Cloud Barista

AI 서비스의 혁신적 활용을 위한 컴퓨팅 인프라, 멀티 클라우드

- 클라우드바리스타 커뮤니티 제10차 컨퍼런스 -

One Service on Multi-Cloud

CB-Tumblebug: 멀티 클라우드 인프라 서비스 통합 관리

Lead/Maintain@CB-Tumblebug

손 석 호

다즐링 (Darjeeling) 한잔 어떠세요 ?

What is your Github handle?

@seokho-son

@seokho-son

@seokho son (CNCF / K8s Slack)

Ph.D. in Computer Science,

Senior Researcher & Special Fellow, ETRI

Ambassador, CLOUD NATIVE COMPUTING FOUNDATION

Maintainer, Cloud-Barista CB-Tumblebug

Maintainer, M-CMP Platform

Maintainer, CNCF Cloud Native Glossary

Maintainer, Kubernetes Website

Lead, Kubernetes SIG-Docs Subproject

Lead, Kubernetes SIG-Docs Korean l10n Team

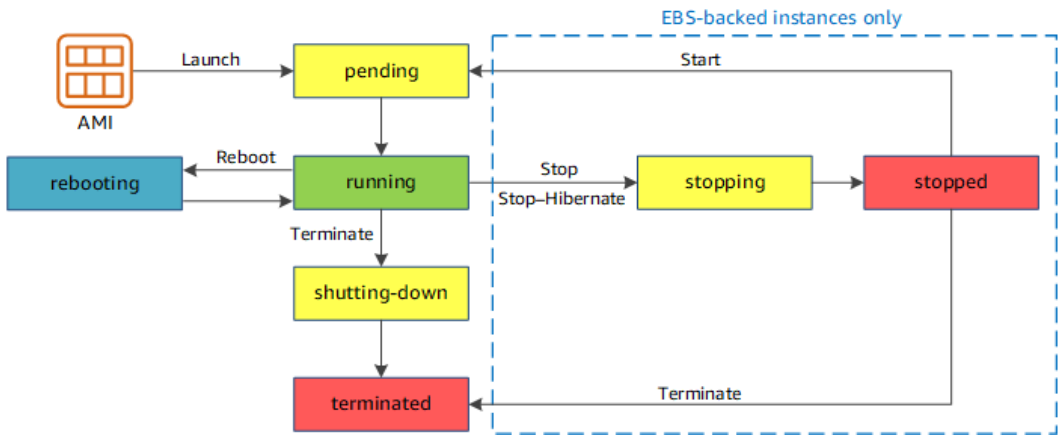
Going to talk about..

1. CB-TB, 그게 뭐죠? (개요: 퀵리뷰)
2. CB-TB, 5개월간 뭐가 바뀌었나요? (v0.9 → v0.10 프리뷰)
3. CB-TB, 재미있는 AI 탐구생활
(AI 인프라를 위한 CB-TB의 여정)

CB-Tumblebug ?

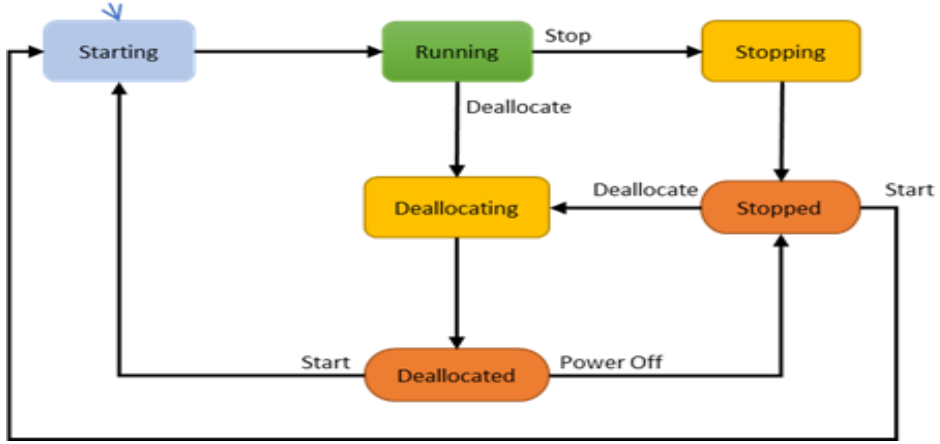
What if …

Different Terms, APIs, and Methods Across Clouds



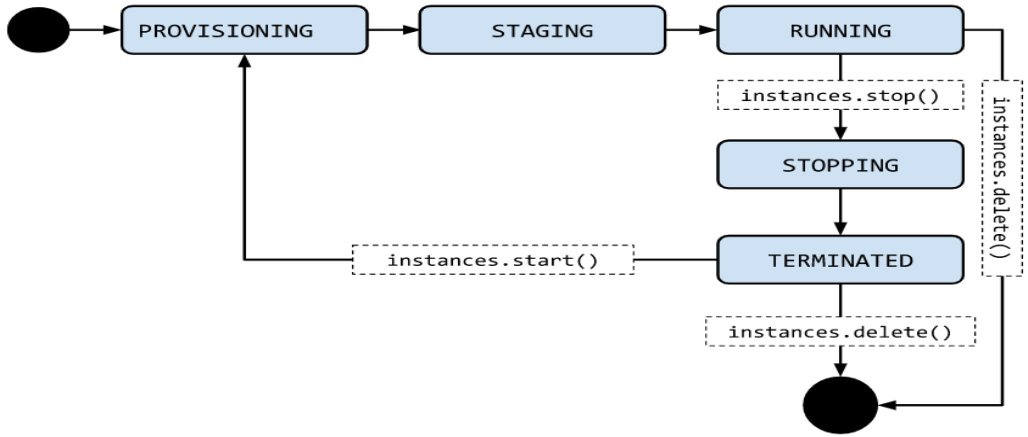
docs.aws.amazon.com/ko_kr/AWSEC2/latest/UserGuide/ec2-instance-lifecycle.html

AWS



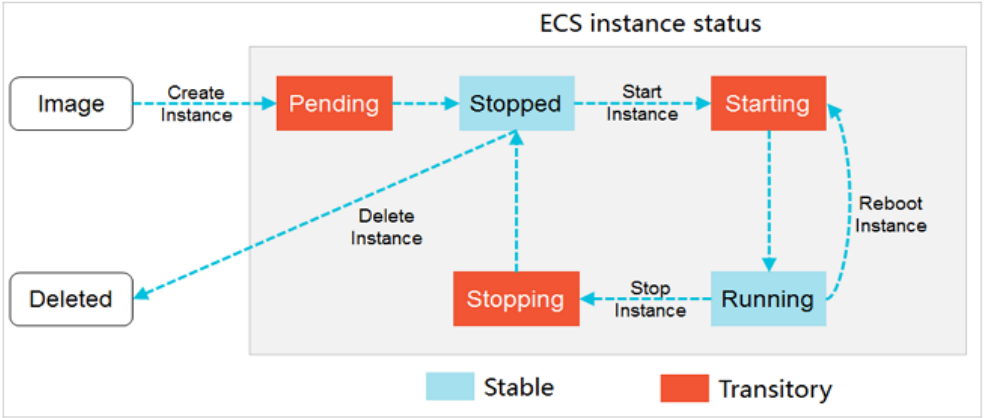
docs.microsoft.com/en-us/azure/virtual-machines/linux/states-lifecycle

Azure



cloud.google.com/compute/docs/instances/instance-life-cycle

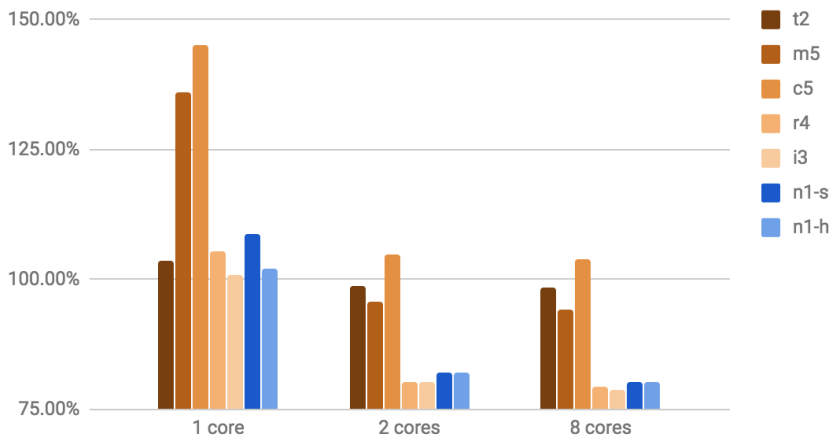
GCP



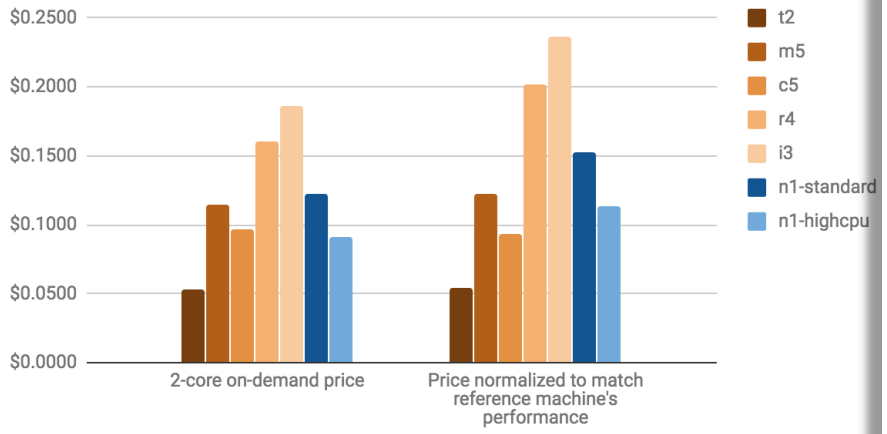
alibabacloud.com/help/doc-detail/25380.htm

AlibabaCloud

Cloud performance varies more than you think

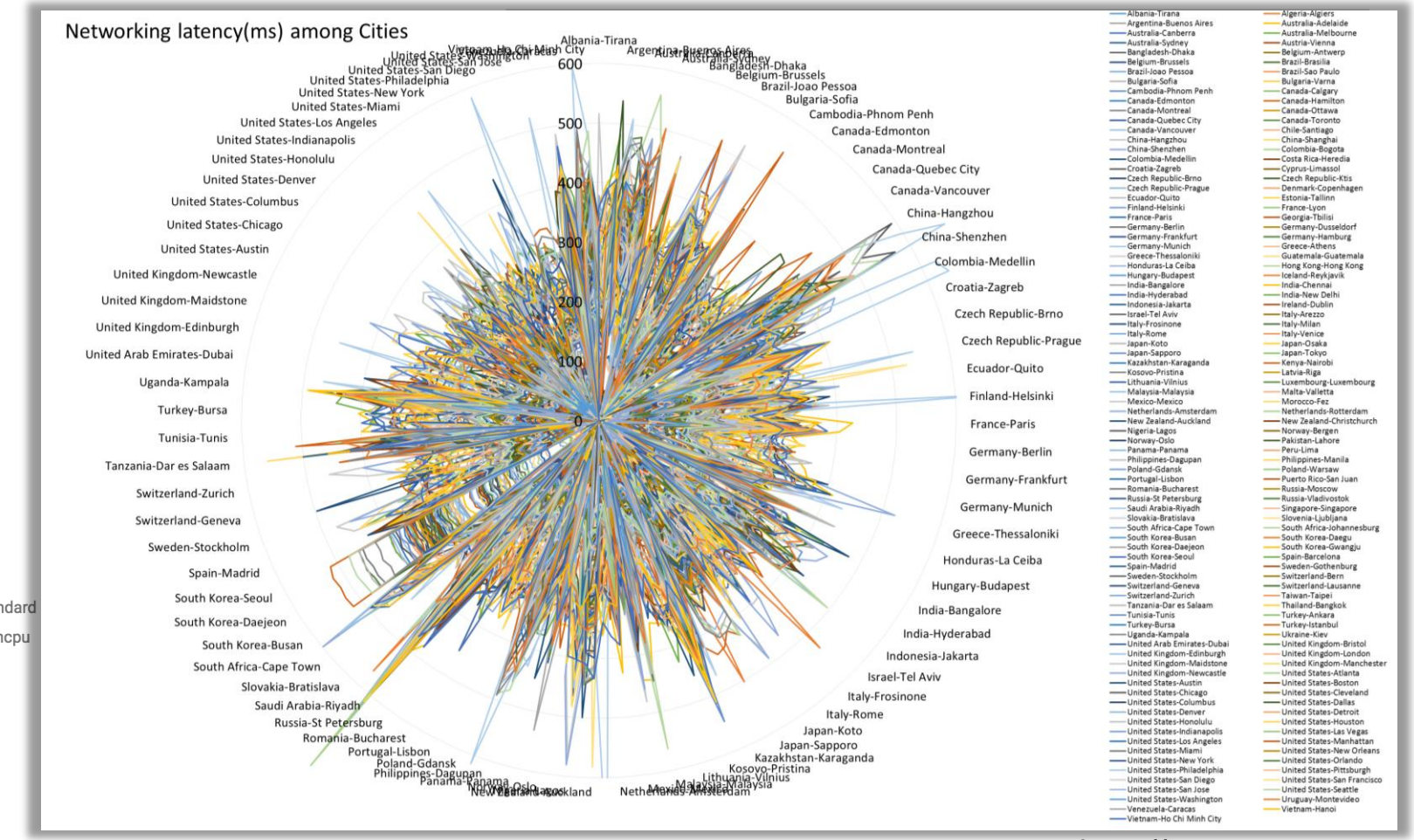


VM performance (AWS vs GCP)



