"
  },
  "diagnostics": [
    {}
  ]
}
```

[ <https://cloudforet.gitbook.io/cloudforet-apis> ]

cloudflare-iot/api

master

Pull requests Issues Marketplace Explore

github bin docs proto/spacetime/api/inventory/v1 proto/spacetime/api/billing board/v1 config/v1 core/v1 cost\_analysis cost\_saving/v1 file\_manager/v1 identity inventory plugin change\_history.proto cloud\_service.proto CloudService, ServiceTag, ServiceType, Collector, Job, JobTask, Region, ResourceGroup, Server, Monitoring, Notification, Plugin, PowerScheduler, Repository, SampleV1, SecretV1, SpatAutomaStat, Statistics, ReleaseNotes, TemplatePython, ThirdParty

quests Actions Projects Wiki Security Insights Settings

I master api proto spacetime /api /inventory /v1 /cloud\_servic

Seolmin Kwon fix type ✓

Ri2 contributors

568 lines (539 sloc) | 18.6 KB

```
1 //  
2 desc A CloudService is data of an 'instance' of a 'resource'. A  
3 syntax = "proto3";  
4  
5 package spacetime.api.inventory.v1;  
6  
7 import "google/protobuf/empty.proto";  
8 import "google/protobuf/timestamp.proto";  
9 import "google/api/annotations.proto";  
10 import "spacetime/api/core/v1/query.proto";  
11  
12  
13  
14 service CloudService {  
15     /*  
16     desc Creates a new CloudService. A CloudService instance is  
17     request example:->  
18         {  
19             "cloud_service_group": "Key",  
20             "provider": "aws",  
21             "cloud_service_group": "NSW",  
22             "cloud_service_name": "cloud_service_test",  
23             "account_id": "12345678901234567890",  
24             "launched_at": "2020-09-07T15:00:54.000Z",  
25             "ip_addresses": [],  
26             "data": {},  
27             "tags": null,  
28             "origin": "AWS_RDS",  
29             "cloudwatch": {  
30                 "region_name": "ap-northeast-1",
```

[ <https://github.com/cloudforet-io/api> ]

The screenshot shows the GitHub repository page for `spaceone-api`. The top navigation bar includes links for 'Search projects', 'Help', 'Sponsors', 'Log in', and 'Regions'. A search bar is present at the top. Below the header, there's a banner with the text 'spaceone-api 1.10.2' and a link to 'pio install spaceone-api'. The main content area is titled 'spaceONE API ProtoBuf'.

**Navigation:**

- Project description
- Release history** (selected)
- Download files

**Project Links:**

- Homepage

**Statuses:**

New database for this project was created on Oct 19, 2022 by the user who published it on GitHub. [View details](#)

**Milestones:**

- spaceone-dev
- sunhost

**Sponsors:**

NVIDIA is a sustainability sponsor of the SpaceONE Foundation.

**Helpful links:**

- Get started
- Get help

**Release history:**

Version	Published	Type
1.10.3rc2	Oct 19, 2022	PRE-RELEASE
1.10.3rc1	Oct 18, 2022	PRE-RELEASE
1.10.2rc5	Oct 14, 2022	PRE-RELEASE
1.10.2rc4	Oct 9, 2022	PRE-RELEASE
1.10.2rc3	Oct 4, 2022	PRE-RELEASE
1.10.2rc2	Sep 29, 2022	PRE-RELEASE
1.10.2rc1	Sep 27, 2022	PRE-RELEASE
1.10.2dev7	Sep 26, 2022	PRE-RELEASE
1.10.2dev6	Sep 25, 2022	PRE-RELEASE

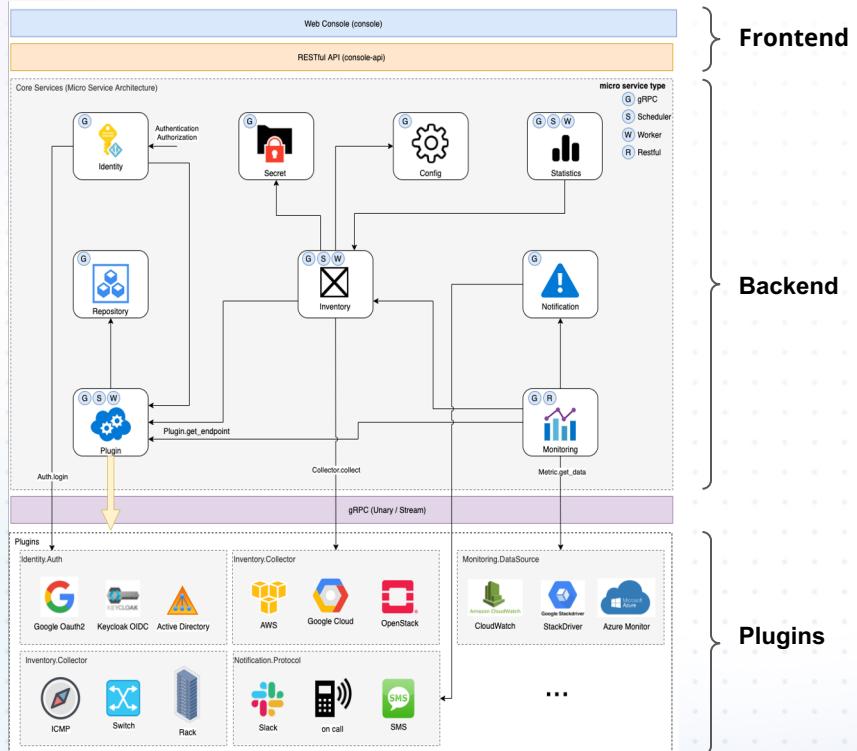
**Reliable notifications | Edit feed**

↳ <https://pypi.org/search/?q=spaceone-api>

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Architecture



マイ크로 서비스 13개 / 플러그인 50 개로 구성

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



**SpaceONE**

클라우드 리소스

서비스 어카운트

빌링 데이터 Rows

Daily Events

**800K+**

**2,000+**

**100M+**

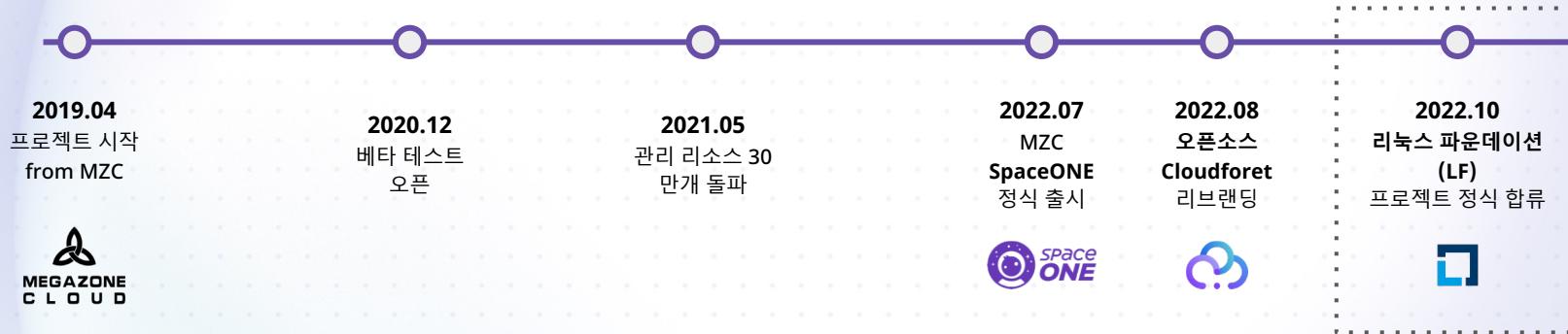
**1,000+**

# Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

## Footprint of Cloudforet

Cloudforet 의 여정



오픈소스 전략을 가져가는 이유

# 오픈소스 프로젝트의 시작

# 오픈소스(Opensource)로서의 시작

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

오픈 소스를 통해

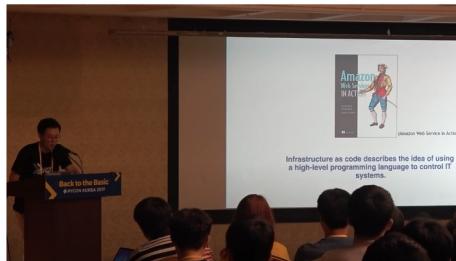
전세계 많은 엔지니어들에게 기억될 만한

클라우드 플랫폼을 만들고 싶다는

막연한 꿈과 같은 계획



2016 Openstack day



Pycon 2017



Pycon 2019

(좌절 & 그리고 다시 시도)

뒤돌아 보니

저도 참 끗끗하게 도전 했더라고요

# 오픈소스(Opensource)로서의 시작

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

우리의 뜻을 공감해 준 회사를 만나  
본격적으로 시작된 새로운 도전



# 오픈소스(Opensource)로서의 시작

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

어차피 시작한 이 판.. 좀 더 크게 키워볼까



Kubernetes 를 중심으로 한  
Ecosystem 형태



CNCF 상위의 리눅스 재  
단



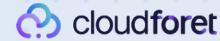
"SpaceONE 은 Platform Stack 에  
가깝기 때문에 방향성이 다르다는  
의견"



"SpaceONE 의 명칭과 로고의 소유  
권 이슈 발생 여지가 존재"



오픈소스 프로젝트 리브랜딩



# 오픈소스(Opensource)로서의 시작

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

2022.10월

Linux Foundation(LF) 정식 프로젝트 (Series) 등재

Technical Charter (the "Charter")  
for  
Cloudforet a Series of LF Projects, LLC

Adopted 10-7-2022

This Charter sets forth the responsibilities and procedures for technical contribution to, and oversight of, the Cloudforet open source project, which has been established as Cloudforet a Series of LF Projects, LLC (the "Project"). LF Projects, LLC ("LF Projects") is a Delaware series limited liability company. All contributors (including committers, maintainers, and other technical positions) and other participants in the Project (collectively, "Collaborators") must comply with the terms of this Charter.