VM price (AWS vs GCP)

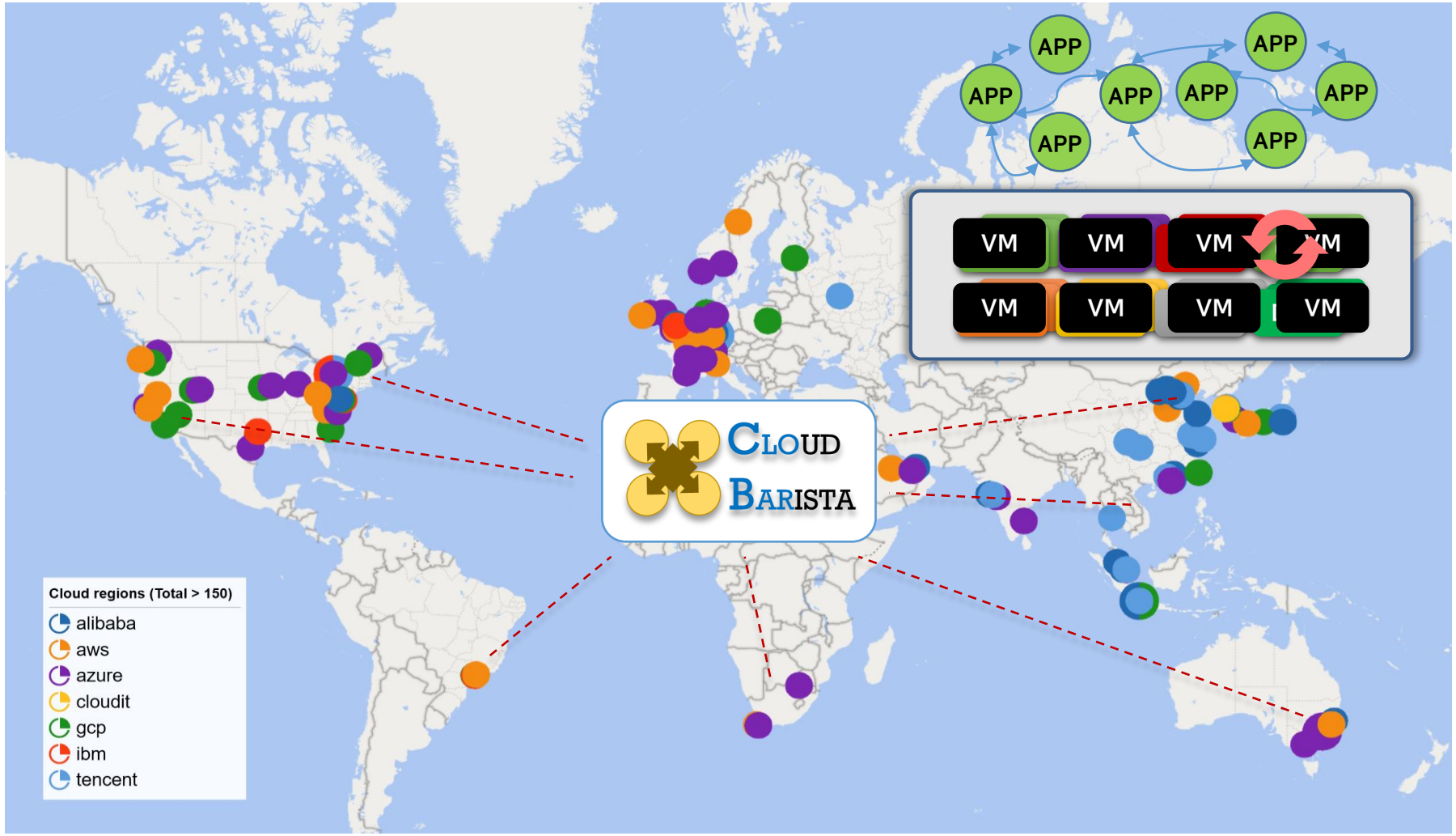
(https://medium.com/infrastructure-adventures/aws-vs-gcp-vs-on-premises-cpu-performance-comparison)

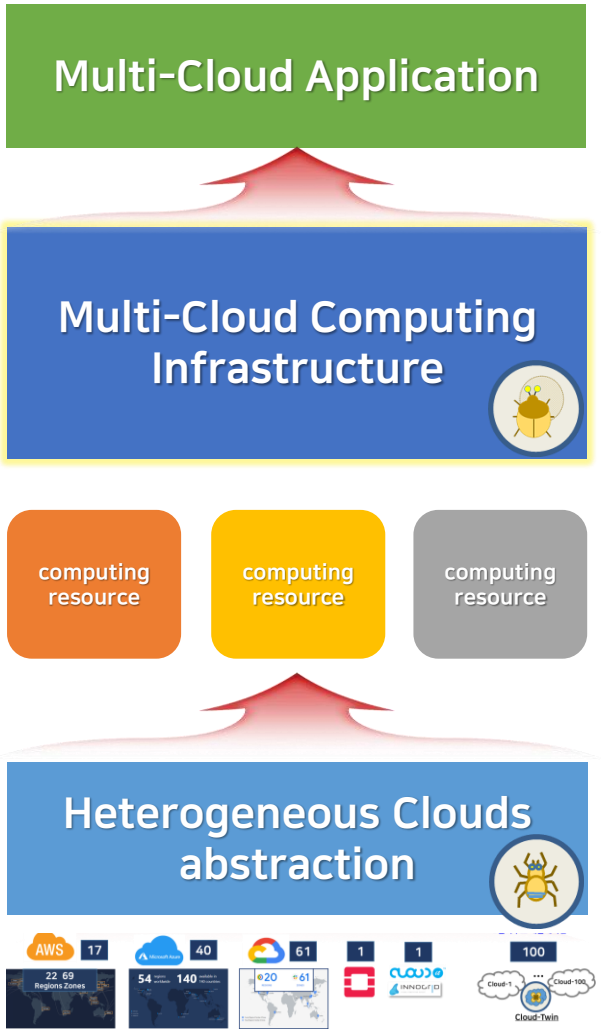


GPU performance and cost comparison (AWS vs GCP)

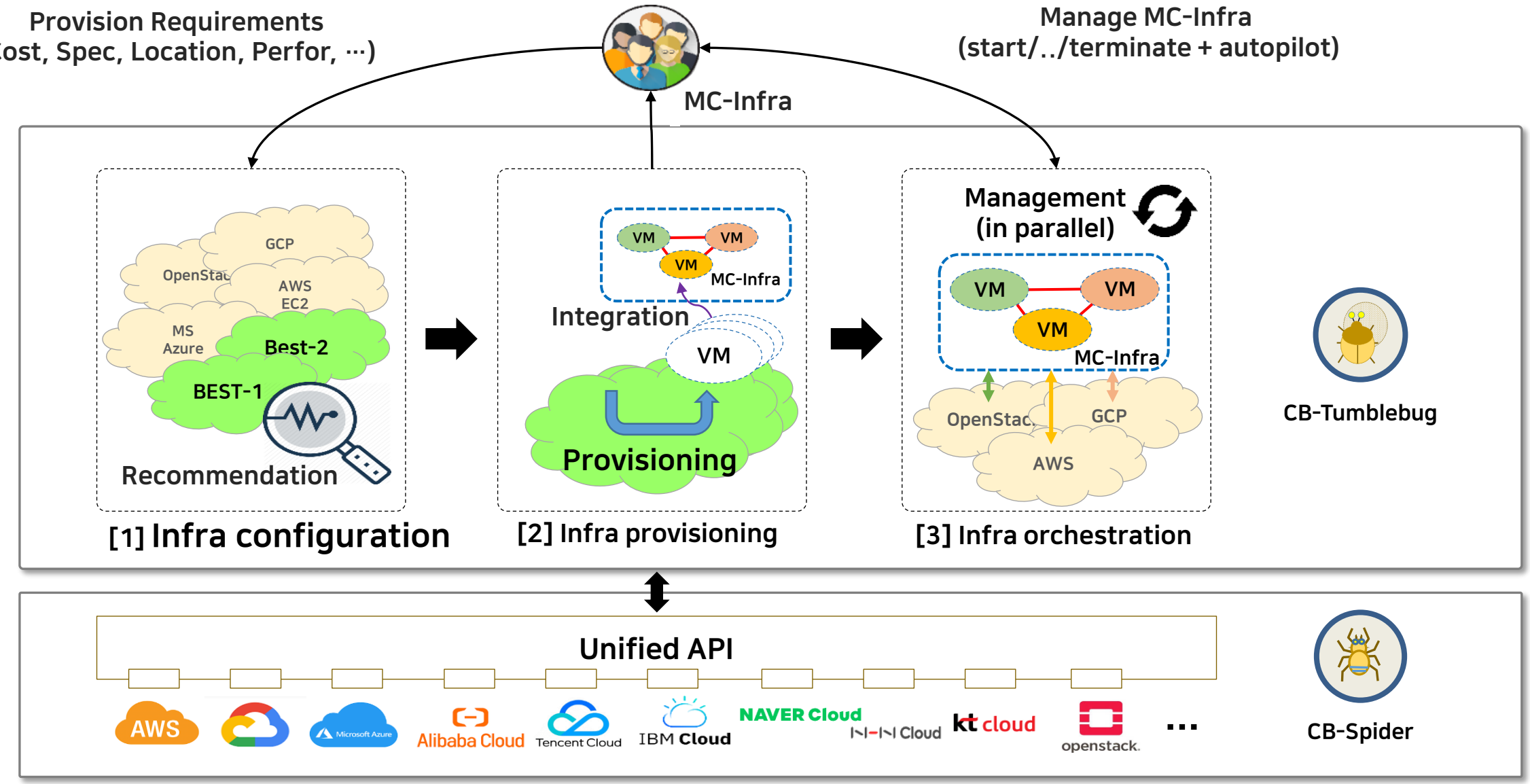
(https://towardsdatascience.com/maximize-your-gpu-dollars-a9133f4e546a)

Manages Multi-Cloud Infrastructures !