**1. Mission and Scope of the Project**

- The mission of the Project is to develop an open source multi & hybrid cloud management platform.
- The scope of the Project includes collaborative development under the Project License (as defined herein) supporting the mission, including documentation, testing, integration and the creation of other artifacts that aid the development, deployment, operation or adoption of the open source project.

THE LINUX FOUNDATION PROJECTS

cloudforet

## Manage All Cloud Resources in One Platform

Cloudforet is an Open Source Platform for Enabling Integrated Management of Multi-Clouds.

<https://cloudforet.io>

Find a project to contribute to:

FILTER PROJECT BY ▾

Show All

All	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Cicero	CICN	Projects	Man)	CLAMP																						
Cloud Custodian	Cloud Events	Civil Infrastructure Platform (CIP)	CLA Bot	Cloud Hypervisor																						
Cloud Native Computing Foundation (CNCF)	CloudEvents	Cloud Foundry Foundation (CFF)	Cloud Native Application Bundle (CNAB)																							
COBOL Programming Course	CNI-Genie	ClusterDuck Protocol	CNI																							
	COBOL Working Group	Coalition for Content Provenance and Authenticity (C2PA)	Coalition for Content Provenance and Authority																							

<https://linuxfoundation.org/projects>

cloudforet | THE LINUX FOUNDATION

# 오픈소스(Opensource)로서의 시작

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

유저의 피드백 기준으로  
빠르게 에러를 수정해 나가고 있음

Pull requests list:

- Modify data.account\_id -> account in metadata
- Add account in match\_rules
- Bug: RDS>Database : Cluster object no attribute tags
- Add CloudWatch info for monitoring metrics
- Add CloudTrail condition data in each cloud service
- Exclude Name and Resource ID from Table and Search metadata
- An error occurred (InvalidParameterValue) when calling the DescribeDBClusters operation: Unrecognized engine name: doob-\*
- cannot connect to the endpoint URL: "https://lightsail.eu-south-1.amazonaws.com"
- add all storage type object size for S3
- Collecting Error: An error occurred (TooManyRequestsException) when calling the GetResources operation (reached max retries: 4): Too Many Requests
- Collecting Error: Could not connect to the endpoint URL: "https://lightsail.ap-east-1.amazonaws.com"
- PostgreSQL based RDS does not work(collected)
- Collecting Error: Not Support region (ne-south-1) Lightsail

기업 외 다양한 단체 (ex. 대학) 연계

Open SOURCE SOFTWARE



Community 를 통한 개발력 확보



초기 점유율 높이는데 유리



다양한 피드백 확보. 선순환 구조 가능



Global 진출 용이

실제 Openstack 연동 플러그인은 H기업 개발자가 컨트리뷰트

### Openstack Collector

version 1.0.0 License Apache 2.0

Plugin to collect Openstack

SpaceONE's plugin-openstack-inven-collector is a convenient tool to get resource data from Openstack.

Find us also at Dockerhub

Latest stable version : developing

# Deep dive into Cloudforet

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

다양한 클라우드를 품을 수 있는 구조



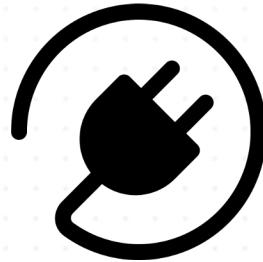
cloudforet

어떻게 Cloudforet 의 생태계에  
모든 클라우드를 담을 수 있을까  
구조적 고민

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

다양한 클라우드를 품을 수 있는 구조



Plugin Architecture

외부 시스템과 유기적으로 연동하기 위한 구조

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

다양한 클라우드를 품을 수 있는 구조

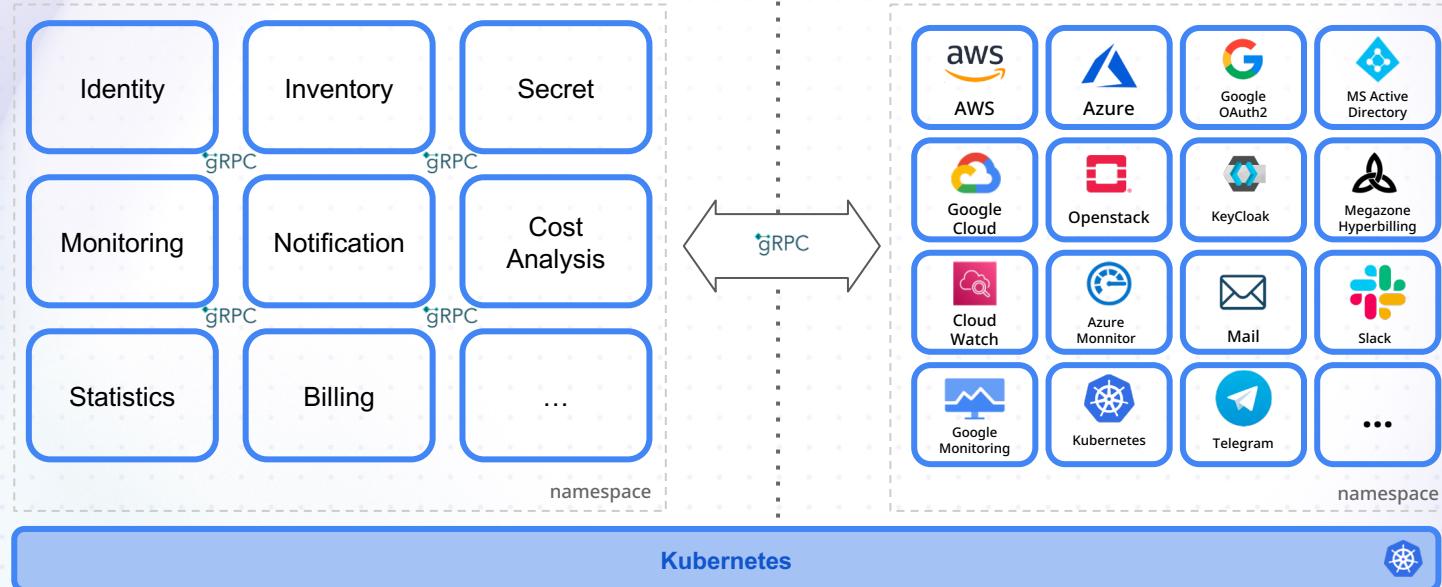


Cloud-native Plugin Architecture (CNPA)

Kubernetes 의 장점을 극대화하기로 결정

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법