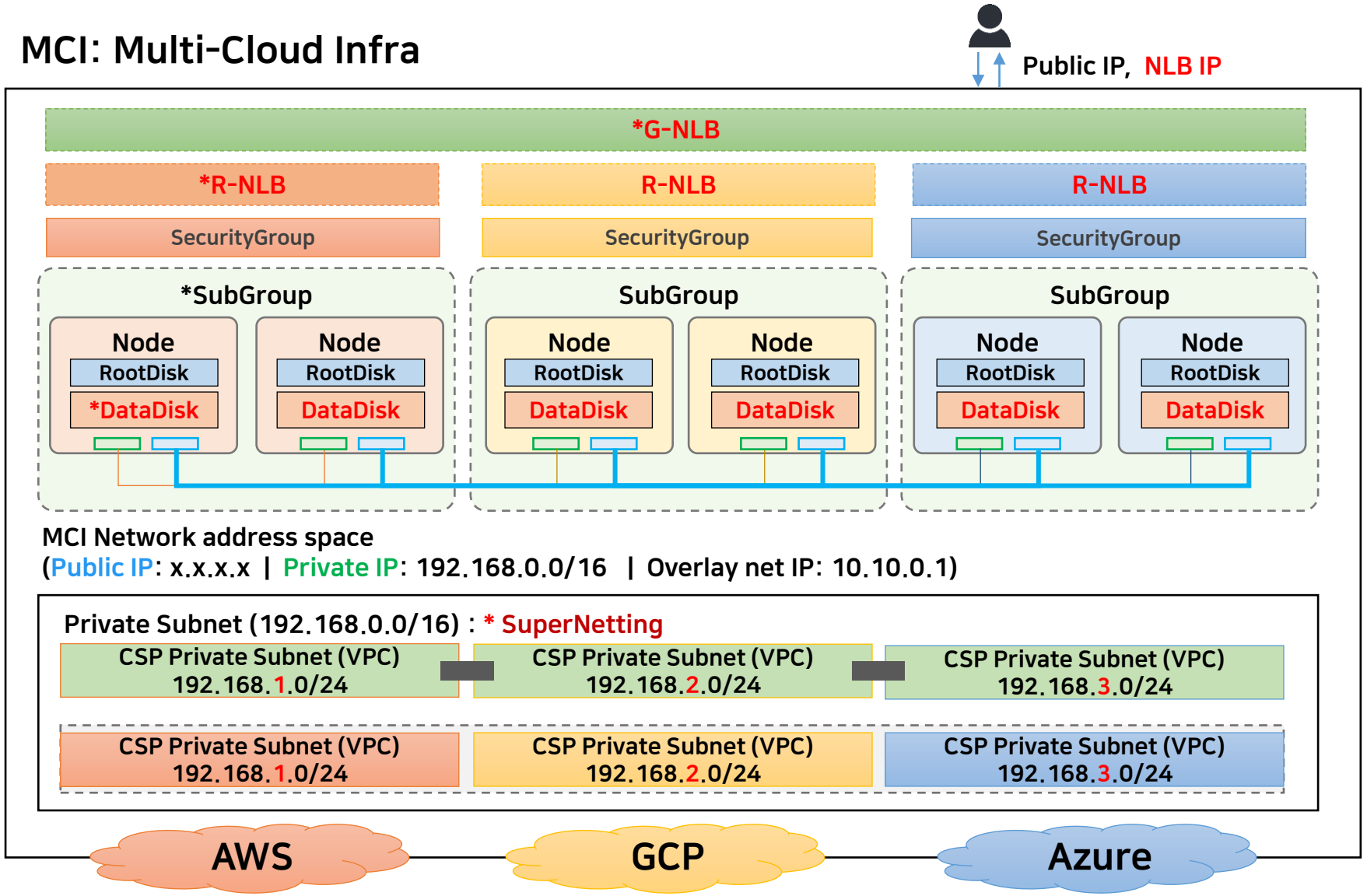


Supported Main Features



Structure of the Multi-Cloud Infra

MCI: Multi-Cloud Infra



*** NLB**
Network Load-Balancer (L4)
- G-NLB: Global (SW-based)
- R-NLB: Regional (CSP service)

*** SubGroup (Node Group)**
Node and resource groups with identical attributes

*** DataDisk**
Disk Volume attached to a node

*** Site-to-Site VPN**
Secure tunneling through CSP VPN services

*** SuperNetting**
For greater use of IP address space, routing table simplification, and tunneling.

Supported CSPs and Resource Types

Resource Type	AWS	Azure	GCP	Alibaba	Tencent	IBM	NCP	NHN	KT	Open Stack
VM (CPU)	YES	YES	YES	YES	YES	YES	YES	Partial	Partial	YES
VM (GPU)	YES	YES	YES	YES	WIP	TBD	TBD	TBD	TBD	TBD
Virtual Network	YES	YES	YES	YES	YES	YES	YES	Partial	Partial	YES
Security Group	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
SSH key	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Volume (Disk)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
NLB (L4 LB)	YES	YES	YES	YES	YES	YES	YES	WIP	Partial	YES
Kubernetes	WIP	YES	WIP	YES	YES	TBD	TBD	YES	NA	NA
VPN Gateway	YES	Partial	YES	TBD	TBD	TBD	TBD	TBD	TBD	TBD

(Note: reference only, and we do not guarantee its functionality. It is regularly updated.)

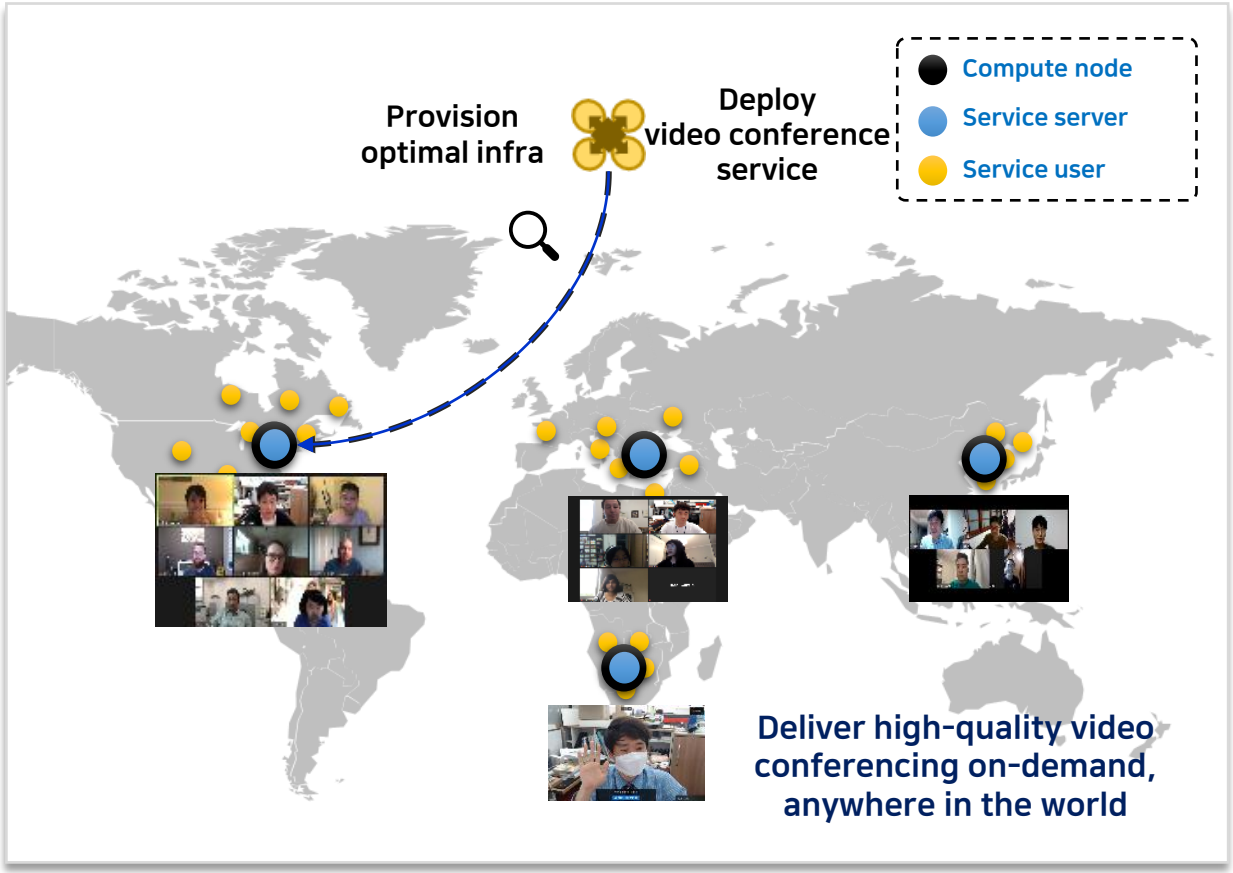
Live doc: CB-TB Supported Resource Types

REST API: 180

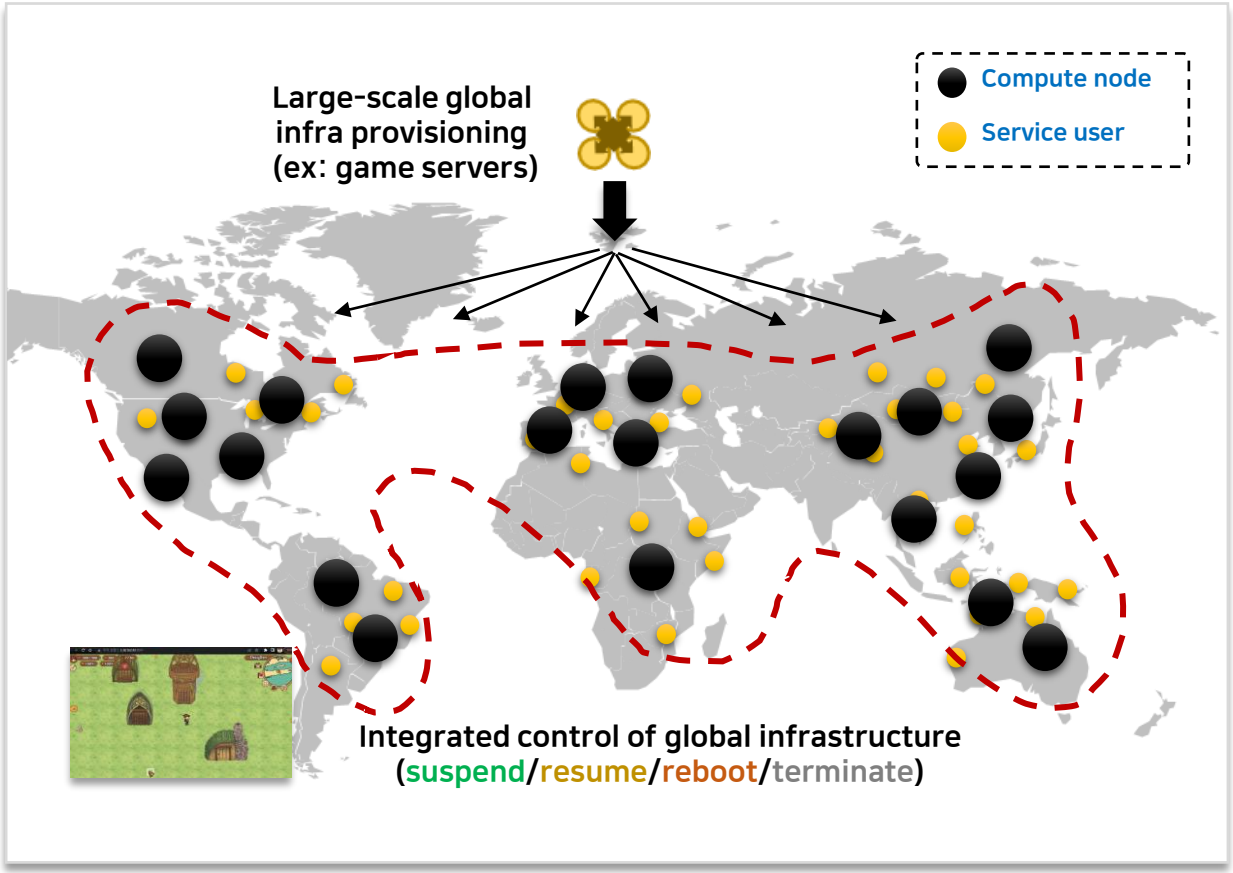
(POST:58 GET:69 PUT:40 DEL:13)