## Core 서비스

Cloudforet 기능을 담당하는 다수의 마이크로 서비스들로  
구성  
개별 서비스는 모두 별도의 Pod 로 동작

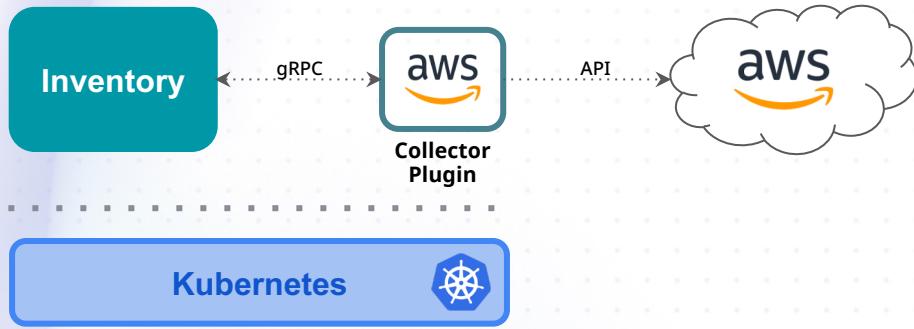
## Plugin

Core 에서 정의한 기능별로 지원 영역을 확장해 나가는 역할  
Plugin 도 하나의 Pod 로 통합 cloudforet | THE LINUX FOUNDATION



# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

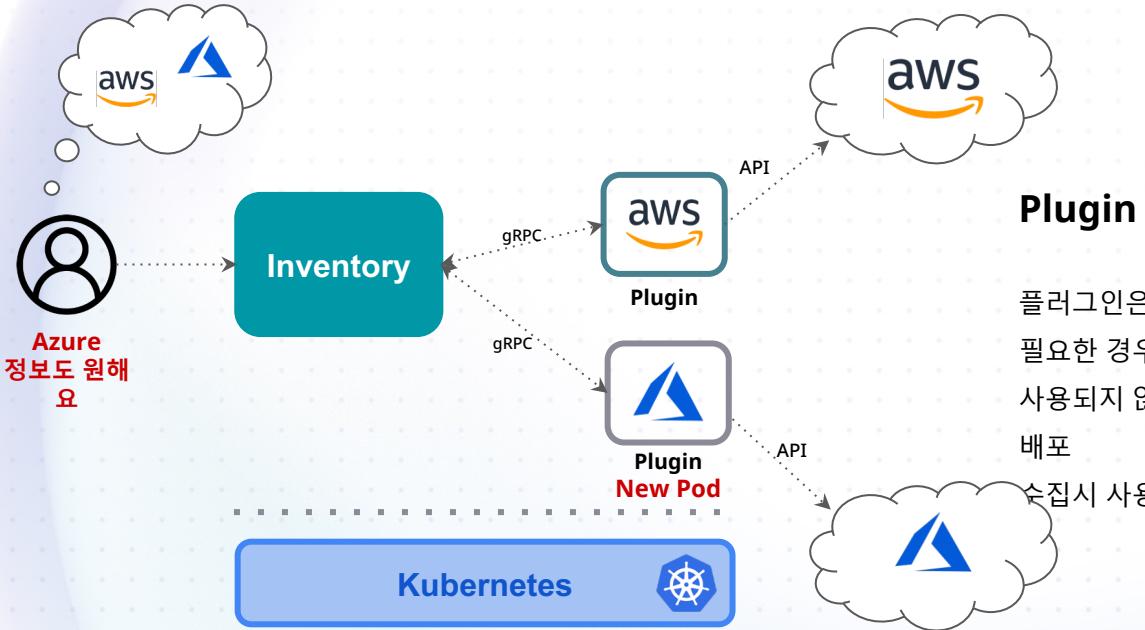


## Plugin

플러그인은 모두 Kubernetes 상의 개별 Pod로 구성  
플러그인도 하나의 마이크로서비스 형태  
AWS 정보를 수집하는 플러그인의 경우,  
사용자가 등록한 AWS 인증 정보에 따라  
AWS API(SDK)를 활용해 리소스 정보 수집

# Deep dive into Cloudforet

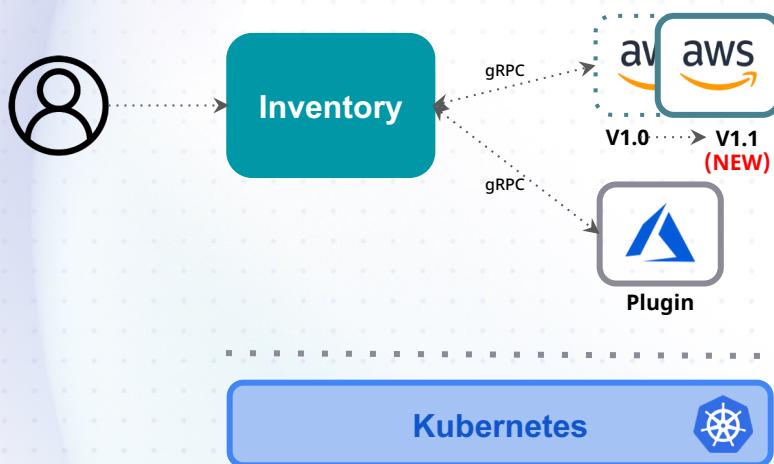
멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법



Plugin은 사용자의 요청에 따라 유동적으로 배포  
필요한 경우에만 Pod 배포,  
사용되지 않는 경우 자동 삭제, 이 후 재요청이 있는 경우  
배포  
수집시 사용되는 자원에 대한 효율화

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

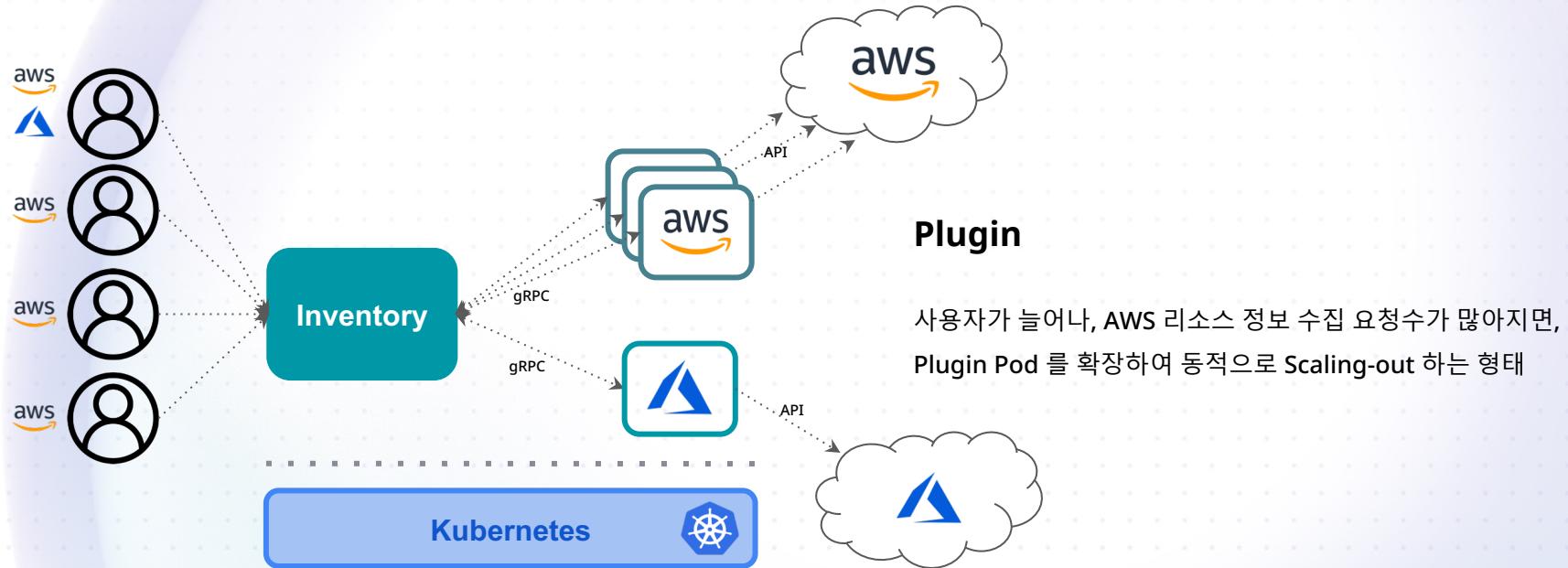


## Plugin

플러그인도 별도 Pod 이기 때문에, 언제든 신규 업데이트 가능  
코어와 무관하게 별개의 라이프 사이클로 배포 운영

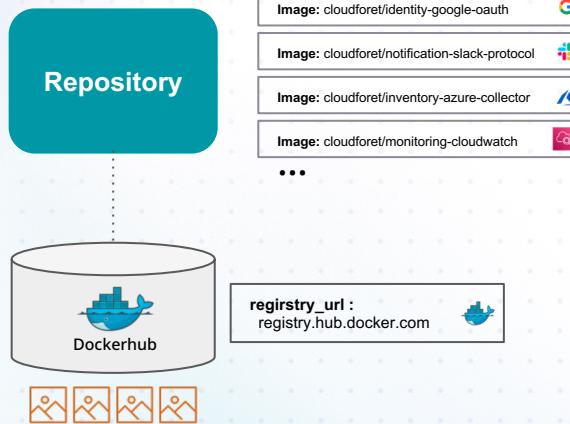
# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법

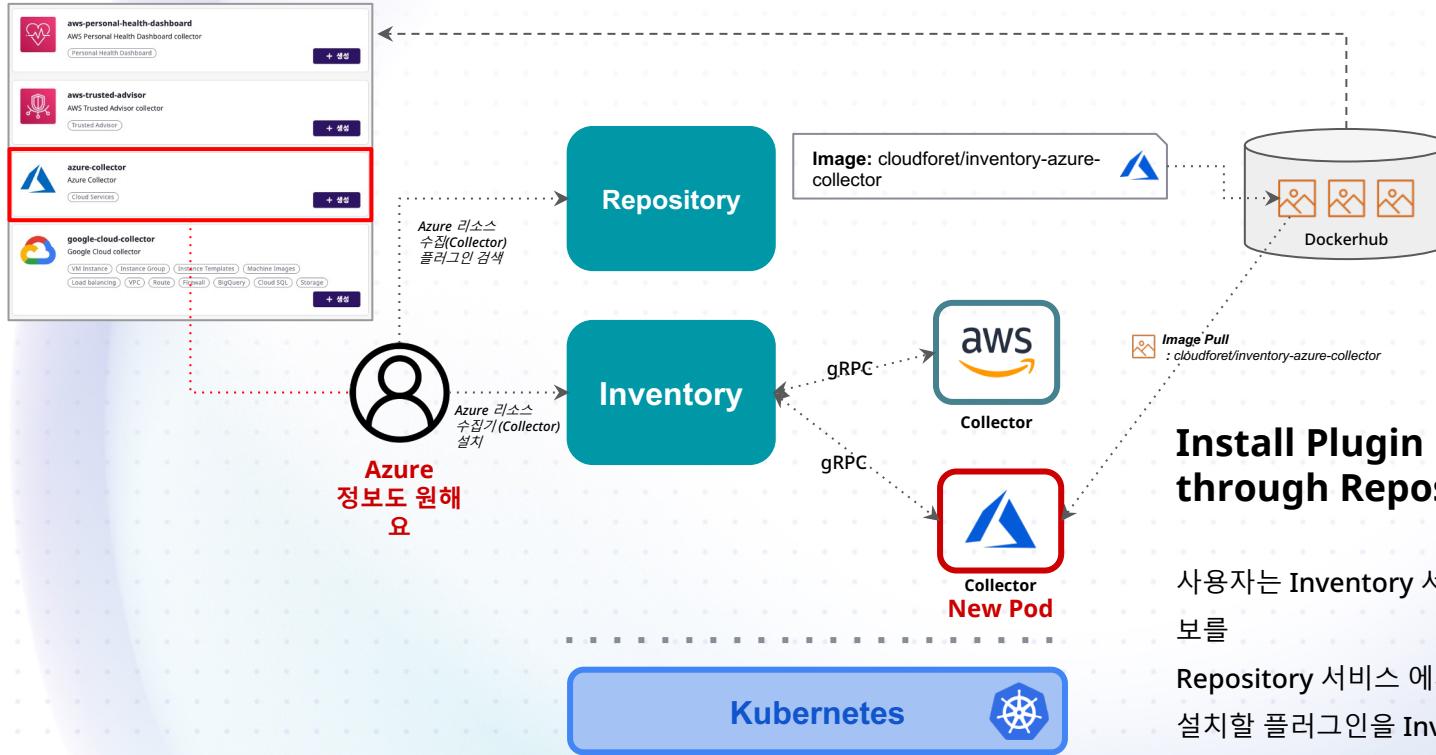


## Repository

배포 가능한 플러그인 정보들을 관리하는 마이크로 서비스  
플러그인들은 모두 컨테이너들이기 때문에  
플러그인들의 컨테이너 이미지와 Registry URL 정보를 관리

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

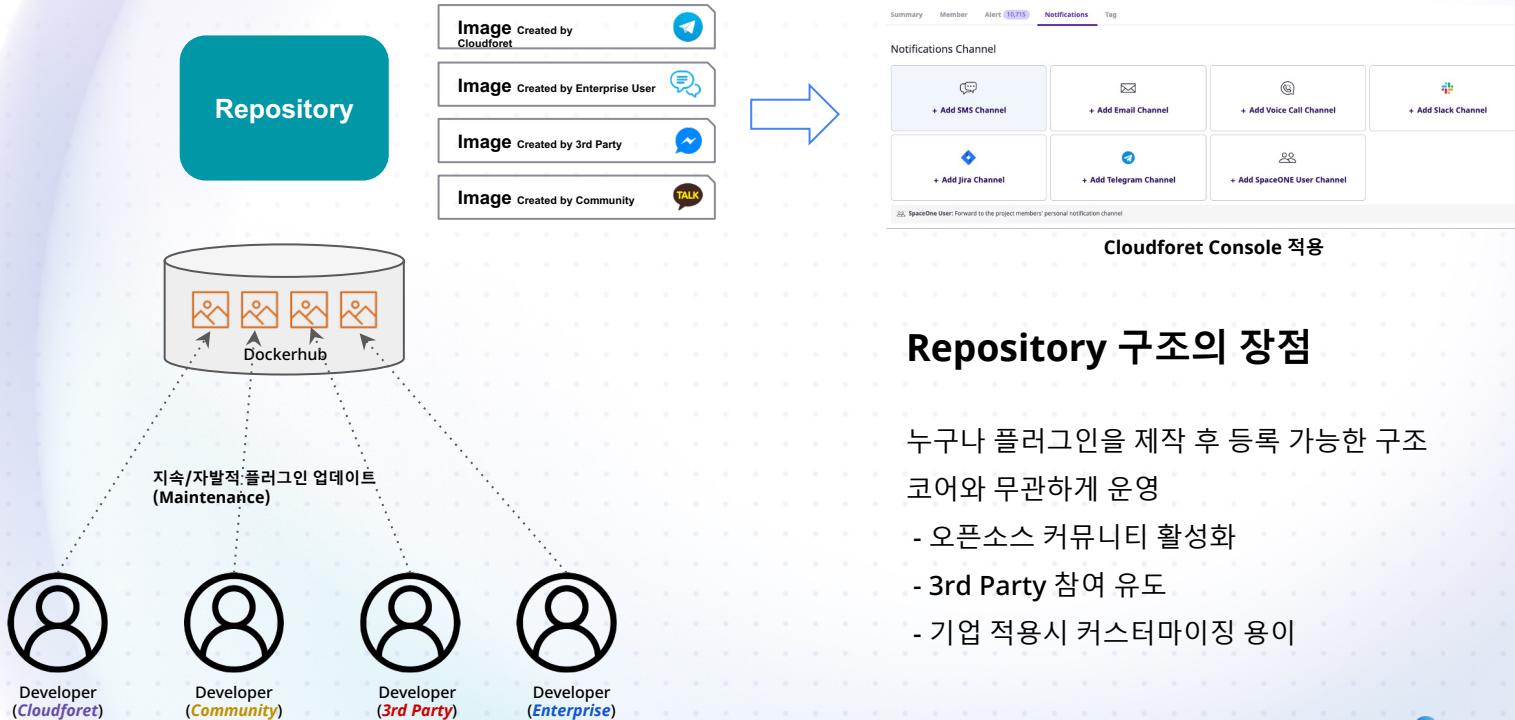


사용자는 Inventory 서비스에 설치 가능한 플러그인 정보를

Repository 서비스에서 검색  
설치할 플러그인을 Inventory 서비스의 Collector로 배포

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법



Developer  
(Cloudforet)

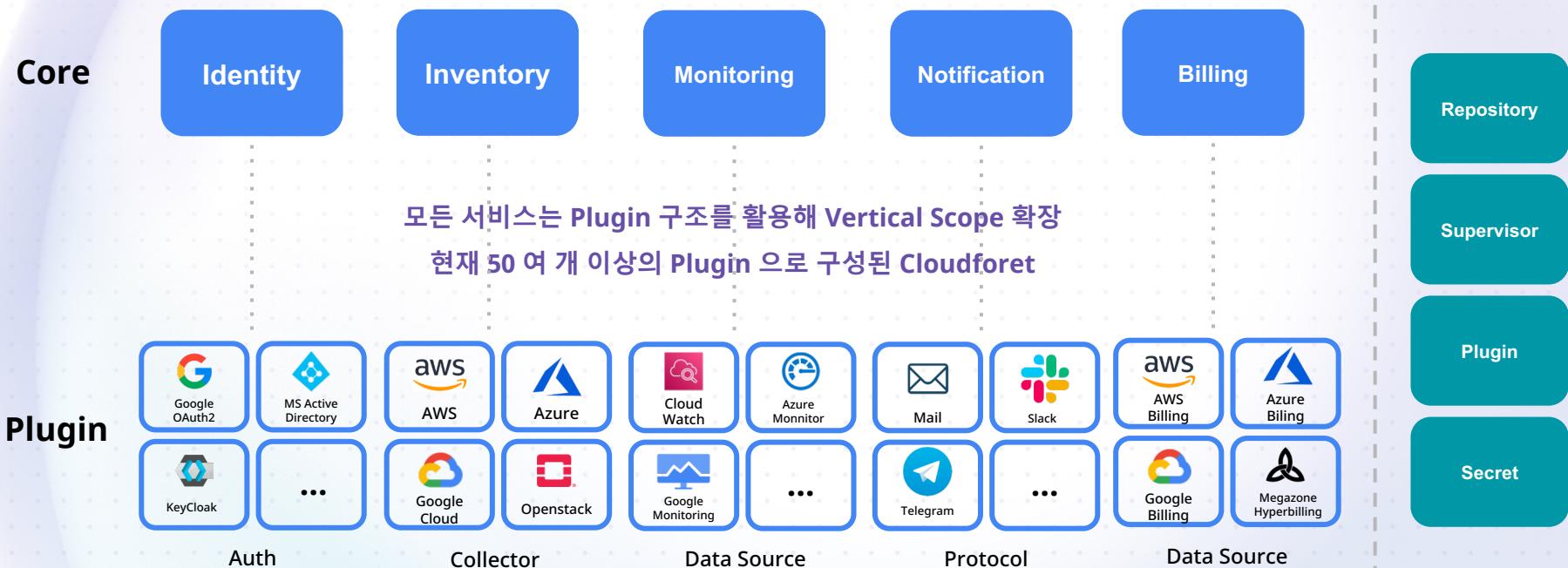
Developer  
(Community)

Developer  
(3rd Party)

Developer  
(Enterprise)

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법



# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

Azure
VirtualNetworks
Instance 3

Google
Pub/Sub
Schema 1   Subscription 11

AWS
ELB
LoadBalancer 21

Name	Resource Group	Location	Subscription Name	Provider
minho-rg-vent	minho-rg	uksouth	CloudONE Development	Azure
seolmin-rg-vnet	seolmin-rg	koreacentral	CloudONE Development	Azure
jhsong-rg-vnet	jhsong-rg	eastus	CloudONE Development	Azure

Name	Encryption key	Topic ID	Retention	Subscription count	Project	Provider
projects/bluese-cludone-20200113/topics/duration-test3	Google managed	duration-test3	10 min	1	bluese-cludone-20200113	Google
projects/bluese-cludone-20200113/topics/duration-test	Google managed	duration-test	3 days 18 hr	1	bluese-cludone-20200113	Google
projects/bluese-cludone-20200113/topics/topic-test	Google managed	topic-test	7 days	1	bluese-cludone-20200113	Google
projects/bluese-cludone-20200113/topics/seolmin-dev-test	Google managed	seolmin-dev-test		6	bluese-cludone-20200113	Google
projects/bluese-cludone-20200113/topics/test	Google managed	test		1	bluese-cludone-20200113	Google

Name	DNS Name	State	Type	Availability Zones	Provider
spaceone-dev-grpc-alb	spaceone-dev-grpc-alb-2035840108.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2d ap-northeast-2e ap-northeast-2f ap-northeast-2g	AWS
cloudforet-io-alb	cloudforet-io-alb-1367026454.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2d ap-northeast-2e ap-northeast-2f ap-northeast-2g	AWS
samsung-poc-rancher-alb	samsung-poc-rancher-alb-1064063985.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2d ap-northeast-2e ap-northeast-2f ap-northeast-2g	AWS
service-portal-api-rest-dev-alb	service-portal-api-rest-dev-784627884.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2d ap-northeast-2e ap-northeast-2f ap-northeast-2g	AWS
service-portal-dev-grpc	service-portal-dev-grpc-1863174323.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2d ap-northeast-2e ap-northeast-2f ap-northeast-2g	AWS

Frontend

Backend

Inventory



# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

A screenshot of the Cloudforet UI interface. On the left, there's a sidebar with icons for Azure, Google, Schrodinger, AWS, and OpenShift. The main area shows two code snippets. The first snippet is for an AWS Load Balancer:

```
1  {
2    "ip_addresses": [],
3    "cloud_service_id": "cloud-svc-7ce377f5c655",
4    "name": "spaceone-dev-grpc-alb",
5    "state": "ACTIVE",
6    "account": "557706363616",
7    "instance_type": "application",
8    "instance_size": 0,
9    "cloud_service_type": "LoadBalancer",
10   "cloud_service_group": "ELB",
11   "provider": "aws",
12   "data": {
13     "target_groups": {@},
14     "security_groups": {@},
15     "type": "application",
16     "scheme": "internet-facing",
17     "created_time": "2022-08-09T08:47:52.740000+0000",
18     "state": {@},
19     "cloudtrail": {@},
20     "tags": {@},
21     "canonical_hosted_zone_id": "ZWKZPGTI48KDX",
22     "cloudwatch": {@},
23     "instances": {@},
24     "dns_name": "spaceone-dev-grpc-alb-2035840108.ap-northeast-2.elb.amazonaws.com",
25     "attributes": {@},
26     "load_balancerArn": "arn:aws:elasticloadbalancing:ap-northeast-2:257706363616:loadbalancer/applicationspaceone-dev-grpc-alb-2035840108/70a0ac727",
27     "vpc_id": "vpc-0495981070a0ac727",
28     "ip_address_type": "ipv4",
29     "availability_zones": {@},
30     "listeners": {@},
31     "load_balancer_name": "spaceone-dev-grpc-alb"
32   },
33   "metadata": {@},
34   "reference": {@},
35   "tags": {@},
36   "collection_info": {@},
37   "region_code": "ap-northeast-2",
38   "project_id": "project-1865551ec535",
39   "domain_id": "domain-58010aa2e45",
40   "created_at": "2022-09-30T02:07:48.514Z",
41   "updated_at": "2022-10-31T02:08:43.584Z",
42   "deleted_at": ""
43 }
```

The second snippet is for a VirtualNetworks instance:

```
1  {
2    "ip_addresses": [],
3    "cloud_service_id": "cloud-svc-bc9968ecf71a",
4    "name": "minho-rg-vent",
5    "state": "ACTIVE",
6    "account": "3ec64e1e-ice8-4f2c-82a0-a7ff6db0899ca",
7    "instance_type": "",
8    "instance_size": 0,
9    "cloud_service_type": "Instance",
10   "cloud_service_group": "VirtualNetworks",
11   "provider": "azurite",
12   "data": {
13     "id": "/subscriptions/3ec64e1e-ice8-4f2c-82a0-a7ff6db0899ca/resourceGroups/minho-rg-vent/providers/Microsoft.Network/virtualNetworks/minho-rg-vent",
14     "enable_ddos_protection": false,
15     "private_endpoints": {@},
16     "resource_group": "minho-rg",
17     "subscription_name": "CloudONE Development",
18     "azure_monitor": {@},
19     "etag": "W\"011da0e6-541-4833-8f4c-1fe6415bb96b\"",
20     "subscription_id": "3ec64e1e-ice8-4f2c-82a0-a7ff6db0899ca",
21     "type": "Microsoft.Network/virtualNetworks",
22     "name": "minho-rg-vent",
23     "subnets": {@},
24     "dhcp_options": {@},
25     "address_space": {@},
26     "provisioning_state": "Succeeded",
27     "location": "ukouth",
28     "connected_devices": {@},
29     "resource_guid": "01f10aed-9528-488b-9928-3bd2a41b34be"
30   },
31   "metadata": {@},
32   "reference": {@},
33   "tags": {@},
34   "collection_info": {@},
35   "region_code": "ukouth",
36   "project_id": "project-5650877dbafdf",
37   "domain_id": "domain-d95",
38   "created_at": "2022-10-28T13:52:56Z",
39   "updated_at": "2022-10-31T18:04:36Z",