CB-TB Use cases

<멀티 클라우드 기반 최적 비디오 컨퍼런스 서비스>



< 멀티 클라우드 기반 대규모 글로벌 게임 서비스>



```
cb-mapui          | Server running at http://0.0.0.0:1324
cb-mapui          | ✨ Built in 49ms
cb-spider         |
cb-spider         |   <CB-Spider> Multi-Cloud Infrastructure Federation Framework
cb-spider         |      - AdminWeb: http://localhost:1024/spider/adminweb
cb-spider         |      - REST API: http://localhost:1024/spider
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/main.go:216 > CB-Spider is now ready. Initializing CB-Tumblebug...
cb-tumblebug      | {"level":"warn","ts":"2024-08-13T08:14:50.194989Z","logger":"etcd-client","caller":"v3@v3.5.11/retry_interceptor.go:62","msg":"retrying of unary invoker failed","targ
et":"etcd-endpoints://0xc0000a8fc0/cb-tumblebug-etcd:2379","attempt":0,"error":"rpc error: code = FailedPrecondition desc = etcdserver: authentication is not enabled"}
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/main.go:258 > etcd is now available.
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/main.go:273 > kvstore is initialized successfully. Initializing CB-Tumblebug...
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/main.go:295 > Local credentials file not found. Continue.
cb-tumblebug      | 8:14AM DBG ../../go/src/github.com/cloud-barista/cb-tumblebug/src/core/common/namespace.go:200 > [Get namespace] ns01
cb-tumblebug      | 8:14AM DBG ../../go/src/github.com/cloud-barista/cb-tumblebug/src/core/common/namespace.go:202 > /ns/ns01
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/main.go:387 > [Initiate Multi-Cloud Orchestration]
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/api/rest/server/server.go:88 > REST API Server is starting
cb-tumblebug      | 8:14AM INF ../../go/src/github.com/cloud-barista/cb-tumblebug/src/api/rest/server/server.go:169 > Basic Auth Middleware is initialized successfully
cb-tumblebug      | 8:14AM DBG ../../go/src/github.com/cloud-barista/cb-tumblebug/src/api/rest/server/server.go:190 > Setting up Basic Auth Middleware for root group
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cb-tumblebug      |
cb-tumblebug      |  Multi-cloud infrastructure management framework
cb-tumblebug      |  ──────────────────────────────────────────────
cb-tumblebug      |
cb-tumblebug      |  https://github.com/cloud-barista/cb-tumblebug
cb-tumblebug      |
cb-tumblebug      |
cb-tumblebug      |  Default Namespace: ns01
cb-tumblebug      |  Default CredentialHolder: admin
cb-tumblebug      |
cb-tumblebug      |  Access to API dashboard (username: default / password: default)
cb-tumblebug      |  http://localhost:1323/tumblebug/api
cb-tumblebug      |
cb-tumblebug      | ⇨ http server started on [::]:1323
```

CB-TB 릴리스

v0.9.0 → v0.10.0 (~5개월)

CB-Tumblebug v0.9.22

Pre-release

Compare

seokho-son released this 19 hours ago · 6 commits to main since this release v0.9.22

0474eb3

- CB-Spider v0.9.8
- CB-MapUI v0.9.12
- MC-Terrarium (PoC) v0.0.10

API

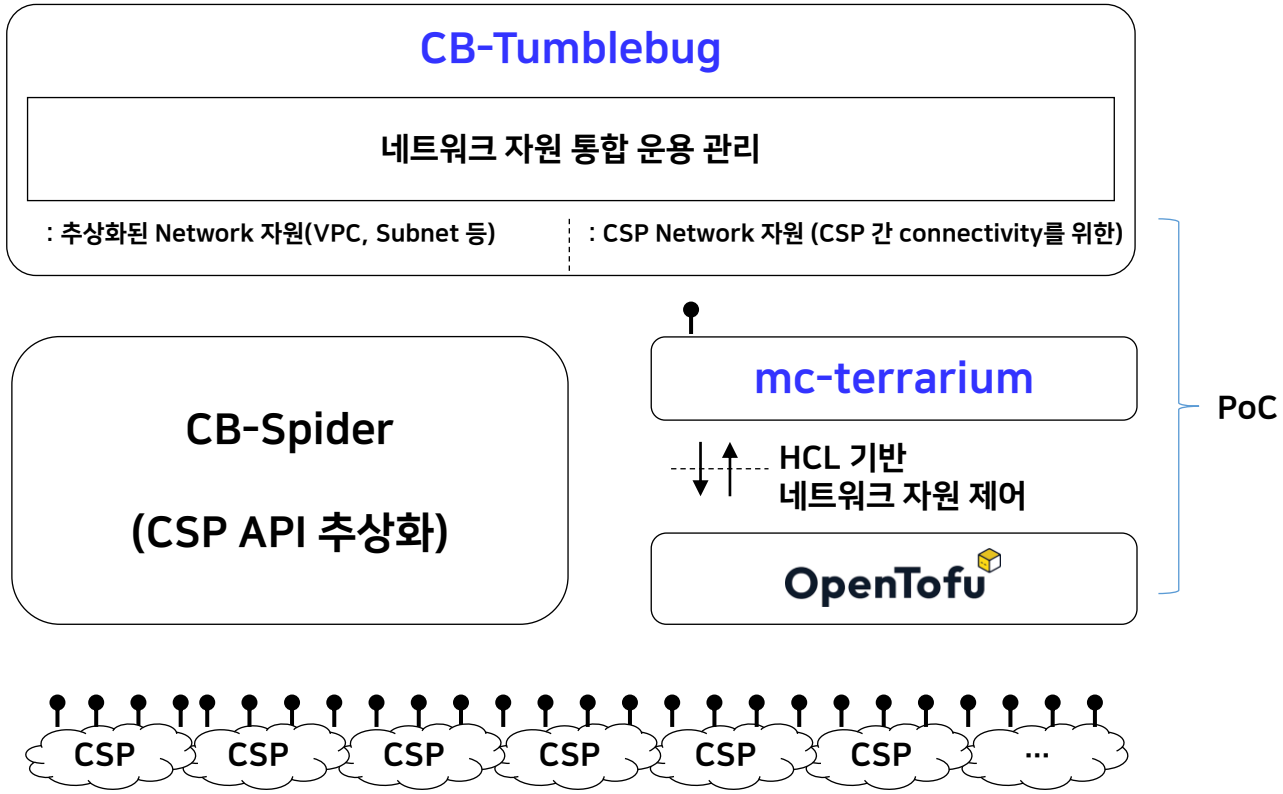
Swagger UI URL: https://cloud-barista.github.io/api/?url=https://converter.swagger.io/api/convert?url=https://raw.githubusercontent.com/cloud-barista/cb-tumblebug/v0.9.22/src/api/rest/docs/swagger.yaml

cb-tumblebug/releases/tag/v0.9.22

What's Changed

- Add infraType field to TbSpecInfo/TbImageInfo and assets by @syki
- [Workflow] Update Swagger REST API doc by @cb-github-robot in
- Validate k8scluster version when creating and upgrading k8scluster
- Add docker-compose by @yunkon-kim in #1666
- Update K8sCluster's REST API description and example by @sykim-
- Add the JWT auths middleware and sample API by @yunkon-kim ir
- Remove unused JWT configuration and environment variable handli
- Modify swaggo/swag `@securityDefinitions` by @yunkon-kim in #
- Update API docs by @yunkon-kim in #1680
- Specify data type in ResponseBodyDump logging by @yunkon-kim
- Fix SetK8sNodeGroupAutoscaling's reponse body by @sykim-etri ir
- Add encryption decryption script for credentials by @seokho-son ir
- Update README.md for encryption details by @seokho-son in #16
- Add `kvstore` pkg and improve functionality by @yunkon-kim in #
- Deduplicate code for checking k8scluster enablement by @sykim-e
- Update k8sclusterinfo.yaml and add 'others' keyword by @sykim-et
- Add etcd-centric kvstore and replace cb-store by @yunkon-kim in
- Add and update docker-compose configuration to customize or set
- Rebase replace-with-etcd onto upstream latest main by @yunkon-k
- Fix GetRegion info bug by @seokho-son in #1692
- Finalize docker-compose and etcd by @yunkon-kim in #1694
- Update cleanDB.sh by @yunkon-kim in #1696
- Replace cb-store with etcd by @yunkon-kim in #1695
- Fix subGroup removal bug in refine func by @seokho-son in #1697
- Enhance env variables by @seokho-son in #1698
- [Workflow] Update Swagger REST API doc by @cb-github-robot in
- Update regarding environment variables by @yunkon-kim in #1701
- Staging v0.9.2 by @seokho-son in #1700
- Register all specs and update asset spec by @seokho-son in #1703
- Fix provisioning error by @seokho-son in #1704
- Fix GetCspResourceId related error by @seokho-son in #1706
- Simply docker compose and isolate containers by @seokho-son in
- add testscripts for persistent volume and service in k8scluster by @
- Enhance logger pkg by @yunkon-kim in #1709
- Enhance common image features and remove key obj by @seokho-
- [k8scluster] add CheckNodeGroupsOnK8sCreation API (no routed) b
- [Workflow] Update Swagger REST API doc by @cb-github-robot in
- [k8scluster] update CheckNodeGroupsOnK8sCreation API by @syki
- [Workflow] Update Swagger REST API doc by @cb-github-robot in
- Support build option for docker compose by @seokho-son in #171
- Remove cb-tb call graph by @seokho-son in #1718
- Remove cb-tb api diff docs by @seokho-son in #1719
- [k8scluster] update valid specId example in TbK8sNodeGroupReq by @
- Replace the MCIS term with the MCI by @seokho-son in #1726
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- docs: add SungWoongz as a contributor for userTesting by @allcontri
- Enhance API docs by @seokho-son in #1728
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Staging v0.9.5 by @seokho-son in #1730
- Speed up docker build time by using go build cache by @seokho-son
- Enhance workflow for ci cd container image by @seokho-son in #173
- Clean up files by @seokho-son in #1734
- Fix typo in source by @seokho-son in #1735
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Remove infra service terms by @seokho-son in #1737
- Fix file names MCI by @seokho-son in #1738
- Change path of cleanDB.sh into the init by @seokho-son in #1740
- Makeup utilities by @seokho-son in #1742
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Rename default-ns: default and system-ns: system by @seokho-son ir
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Remove not effective param in compose by @seokho-son in #1746
- Simplify ID system using GenUid and no Transform by @seokho-son i
- Fix Flask app is run in debug mode by @seokho-son in #1750
- Rename RestLoadDefaultResource to RestLoadSharedResource by @s
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Change defaultresource to sharedresource by @seokho-son in #1753
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Staging v0.9.6 by @seokho-son in #1755
- Use Golang v1.23.0 by @seokho-son in #1757
- Bugfix to correct vNetId to match Spider's Create Subnet API by @yur
- Provide a secure way for register credential api by @seokho-son in #1
- Bump pycryptodome from 3.18.0 to 3.19.1 in /init by @dependabot ir
- Enhance secure credential registeration by @seokho-son in #1761
- Arrange API resource group tags by @seokho-son in #1762
- Staging cb-tumblebug 0.9.7 by @seokho-son in #1763
- Refactor pkg name mcir to resource mci to infra by @seokho-son in #
- Fix api validation warning by @seokho-son in #1766
- [k8scluster] update testscripts by @sykim-etri in #1767
- Add missing path param decs by @seokho-son in #1768
- Enhance api description by @seokho-son in #1769
- Describe how hybrid encryption works in init.py by @seokho-son in #
- Update description for register credential api by @seokho-son in #17
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1
- Provide a link to discussions/1773 by @seokho-son in #1774
- Add LabelSelector and refactor source with model by @seokho-son ir
- Add LabelSelector and refactor source with model by @seokho-son in #1775
- Refactor k8s and nlb parts by @seokho-son in #1776
- Update shields badge README.md by @seokho-son in #1777
- Change label api group by @seokho-son in #1779
- Invite cb-sp v0.9.2 by @seokho-son in #1781
- Staging cb-tumblebug 0.9.8 by @seokho-son in #1782
- Enhance network features and align with Spider APIs by @yunkon-kim in #172
- Staging v0.9.9 by @seokho-son in #1784
- Bump peter-evans/create-pull-request from 6 to 7 by @dependabot in #1785
- Revert TagList in vNet/Subnet API by @yunkon-kim in #1787
- [k8scluster] fix cb-spider's subnet name by @sykim-etri in #1788
- Formalize and refine resource identifiers by @seokho-son in #1789
- Refine MCI object struct by @seokho-son in #1790
- Add get region list by provider by @seokho-son in #1791
- Add a utility function to design vNets and subnets initially by @yunkon-kim in
- Test and bugfix in vNet and subnet APIs by @yunkon-kim in #1794
- Enhance label feature by @seokho-son in #1795
- Provide resourceType to objects by @seokho-son in #1796
- Provide terminate option for delete all MCIs by @seokho-son in #1797
- Support delete all MCIs in parallel by @seokho-son in #1798
- Change API name for loading assets by @seokho-son in #1799
- Enhance API for creating shared resources by @seokho-son in #1800
- Use existing convention for API about name request in k8s by @seokho-son in
- Staging v0.9.10 by @seokho-son in #1802
- Rename spec and image relatd fields by @seokho-son in #1805
- Update Kubernetes dev status for each CSP in README.md by @seokho-son in
- [k8scluster] move CB-SP's returns to cspviewk8sxxx and revert ImageId by @syk
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1810
- Update cloud region zone info and the helper tool by @seokho-son in #1811
- Staging v0.9.11 by @seokho-son in #1812
- Expedite vm recommend filtering speed by @seokho-son in #1813
- Provide openapi 3.0.1 documentation by @seokho-son in #1815
- Add middleware to support tracing-like functionalities by @yunkon-kim in #18
- Change string label to structed label for mci by @seokho-son in #1817
- Add Get Label Info and remove direct string usage by @seokho-son in #1820
- Add remote file transfer feature by @seokho-son in #1821
- Use cb-mapui v0.9.5 by @seokho-son in #1822
- Improve the `X-Request-Id` and Request Details handling mechanism by @yunk
- Staging cb-tumblebug v0.9.12 by @seokho-son in #1824
- [k8scluster] update testscripts by @sykim-etri in #1825
- Bump pascalgn/automerge-action from 0.16.3 to 0.16.4 by @dependabot in #1
- [k8scluster] enable gcp and update regions/versions by @sykim-etri in #1828
- [k8scluster] fix nodegroup's name by @sykim-etri in #1826
- Ensure log file directory exists before creating the log file by @yunkon-kim in #
- Staging v0.9.13 by @seokho-son in #1833
- Replace the vNet and zone validation logic by @yunkon-kim in #1836
- Update label.go. Fix typo: replace 'lable' with 'label' #1838 by @gabrilito1 in #1
- Cleanup comments by @seokho-son in #1837
- docs: add gabrilito1 as a contributor for code by @allcontributors in #1840
- [k8scluster] support empty/default imagename when adding k8snodegroup by
- Add csp connection info to k8s cluster info by @seokho-son in #1843
- Activate dynamic endpoint for swagger API dashboard by @seokho-son in #1844
- Remove deprecated gRPC comments by @ShehzadAhm in #1847
- docs: add ShehzadAhm as a contributor for code by @allcontributors in #1849
- docs: remove misleading comment by @tharun634 in #1848
- docs: add tharun634 as a contributor for code by @allcontributors in #1850
- Refine API request logging struct by @seokho-son in #1852
- Handle the missing vNet/subnets by the unexpected outside operations by @yunkon-kim in #1814
- [k8scluster] apply changes from CB-SP API update by @sykim-etri in #1854
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1855
- [k8scluster] update cloudimage.csv for alibaba by @sykim-etri in #1858
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1859
- [testscripts] update query param(action=withsubnets) in (force-)delete-vnet.sh by @sykim-etri in #1860
- Enhance speed and stability of spec init by @seokho-son in #1861
- Expedite init by supporting bulk update assets by @seokho-son in #1862
- Staging v0.9.16 by @seokho-son in #1863
- Apply spider v0.9.7 by @seokho-son in #1864
- Enable Get image API by @seokho-son in #1865
- Enhance for network design and configuration by @yunkon-kim in #1866
- Update docker-compose.yaml to staging CB-TB v0.9.18 by @seokho-son in #1867
- Enhance error message for mci provision by @seokho-son in #1870
- Add swag install guide message to MAKEFILE by @seokho-son in #1869
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1871
- Fix mc-infra scaleout error by @seokho-son in #1872
- Enhance large scale mc-infra provisioning stability by @seokho-son in #1874
- Code enhancement in vm provision request by @seokho-son in #1875
- fix typo by @sykim-etri in #1879
- Provide connection info to all resource types by @seokho-son in #1880
- Resolve same tag name conflict in TbSubnetInfo struct by @yunkon-kim in #1882
- docs: update README.md by @eltociear in #1881
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1883
- Update site-to-site VPN by @yunkon-kim in #1884
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1885
- Fix #1876: Remove the redundant code for fmt.Print by @MohitKambli in #1878
- Provide location and enhance get spec for k8s cluster by @seokho-son in #1887
- Update to fix malformed .all-contributorsrc json by @seokho-son in #1888
- Enhance initialization script by @seokho-son in #1889
- docs: add eltociear as a contributor for doc by @allcontributors in #1890
- docs: add MohitKambli as a contributor for code by @allcontributors in #1892
- Staging CB-TB v0.9.19 by @seokho-son in #1893
- Add Mutex to MCI related infos by @seokho-son in #1894
- Enhance error handling for randomSleep by @seokho-son in #1895
- Staging CB-TB 0.9.20 by @seokho-son in #1896
- Enhance client call code by @seokho-son in #1897
- Update Alibaba cloud images to assets by @seokho-son in #1898
- Make up for Staging CB-TB v0.9.21 by @seokho-son in #1899
- Enhance the site-to-site VPN by @yunkon-kim in #1900
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1901
- Fix vm status transition check bug by @seokho-son in #1902
- [chore] replace jq empty query by @sykim-etri in #1903
- Disable CB-Dragonfly by default by @seokho-son in #1904
- Add VPN option to label api by @seokho-son in #1905
- Enhance provisioning speed and stability and Update test scripts by @seokho-son in #1907
- [Workflow] Update Swagger REST API doc by @cb-github-robot in #1906
- Apply VPNInfo interface to label by @seokho-son in #1908
- Staging CB-TB v0.9.22 by @seokho-son in #1909