40   "deleted_at": ""
41 }
```

Below the code snippets, there are two small cards: one for the LoadBalancer (ID: 21) and one for the Instance (ID: 3).

A screenshot of the Cloudforet UI interface. On the left, there's a sidebar with icons for Azure, Google, Schrodinger, AWS, and OpenShift. The main area shows two code snippets. The first snippet is for a Google Cloud Pub/Sub Topic:

```
1  {
2    "ip_addresses": [],
3    "cloud_service_id": "cloud-svc-6d7c73bc5cf8",
4    "name": "projects/bluese-cloudone-20200113/topics/duration-test3",
5    "state": "ACTIVE",
6    "account": "bluese-cloudone-20200113",
7    "instance_type": "",
8    "instance_size": 0,
9    "cloud_service_type": "Topic",
10   "cloud_service_group": "Pub/Sub",
11   "provider": "google_cloud",
12   "data": {
13     "topic_id": "duration-test3",
14     "project": "bluese-cloudone-20200113",
15     "display": {@},
16     "message_retention_duration": "600s",
17     "name": "projects/bluese-cloudone-20200113/topics/duration-test3",
18     "subscriptions": {@}
19   },
20   "metadata": {@},
21   "reference": {@},
22   "tags": {@},
23   "collection_info": {@},
24   "region_code": "Global",
25   "project_id": "project-5650877dbafdf",
26   "domain_id": "domain-d95",
27   "created_at": "2022-10-2-28T13:52:56Z",
28   "updated_at": "2022-10-31T18:04:36Z",
29   "deleted_at": ""
30 }
```

The second snippet is for a Subscription:

```
1  {
2    "ip_addresses": [],
3    "cloud_service_id": "cloud-svc-6d7c73bc5cf8",
4    "name": "projects/bluese-cloudone-20200113/topics/duration-test3",
5    "state": "ACTIVE",
6    "account": "bluese-cloudone-20200113",
7    "instance_type": "",
8    "instance_size": 0,
9    "cloud_service_type": "Topic",
10   "cloud_service_group": "Pub/Sub",
11   "provider": "google_cloud",
12   "data": {
13     "topic_id": "duration-test3",
14     "project": "bluese-cloudone-20200113",
15     "display": {@},
16     "message_retention_duration": "600s",
17     "name": "projects/bluese-cloudone-20200113/topics/duration-test3",
18     "subscriptions": {@}
19   },
20   "metadata": {@},
21   "reference": {@},
22   "tags": {@},
23   "collection_info": {@},
24   "region_code": "Global",
25   "project_id": "project-5650877dbafdf",
26   "domain_id": "domain-d95",
27   "created_at": "2022-10-2-28T13:52:56Z",
28   "updated_at": "2022-10-31T18:04:36Z",
29   "deleted_at": ""
30 }
```

Below the code snippets, there are two small cards: one for the Google Pub/Sub topic (ID: 11) and one for the Subscription (ID: 11).

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

Azure	
VirtualNetworks	

Google	
Schema 1	Subscription 11

AWS	
LoadBalancer 21	

OpenStack	
Compute NEW	

안해 떠나자

Name	Resource Group	Location	Subscription Name	Provider
minho-rg-vent	minho-rg	uksouth	CloudONE Development	Azure
seolmin-rg-vnet	seolmin-rg	koreacentral	CloudONE Development	Azure
jhsong-rg-vnet	jhsong-rg	eastus	CloudONE Development	Azure

Name	Encryption key	Topic ID	Retention	Subscription count	Project	Provider
projects/bluese-cloudone-20200113/topics/duration-test3	Google managed	duration-test3	10 min	1	bluese-cloudone-20200113	Google
projects/bluese-cloudone-20200113/topics/duration-test	Google managed	duration-test	3 days 18 hr	1	bluese-cloudone-20200113	Google
projects/bluese-cloudone-20200113/topics/topic-test	Google managed	topic-test	7 days	1	bluese-cloudone-20200113	Google
projects/bluese-cloudone-20200113/topics/seolmin-dev-test	Google managed	seolmin-dev-test		6	bluese-cloudone-20200113	Google
projects/bluese-cloudone-20200113/topics/test	Google managed	test		1	bluese-cloudone-20200113	Google

Name	DNS Name	State	Type	Availability Zones	Provider
spaceone-dev-grpc-alb	spaceone-dev-grpc-alb-2035840108.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2c ap-northeast-2b ap-northeast-2a ap-northeast-2c ap-northeast-2b	AWS
cloudforet-io-alb	cloudforet-io-alb-1367026454.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2a ap-northeast-2b ap-northeast-2c ap-northeast-2c ap-northeast-2a	AWS
samsung-poc-rancher-alb	samsung-poc-rancher-alb-1064063985.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2b ap-northeast-2c ap-northeast-2b ap-northeast-2a ap-northeast-2c	AWS
service-portal-api-rest-dev-alb	service-portal-api-rest-dev-alb-784627884.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2b ap-northeast-2a ap-northeast-2c ap-northeast-2c ap-northeast-2a	AWS
service-portal-dev-grpc	service-portal-dev-grpc-1863174323.ap-northeast-2.elb.amazonaws.com	active	application	ap-northeast-2b ap-northeast-2a	AWS

Name	Instances Count	State	Status	IP Address	Type	Availability Zone	Provider	Region
ip-172-31-35-220	8	UP	ENABLED	172.31.35.220	QEMU	nova	OpenStack	Seongnam   RegionOne
openstack-1	4	UP	ENABLED	172.31.36.199	QEMU	nova	OpenStack	Seongnam   RegionOne

Frontend(;;)

Inventory



cloudforet

THE LINUX FOUNDATION

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Dynamic Layout

Name	Instance State	Instance Type
spaceone-dev-supervisor-node	RUNNING	t3.xlarge
spaceone-dev-supervisor-node	RUNNING	t3.xlarge
windowsManager_test	STOPPED	t2.micro
cloudforet-cloudwatch-test	STOPPED	t2.micro
spaceone-dev-core-node	RUNNING	t3.xlarge

Details Tags Member History Monitoring

Base Information AWS EC2 AWS Tags Disk NIC Security

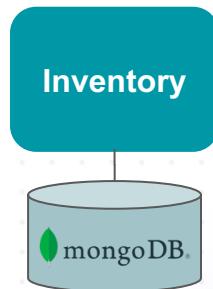
EC2 Instance

Instance ID	i-0a1ef8ff762b11399
Instance State	RUNNING
Instance Type	c5.large
EC2 Lifecycle	scheduled
Key Pair	cloudone-dev-v1-kubectl-ec2-key
IAM Role ARN	



### JSON-based View Metadata

```
"view": {
  "sub_data": {
    "layouts": [
      {
        "type": "list",
        "options": {
          "layouts": [
            {
              "name": "EC2 Instance",
              "options": {
                "fields": [
                  {
                    "type": "text",
                    "key": "data.compute.instance_id",
                    "name": "Instance ID"
                  },
                  {
                    "name": "Instance State",
                    "type": "enum",
                    "options": {me},
                    "key": "data.compute.instance_state"
                  }
                ]
              }
            }
          ]
        }
      }
    ]
  }
},
```



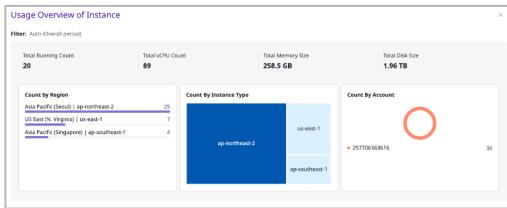
# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Dynamic Layout

Name	Instance State	Instance Type	Cores	Memory	Availability Zone	OS	Primary IP	Account ID	Provider
spaceone-dev-super-node	RUNNING	t3.xlarge	4	16	ap-northeast-2a	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-super-node	RUNNING	t3.xlarge	4	16	ap-northeast-2c	amazonlinux	257705363616	257705363616	AWS
windowsManager_test	STOPPED	t2.micro	1	1	ap-northeast-2c	windows	257705363616	257705363616	AWS