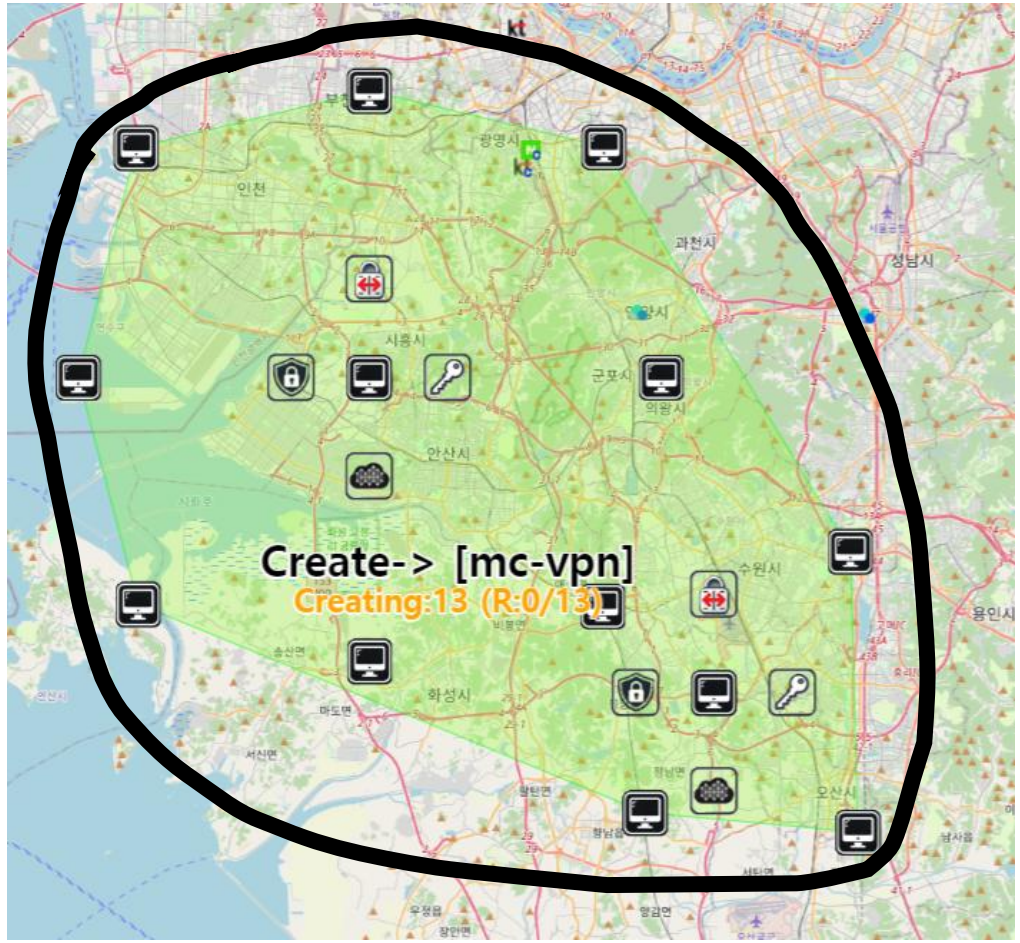
Network 리소스 개별 확장



Yunkon Kim
yunkon-kim

Thanks to Dr.Kim

Network 리소스 개별 확장: VPN Gateway

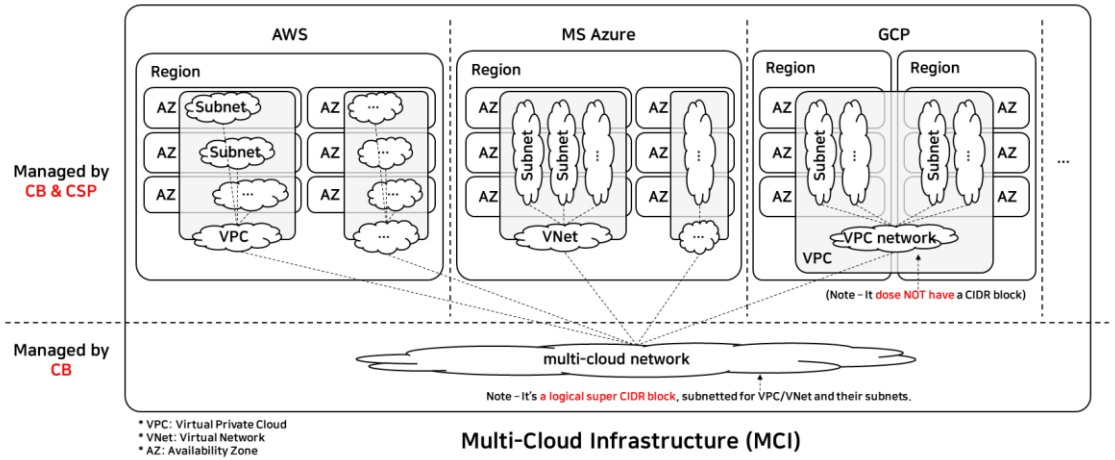


Network 디자인 및 관리 기능 개선

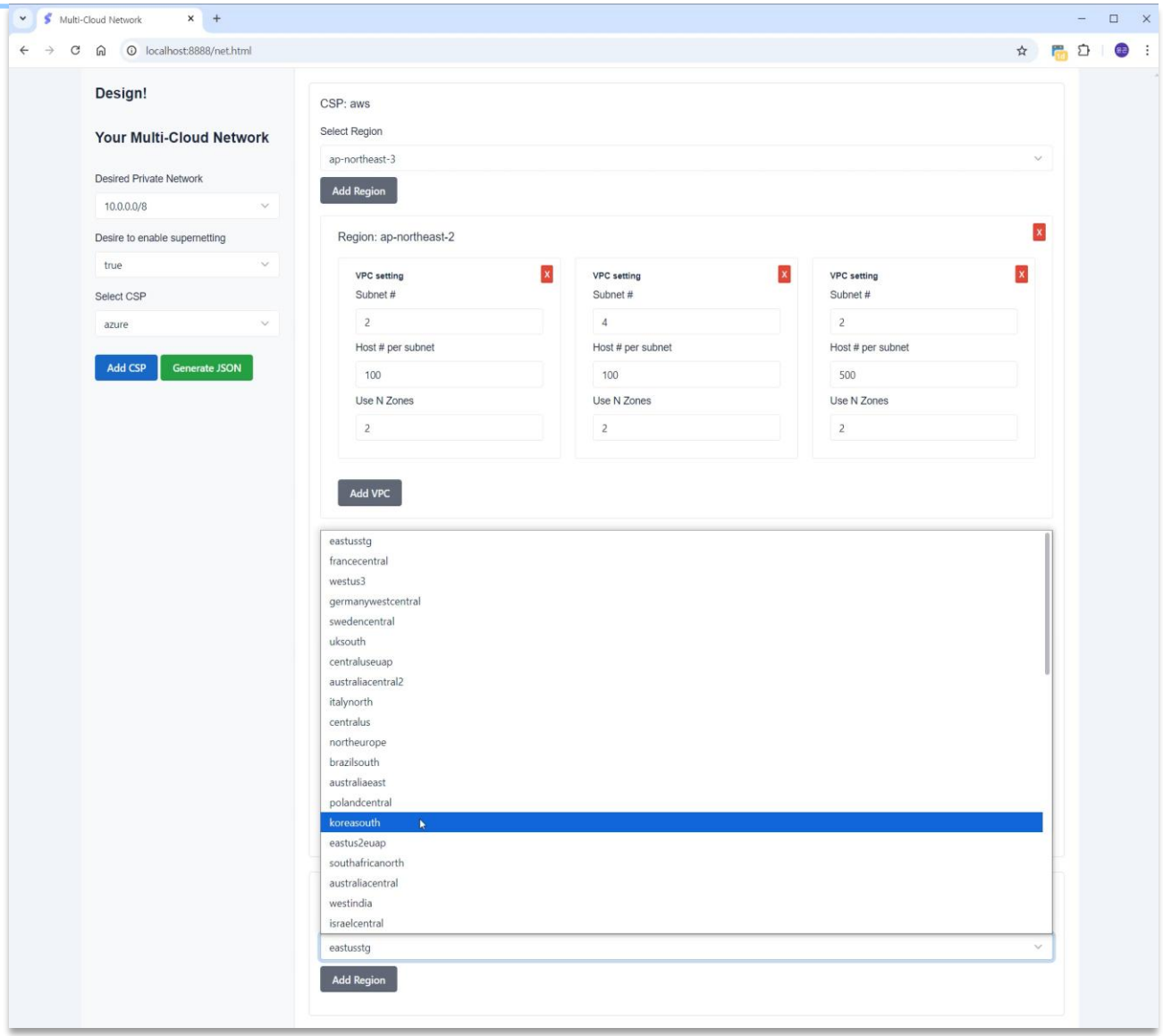
- MC-Infra 차원의 네트워크 설계 UI 추가 (PoC UI, 연구 개발 용)
  - UI와 vNet 설계 API간 연동 예정
  - vNet 설계 API의 결과를 vNet 생성 API의 입력 값으로 활용