cloudforet-cloudwatch-test	STOPPED	t2.micro	1	1	us-east-1a	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-core-node	RUNNING	t3.xlarge	4	16	ap-northeast-2c	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-core-node	RUNNING	t3.xlarge	4	16	ap-northeast-2c	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-core-node	RUNNING	t3.xlarge	4	16	ap-northeast-2c	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-ipn-dedicated-node	RUNNING	t3.medium	2	4	us-east-1a	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-ipn-dedicated-node	RUNNING	t3.medium	2	4	us-east-1f	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-ipn-dedicated-node	RUNNING	t3.medium	2	4	us-east-1b	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-ipn-dedicated-node	RUNNING	t3.xlarge	4	16	ap-northeast-2a	amazonlinux	257705363616	257705363616	AWS
spaceone-dev-ipn-dedicated-node	RUNNING	t3.xlarge	4	16	ap-northeast-2a	amazonlinux	257705363616	257705363616	AWS

Cloud Service Table



Dynamic Widget

Base Information AWS EC2 Disk NIC Security Groups ELB Raw Data

EC2 Instance

Instance ID: i-014a73ee9326400a3

Instance State: RUNNING

Instance Type: t3.xlarge

EC2 Lifecycle: spot

Key Pair: cloudone-dev-v1-eks-worker-node-key

IAM Role ARN: arn:aws:iam::257705363616:instance-profile/eks-d4c1e813-33a4-1a1f-20f-c5fa50e8913d

EBS-Optimized: false

AMI ID: amazon-eks-node-1.21-v20220926

Region: ap-northeast-2

Availability Zone: ap-northeast-2a

Termination Protection: false

Public DNS:

Public IP:

Security Groups: template-0502-remoteAccess-add (sg-0ad036760aeacd21), eks-cluster-sg-cloudone-dev-v1-eks-cluster-545-409756 (sg-082279a40c912840c)

Account ID: 257705363616

Detail Item

← Instance (1 / 36)

Connect to Console

Usage Overview

Total Running Count: 20

Name: spaceone-dev-supe

Properties (38)

Cloud Service ID

Name

Resource ID

IP Address

Instance ID

Instance State

Instance Type

Key Pair

Image

Availability Zone

Search  
(Auto Complete)

Definition

```
1  v {
2      "type": "record",
3      "name": "Avro",
4      "fields": [
5          {
6              "name": "StringField",
7              "type": "string"
8          },
9          {
10             "name": "IntField",
11             "type": "int"
12         }
13     ]
14 }
```

Close

Raw data

# Deep dive into Cloudforet

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법

## Design System (Mirinae)

README.md

### Mirinae - Cloudforet Design System



License Apache 2.0 Design System SpaceOne

#### Mirinae Design System

Author

See our OWNERS file.

#### License

This project is Apache 2.0 licensed.

#### Chart License

Mirinae design system internally uses amCharts for Dynamic Chart.  
Before using the design system, look carefully at amCharts' license.  
If you want to purchase the amCharts license that suits you and use it on your application, see the license FAQ.

<https://www.amcharts.com/online-store/licenses-explained/>

SPACEONE

Without Index: The same theme is displayed repeatedly.

Que magnam possimus. Showing Top 5

Category	Value
metrics	14,055,420,987
Market	16,583,284,247
Team	15,520,743,768
copying	4,281,059,906
Lithuanian	

Veniam incident ipsum. Showing Top 5

Category	Value
content	18,362,212,345
synergize	4,444,129,444
Bedfordshire	3,115,129,300
Account	8,353,316,539
Ad totam dolorem.	4,551,341,074

Iste quo eum. Showing Top 5

Category	Value
Frozen	16,013,205,242
website	2,226,297,590
transmitting	17,548,120,021
up	9,725,605,364
108tp	15,020,477,212

Ad totam dolorem. Showing Top 10

Category	Value
enhance	
bypassing	
sexy	
Manager	
transmitting	
implementa...	
killer	
...	
...	
...	