POST /util/vNet/design Design VNet and subnets based on user-friendly properties

POST /ns/{nsId}/resources/vNet Create VNet



Multi-Cloud Infrastructure (MCI)

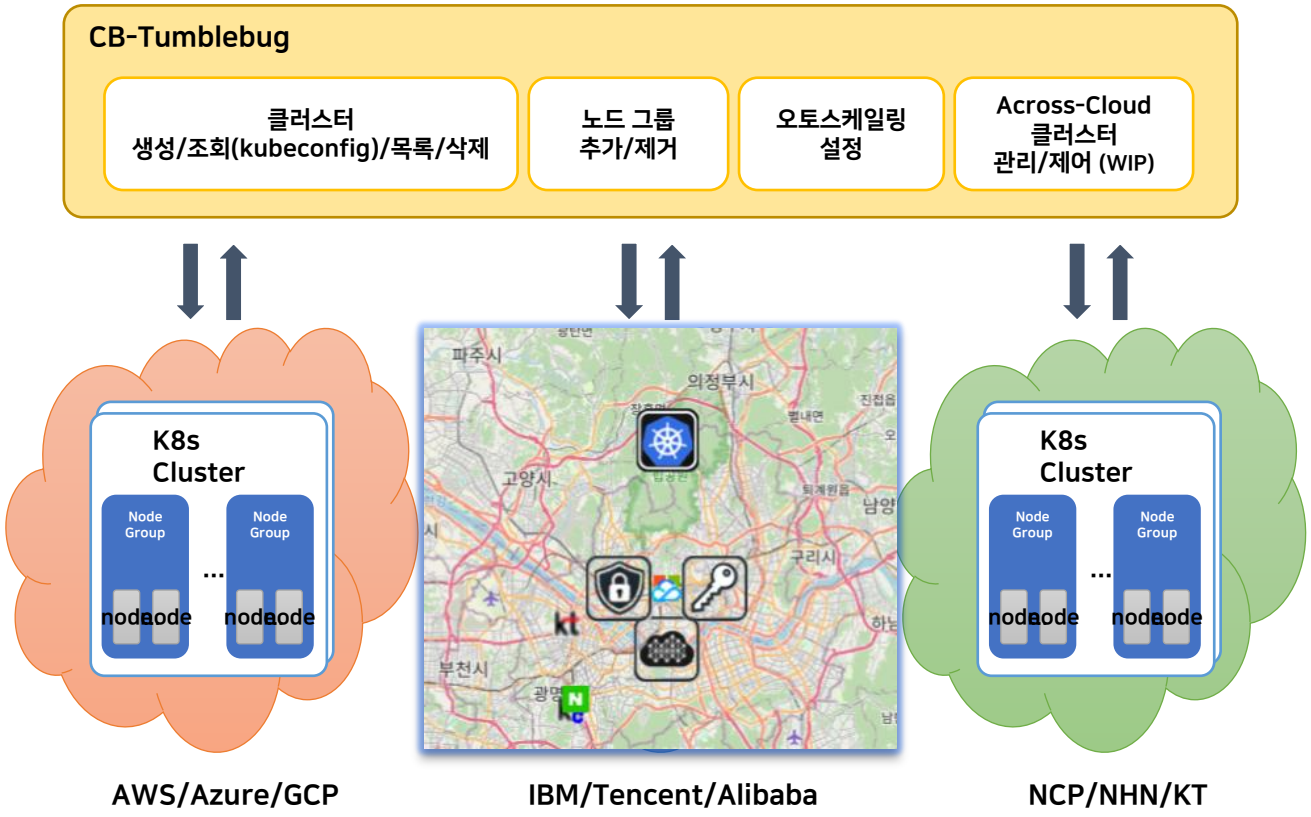


쿠버네티스 클러스터 프로비저닝

- 멀티 클라우드 컨테이너 통합 운용 및 관리
  - Azure, Alibaba, NHN, Tencent …

[Infra resource] Cluster management

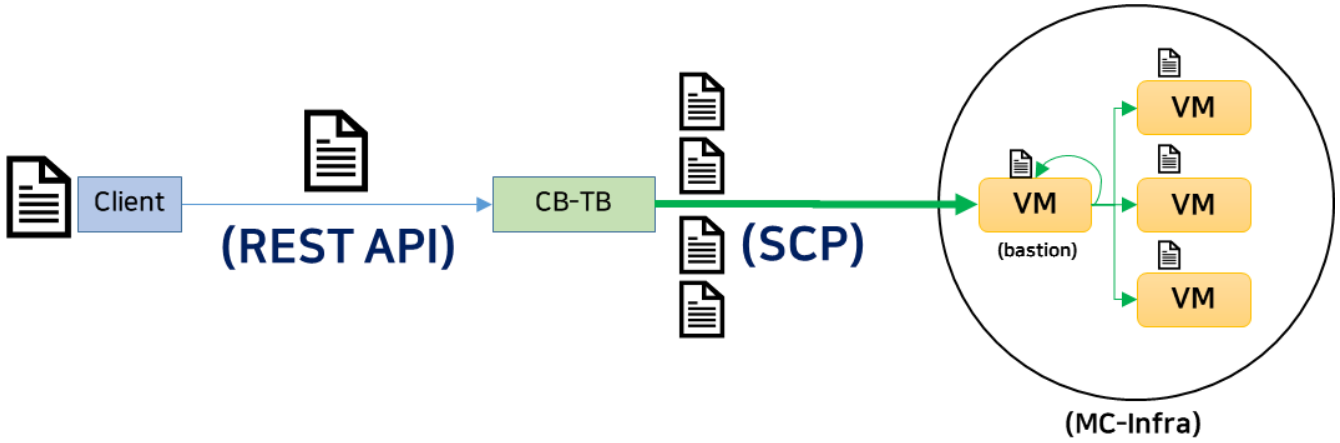
DELETE	/ns/{nsId}/cluster	Delete all Clusters
GET	/ns/{nsId}/cluster	List all Clusters or Clusters' ID
POST	/ns/{nsId}/cluster	Create Cluster
DELETE	/ns/{nsId}/cluster/{clusterId}	Delete Cluster
GET	/ns/{nsId}/cluster/{clusterId}	Get Cluster
POST	/ns/{nsId}/cluster/{clusterId}/nodegroup	Add a NodeGroup
DELETE	/ns/{nsId}/cluster/{clusterId}/nodegroup/{nodeGroupName}	Remove a NodeGroup
PUT	/ns/{nsId}/cluster/{clusterId}/nodegroup/{nodeGroupName}/autoscalesize	Cha
PUT	/ns/{nsId}/cluster/{clusterId}/nodegroup/{nodeGroupName}/onautoscaling	Set



사용방법: https://github.com/cloud-barista/cb-tumblebug/discussions/1614

가상머신 인프라 원격 파일 전송

- SW의 설정 파일 등을 인프라로 전송(중계)해주는 보조 기능
  - 대용량 파일/DB 덤프 전송하기 위한 기능 아님
  - 파일 예시 (*.yaml, *.json, ENV, *.sh, *.py, …)
- 중계 전송 방식
  - 사용자 → CB-TB: REST API 기반 파일 업로드 (multipart/form-data)
  - CB-TB: 파일 임시 저장 (메모리)
  - CB-TB → 인프라: SSH 프로토콜 기반 파일 전송 (~~rsync over SSH~~, SCP)
- 전송 허가 정책 설정 기능 추가
  - 허용 크기(10MB), 허용 타입(지정X)



Curl

```
curl -X 'POST' \
  'http://localhost:1323/tumblebug/ns/default/transferFile/mci/mc-zy6w8?subGroupId=g1&vmId=g1-
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -H 'Authorization: Basic ZGVmYXVsdDpkZWZhdWx0' \
  -F 'path=/home/cb-user/' \
  -F 'file=@240919-과제-Todolist.pdf;type=application/pdf'
```

Request URL

```
http://localhost:1323/tumblebug/ns/default/transferFile/mci/mc-zy6w8?
subGroupId=g1&vmId=g1-1
```

Server response

Code | Details

200

Response body


```
[
  {
    "mciId": "mc-zy6w8",
    "vmId": "g1-1",
    "vmIp": "10.33.6.184",
    "command": {
      "0": "scp 240919-과제-Todolist.pdf to /home/cb-user/"
    },
    "stdout": {
      "0": "File transfer successful: /home/cb-user/240919-과제-Todolist.pdf"
    },
    "stderr": {},
    "err": null
  }
]
```


Download

Labeler 및 Label Selector

- 리소스 Labeler 및 Label Selector 제공
  - Kubernetes 수준의 LabelSelector 기능 제공
  - 사용자의 label을 자유롭게 추가할 수 있음
  - sys. 로 시작하는 label 항목은, system에서 자동으로 등록한 label 항목
    - 리소스 오브젝트 생성 완료시에, 관련 정보를 sys.xxx 로 자동 등록

[Infra Resource] Common Utility

GET	/label/{labelType}/{uid}	Get labels for a resource
PUT	/label/{labelType}/{uid}	Create or update a label for a resource
DELETE	/label/{labelType}/{uid}/{key}	Remove a label from a resource
GET	/ns/{nsId}/checkResource/{resourceType}/{resourceId}	Check resources' existence
POST	/ns/{nsId}/sharedResource	Create shared resources for MC-Infra
DELETE	/ns/{nsId}/sharedResources	Delete all Default Resource Objects in the given namespace
GET	/resources/{labelType}	Get resources by label selector

GET /resources/{labelType} Get resources by label selector

Get resources based on a label selector. The label selector supports the following operators:

- `=` : Selects resources where the label key equals the specified value (e.g., `env=production`).
- `!=` : Selects resources where the label key does not equal the specified value (e.g., `tier!=frontend`).
- `in` : Selects resources where the label key is in the specified set of values (e.g., `region in (us-west, us-east)`).
- `notin` : Selects resources where the label key is not in the specified set of values (e.g., `env notin (production, staging)`).
- `exists` : Selects resources where the label key exists (e.g., `env exists`).
- `!exists` : Selects resources where the label key does not exist (e.g., `env !exists`).

Parameters Cancel

Name	Description
labelType * required string (path)	Label Type vm
labelSelector * required string (query)	Label selector query. Example: env=production,tier=backend kkk !exists

Execute Clear

Responses Response content type application/json

Curl

```
curl -X 'GET' \
  'http://localhost:1323/tumblebug/resources/vm?labelSelector=kkk%20!exists' \
  -H 'accept: application/json' \
  -H 'Authorization: Basic ZGVmYXVsdDpkZWZhdWx0'
```

Request URL

```
http://localhost:1323/tumblebug/resources/vm?labelSelector=kkk%20!exists
```

Server response

Code Details

200 Response body


```
{
  "results": [
    {
      "resourceType": "vm",
      "id": "aws-ap-northeast-2-oh-for-cloud-twin-hiscall-test-i-08a444fd0bd445032-1",
      "uid": "crd242ugsanc73e2oui0",
      "cspResourceName": "crd242ugsanc73e2oui0",
      "cspResourceId": "i-08a444fd0bd445032",
      "name": "aws-ap-northeast-2-oh-for-cloud-twin-hiscall-test-i-08a444fd0bd445032-1",
      "subGroupId": "aws-ap-northeast-2-oh-for-cloud-twin-hiscall-test-i-08a444fd0bd445032",
      "location": {
        "display": "South Korea (Seoul)",
        "latitude": 37.36,
        "longitude": 126.78
      },
      "status": "Suspended",
      "targetStatus": "None",
      "targetAction": "None",
      "monAgentStatus": "notInstalled",
      "networkAgentStatus": "notInstalled",
      "systemMessage": "",
      "createdTime": "2024-09-05 21:26:39",
      "label": "not defined",
      "description": "Ref name: Oh-for-Cloud-Twin_HisCall_Test. CSP managed VM (registered to CB-TB)",
      "region": {
        "Region": "ap-northeast-2",
        "Zone": "ap-northeast-2b"
```


Download

LabelSelector API

시스템 설치 및 실행 방법 개선: Docker Compose

```yaml
networks:
  internal_network:
    internal: true
  external_network:
    driver: bridge
services:
  # CB-Tumblebug
  cb-tumblebug:
    image: cloudbaristaorg/cb-tumblebug:0.9.15
    container_name: cb-tumblebug
    build:
      context: .
      dockerfile: Dockerfile
...
  # cb-tumblebug-etcd
  cb-tumblebug-etcd:
    image: gcr.io/etcd-development/etcd:v3.5.14
    container_name: cb-tumblebug-etcd
...
  # CB-Spider
  cb-spider:
    image: cloudbaristaorg/cb-spider:0.9.6
    container_name: cb-spider
...
  # cb-mapui
  cb-mapui:
    image: cloudbaristaorg/cb-mapui:0.9.8
    container_name: cb-mapui
    # build:
    #   context: ../cb-mapui
    #   dockerfile: Dockerfile
...
```

docker-compose.yaml

CB-Tumblebug v0.9.15 Pre-release

- CB-Spider v0.9.6
- CB-MapUI v0.9.8

API

Swagger UI URL: https://cloud-barista.github.io/api/?url=https://converter.swagger.io/api/convert?url=https://raw.githubusercontent.com/cloud-barista/cb-tumblebug/v0.9.15/src/api/rest/docs/swagger.yaml

What's Changed

- Remove deprecated gRPC comments by @ShehzadAhm in #1847
- docs: add ShehzadAhm as a contributor for code by @allcontributors in #1849
- docs: remove misleading comment by @tharun634 in #1848
- docs: add tharun634 as a contributor for code by @allcontributors in #1850
- Refine API request logging struct by @seokho-son in #1852
- Handle the missing vNet/subnets by the unexpected outside operations by @yunkon-kim in #1814

New Contributors

- @ShehzadAhm made their first contribution in #1847
- @tharun634 made their first contribution in #1848

Full Changelog: `v0.9.14...v0.9.15`

Contributors

seokho-son, yunkon-kim, and 3 other contributors

시스템 구동 방법 & 초기화(init) 개선

Verified availability zone: 661 (region-representative: 187)

Spec: 90,662 (3,716 by asset)

Filter 3 tables... Rows: 90,662

Tables
- TbCustomImageInfo
- TbImageInfo
- TbSpecInfo

	Id
1	gcp+us-west1+c3-standard-44-l...
2	gcp+us-west1+c3-standard-8
3	gcp+us-west1+c3-standard-8-lssd
4	gcp+us-west1+c3-standard-88
5	gcp+us-west1+c3-standard-88-l...

Image: 514

Filter 3 tables... Rows: 514

Tables
- TbCustomImageInfo
- TbImageInfo
- TbSpecInfo

	Id	Uid
1	gcp+asia-southeast1+debian10	
2	aws+eu-central-1+ubuntu18.04	
3	aws+eu-west-2+ubuntu22.04	
4	gcp+asia-east1+debian11	
5	gcp+australia-southeast2+debian10	
6	gcp+europe-west4+ubuntu20.04	

init.py 처리 속도/안정성 향상 (<3분)

```
+-------------------------------------------+-------------------+-------------------+
| tencent-na-toronto-na-toronto-1           | na-toronto        | na-toronto-1      |
+-------------------------------------------+-------------------+-------------------+
| tencent-sa-saopaulo                       | sa-saopaulo       | sa-saopaulo-1     |
+-------------------------------------------+-------------------+-------------------+
| tencent-sa-saopaulo-sa-saopaulo-1         | sa-saopaulo       | sa-saopaulo-1     |
+-------------------------------------------+-------------------+-------------------+

Loading common Specs and Images...

Progress: 100%|

Loading completed (2.25 minutes)
Registered Common specs
- Successful: 3716, Failed: 1869
Registered Common images
- Successful: 432, Failed: 231

Cleaning up...
Environment cleanup complete.
son@son:~/go/src/github.com/cloud-barista/cb-tumblebug$
```

클라우드 연결 정보 및 크리덴셜 처리 방법 개선

```yaml
### Cloud credentials for credential holders (default: admin)
credentialholder:
  admin:
    alibaba:
      # ClientId(ClientId): client ID of the EIAM application
      # Example: app_mkv7rgt4d7i4u7zqtzev2mxxxx
      ClientId:
      # ClientSecret(ClientSecret): client secret of the EIAM application
      # Example: CSEHDcHcrUKHw1CuxkJEHPveWRXBGqVqRsxxxx
      ClientSecret:
    aws:
      # ClientId(aws_access_key_id)
      # ex: AKIASSSSSSSSSSS56DJH
      ClientId:
      # ClientSecret(aws_secret_access_key)
      # ex: jrcy9y0Psejjfeosifj3/yxYcgadklwihjdljMIQ0
      ClientSecret:
    azure:
      # ClientId(client_id): Client ID
      # ex:2df8b-4c35-4bak-a23c-ckf05a54a824
      ClientId:
      # ClientSecret(client_secret): Client Secret
      # ex: 213r868b-4c35-426vi-.VDEkf05a54aGq~_crT
      ClientSecret:
      # TenantId(tenant_id): Tenant ID
      # ex: 21e7868b-4c35-4bak-a23c-ckf05a54a824
      TenantId:        You, 4 weeks ago • Add credential.yaml template
      # SubscriptionId(subscription_id): Subscription ID
      # ex: 2dvdveb-4c35-4bak-a23c-ckf05a54a824
      SubscriptionId:
    gcp:
      # client_id: OAuth 2 Client ID (or Unique ID) of the service account
      # https://console.cloud.google.com/iam-admin/serviceaccounts
      # ex: "107777777600845725910" (Please note that adding double quotes
      client_id: ""
```

보안성 향상

```
son@son:~/go/src/github.com/cloud-barista/cb-tumblebug$ ./init/encCredential.sh

Do you want to encrypt the file /home/son/.cloud-barista/credentials.yaml? (y/n): y
Enter a password (press enter to generate a random key):
Confirm the password:

Remember the password you have entered. You will need it to decrypt the file.


File successfully encrypted: /home/son/.cloud-barista/credentials.yaml.enc
(Original file deleted: /home/son/.cloud-barista/credentials.yaml)

To edit the credentials,
Use /home/son/go/src/github.com/cloud-barista/cb-tumblebug/init/decCredential.sh to decrypt the file
Then edit /home/son/.cloud-barista/credentials.yaml

son@son:~/go/src/github.com/cloud-barista/cb-tumblebug$ ./init/decCredential.sh
Enter the password:

File successfully decrypted: /home/son/.cloud-barista/credentials.yaml
(Encrypted file deleted: /home/son/.cloud-barista/credentials.yaml.enc)
```

- encCredential.sh
- decCredential.sh

크리덴셜 위치: ~/.cloud-barista/credential.yaml

클라우드 연결 정보 및 크리덴셜 처리 방법 개선

POST /credential Register Credential Information

This API registers credential information using hybrid encryption. The process involves compressing and encrypting sensitive data with AES-256, encrypting the AES key with a 4096-bit RSA public key (retrieved via `GET /credential/publicKey`), and using OAEP padding with SHA-256. All values, including the AES key, must be base64 encoded before sending, and the public key token ID must be included in the request.

Parameters Try it out

No parameters

Request body required application/json

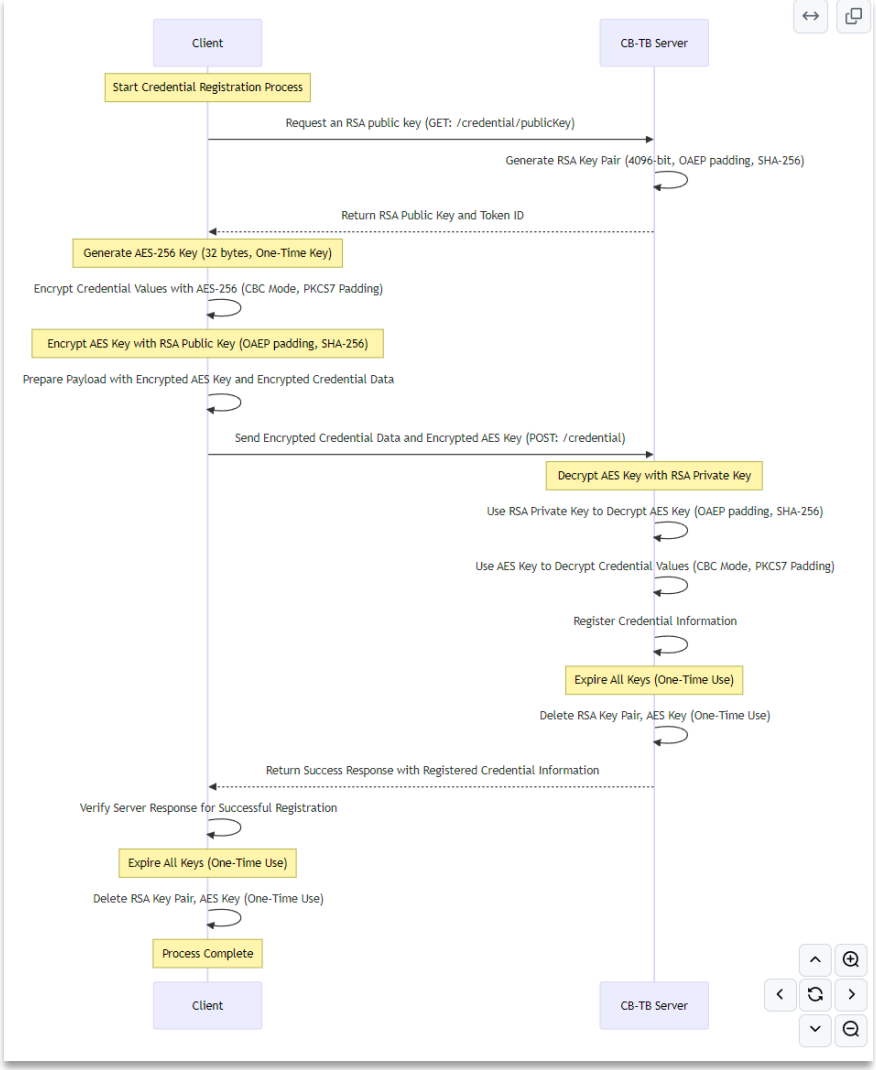
Credential request info

Example Value | Schema


```
{
  "credentialHolder": "admin",
  "credentialKeyValueList": [
    {
      "key": "string",
      "value": "string"
    }
  ],
  "encryptedClientAesKeyByPublicKey": "ZzXL27hbAUDT0ohglf2Gwr60sAqdPw3+CnCsn0RJXeiZxXnHfW03mFx5RaSfbwtPYCq1h6wwv7XsiWzfFmr02...",
  "providerName": "aws",
  "publicKeyTokenId": "cr31av30uphc738d7h0g"
}
```


보안성 향상 (*RSA&AES):

GET /credential/publicKey



API로 Credential 등록 (WIP: credential holder 조회, 활용 등)