Accessibility: Kudos Story Design Controls (8) Actions

4 Violations 12 Passes 2 Incomplete

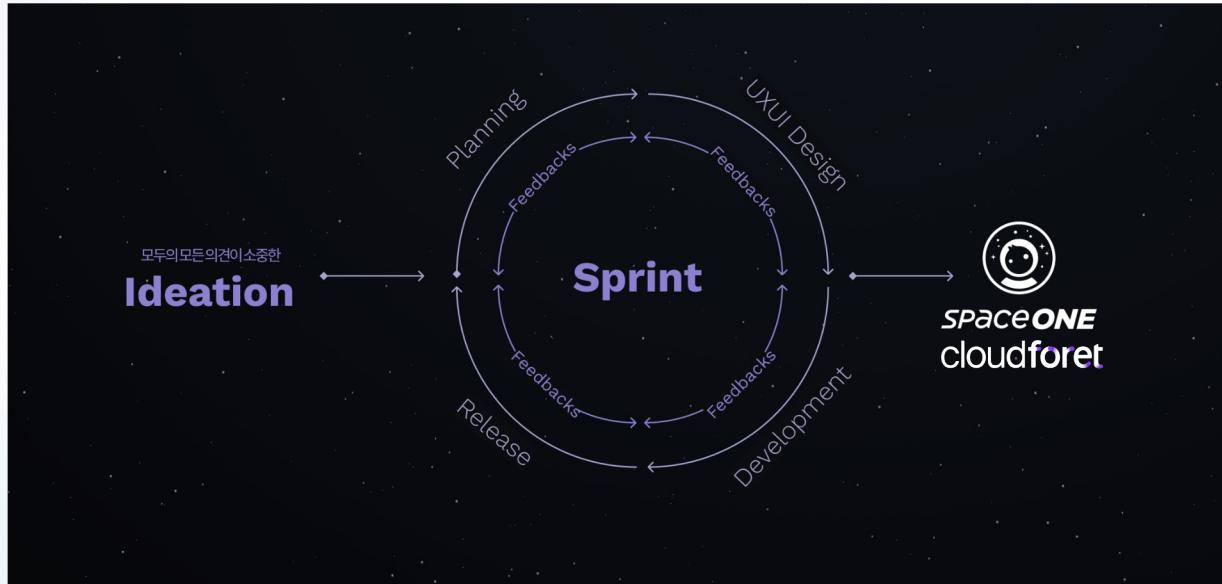
- Ensures every ARIA button, link and menuitem has an accessible name
- Ensures elements with an ARIA role that require parent roles are contained by them
- Ensures the contrast between foreground and background colors meets WCAG 2 AA contrast ratio thresholds
- Landmarks should have a unique role or role/label/title (i.e. accessible name) combination

Mirinae Design System

# Proposal

# Proposal

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



# Proposal

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



*We are Hiring !*

[admin@cloudforet.io](mailto:admin@cloudforet.io) (admin)

[bluese05@gmail.com](mailto:bluese05@gmail.com) (송지현)

**Backend Developer**

**Frontend Developer**

**Security Developer**

**SRE (Site Reliability Engineering)**

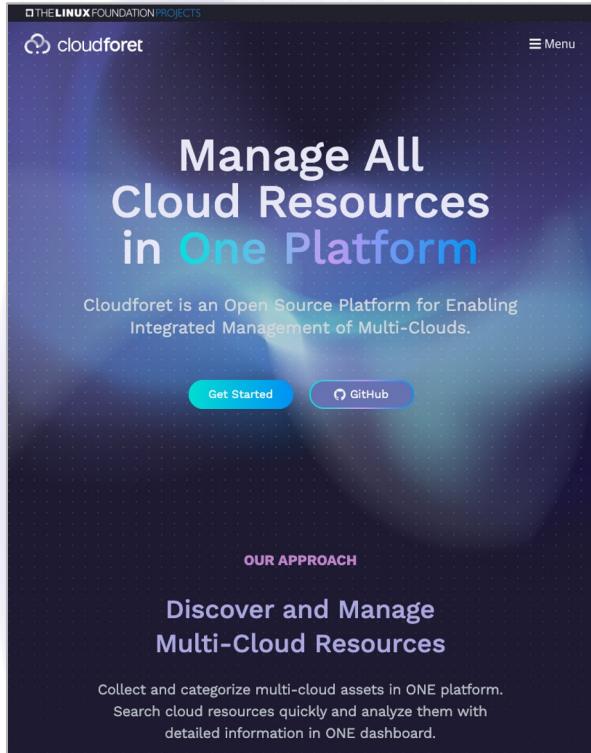
# Proposal

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



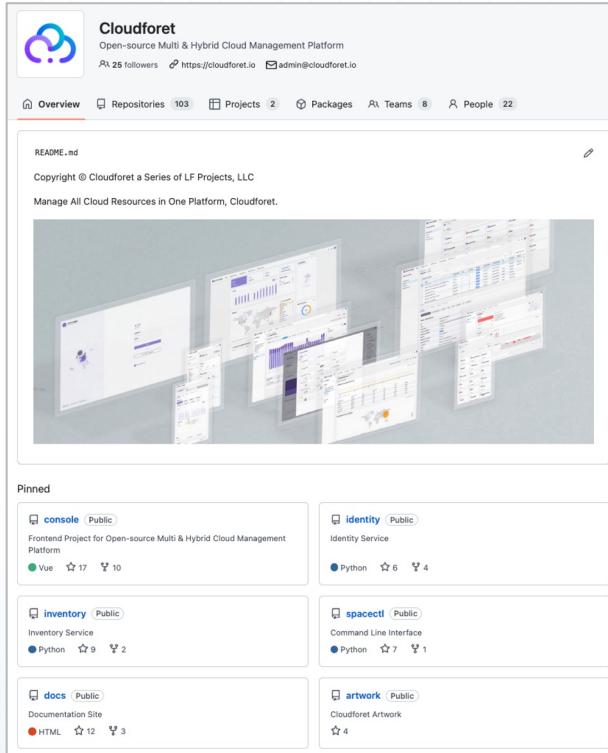
# Contact

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미로운 방법



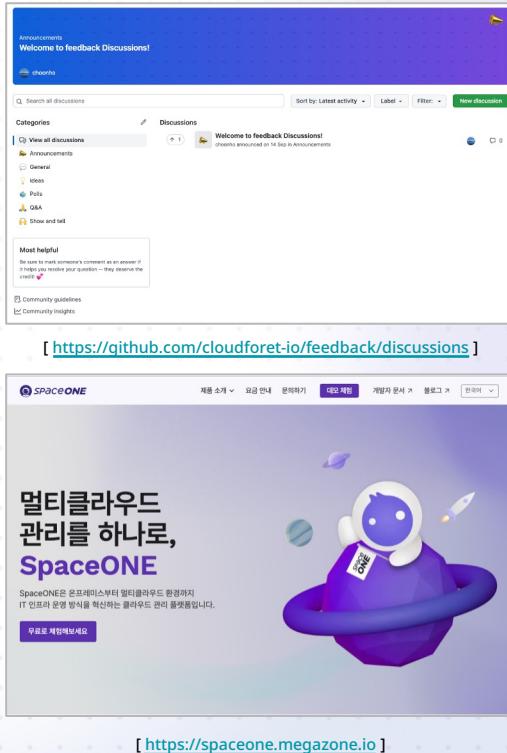
The homepage of Cloudforet, an open-source multi-cloud management platform. It features a dark blue header with the Linux Foundation logo and a navigation menu. The main title "Manage All Cloud Resources in One Platform" is prominently displayed in large white text. Below it, a subtitle explains that Cloudforet is an open-source platform for enabling integrated management of multi-clouds. Two calls-to-action buttons are visible: "Get Started" and "GitHub". A section titled "OUR APPROACH" contains the text "Discover and Manage Multi-Cloud Resources" and a brief description of how it collects and categorizes assets. At the bottom, there's a callout for quickly searching and analyzing resources with detailed information in the ONE dashboard.

[\[ https://cloudforet.io \]](https://cloudforet.io)



The GitHub repository page for Cloudforet. The header shows basic repository statistics: 25 followers, 103 repositories, 2 projects, 8 packages, 8 teams, and 22 people. The "Overview" tab is selected, showing the README file which highlights the ability to manage all cloud resources in one platform. Below the README is a large screenshot of the Cloudforet interface displaying various dashboards and resource management tools. A "Pinned" section lists several projects: "console" (Frontend Project for open-source Multi & Hybrid Cloud Management Platform, Vue, 17 stars), "identity" (Identity Service, Python, 6 stars), "inventory" (Inventory Service, Python, 9 stars), "spacectl" (Command Line Interface, Python, 7 stars), "docs" (Documentation Site, HTML, 12 stars), and "artwork" (Cloudforet Artwork, 3 stars).

[\[ https://github.com/cloudforet-io/cloudforet \]](https://github.com/cloudforet-io/cloudforet)



The GitHub repository page for SpaceONE. The header includes a search bar, discussion section, and filter options. The "Announcements" section welcomes users to feedback discussions. The main content area shows a "Most helpful" section with a note about marking answers and a "Community guidelines" section. The "Discussions" sidebar lists categories like General, Ideas, Polls, Q&A, and Show and tell. A large screenshot of the SpaceONE interface is shown, featuring a purple space-themed character and Korean text. The bottom of the page provides a link to the official website.

[\[ https://spaceone.megazone.io \]](https://spaceone.megazone.io)

# Contact

멀티 클라우드 플랫폼을 Kubernetes 위에서 다루는 흥미  
로운 방법



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*bluese05@gmail.com (송지형)*

# 감사합니다.

bluese05@gmail.com



<https://cloudforet.io>  
<https://github.com/cloudforet-io>