가이드: https://github.com/cloud-barista/cb-tumblebug/discussions/1773

github.com/cloud-barista/cb-tumblebug/blob/main/README.md

시스템 성능 및 안정성 극대화 : 500VM 프로비저닝 (30리전 활용)

Files

main

Go to file

- .github
- assets
- conf
- docs
- init
- scripts
- src
- .all-contributorsrc
- .dockerignore
- .env
- .gitignore
- CHANGELOG.md
- CODEOWNERS
- CODE_OF_CONDUCT.md
- CONTRIBUTING.md

Preview | Code | Blame | 693 lines (515 loc) · 50.8 KB

CB-Tumblebug (Multi-Cloud Infra Management) 👋

go report A+ | go 73.5% | go.mod v1.23.0 | repo size 35.7 MB | GO reference | Visual Codebase | API Doc Swagger

license Apache-2.0 | release v0.9.0 | release(dev) v0.9.22 | build passing | Slack SIG-TB

all contributors 49

CB-TB? ✨

CB-Tumblebug (CB-TB for short) is a system for managing multi-cloud infrastructure consisting of resources from multiple cloud service providers. (Cloud-Barista)

- Overview, Features, Architecture
- Supported Cloud Providers and Resource Types

Resource Type	AWS	Azure	GCP	Alibaba	Tencent	IBM	NCP	NHN	KT	Open Stack
VM (CPU)	YES	YES	YES	YES	YES	YES	YES	Partial	Partial	YES
VM (GPU)	YES	WIP	YES	YES	WIP	TBD	TBD	TBD	TBD	TBD
Virtual Network	YES	YES	YES	YES	YES	YES	YES	Partial	Partial	YES
Security Group	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
SSH key	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

shson@DESKTOP-KTDT15E: ~,

```
shson@DESKTOP-KTDT15E:~/go/src/github.com/cloud-barista/cb-tumblebug$
shson@DESKTOP-KTDT15E:~/go/src/github.com/cloud-barista/cb-tumblebug$
shson@DESKTOP-KTDT15E:~/go/src/github.com/cloud-barista/cb-tumblebug$ make compose
```

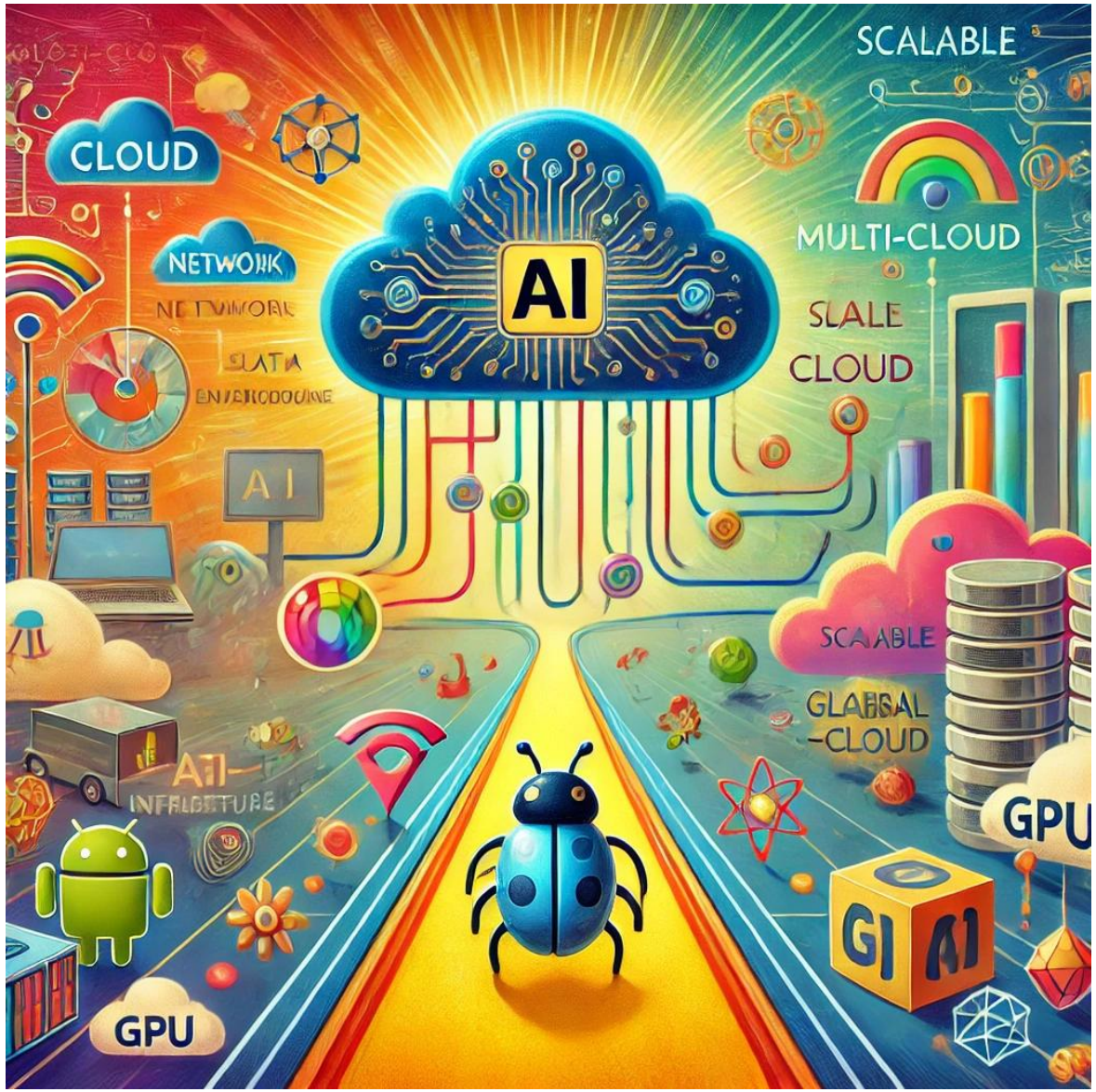
```
rista/cb-tumblebug/src/testclient/scripts/sequentialFullTest$
rista/cb-tumblebug/src/testclient/scripts/sequentialFullTest$
rista/cb-tumblebug/src/testclient/scripts/sequentialFullTest$
```

참고: 마일스톤

	3월	4월	5월	6월	7월	8월	9월	10월	11월
가상머신	인프라 관리 방식 개선 (라이프사이클 상태 확장/ 커맨드 빌트인 함수)		인프라 형상 개선 (+GPU)		리소스 관리 방식 개선 (라이프사이클)				
컨테이너	+ Alibaba, Tencent, NHNCloud, Azure (안정성 향상)						➔2025년, Across-Cloud 쿠버네티스 클러스터 구성/배포		
			기능 코드 / 테스트 방법 및 안정성 개선 등						
네트워크	동적 MCI 프로비저닝, 슈퍼네팅용 VPC CIDR 추천/연동				VPC, Subnet 형상 검토, 개선 및 고도화				신규 네트워크 서비스 추가 여부 검토
	TF PoC: Azure VPN 연동		TF PoC: CB-TB 연동 테스트			TF PoC: 국내 CSP 1~2종 VPN 연동			
스토리지	블록 스토리지 통합 제어 기능								
		Ceph 클러스터 자동 구성 기능			애플리케이션 유스케이스로 분산 클러스터 연동 테스트				
기존 자원 등록					K8s 자원 등록 기능 개발		신규 등록 자원에 대한 지원 여부 검토		
	등록 오류 분석 및 대응							➔ 등록 기능 인터페이스 개선, 자원 등록 해제 기능 개발	
Cloud-Agnostic							➔ PoC 기능, PoC API		
시스템	Forward API 테스트 (Price, region, spec 등)	Request tracking 활용 방안 마련 (원격 커맨드 중간 결과 확인 등)			시스템 배포 및 초기화 기능 및 성능 향상				
			클라우드 연결 정보 및 크리덴셜 처리 방법 개선						
유스케이스			Self-hosted Cloud LLM service 고도화						
통합/시험	통합 연동 지원 (VM 인프라)		시험 및 시연 준비		통합 연동 지원 (VM/K8s 인프라)			시험 및 시연 준비	

재미있는 AI 탐구생활

멀티 클라우드 기반 자유로운 AI 인프라를 위한 CB-TB의 여정



CEO SUDDENLY CALLIN M.LING,
"LLMS are getting FAMOUS THESE DAYS,
LET'S CREATE A SERVICE AROUND THEM!"
LLMS

What if …

CB-Tumblebug + GPU x (Ollama + WebUI) + LLM

Cloud Barista

https://github.com/cloud-barista/cb-tumblebug

Ollama

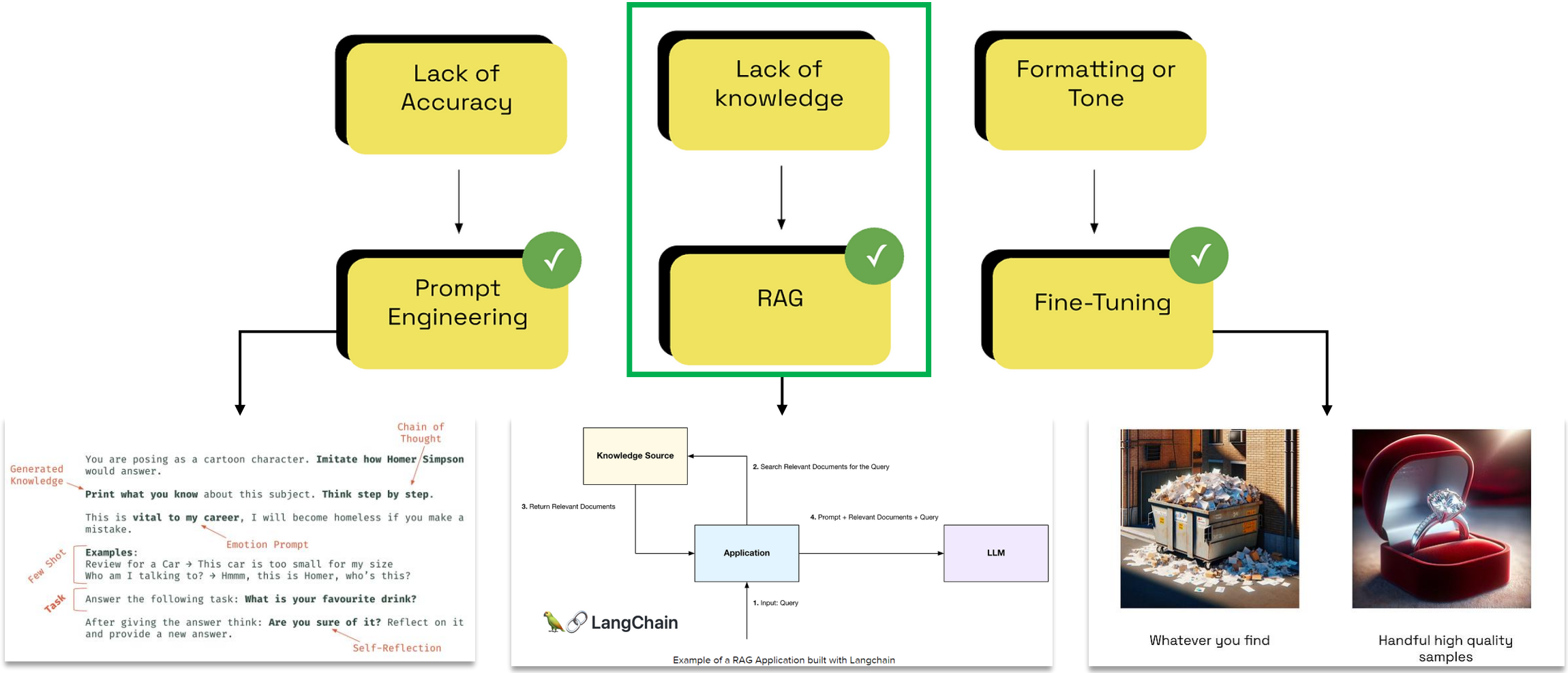
Open WebUI

SELF HOSTED MULTI-CLOUD LLM BY CLOUD-BARISTA (&OLLAMA&WEBUI)

ENNONO!
AE!!
RETRIVDAL-
-AUGIUNCTED
GENERATION!
TO BUILD TO BULD AI SERVICE
RAG
RETRIFAL-AUGPONED GENERATION
RAG
AI
CEO
AIG

What if …

잠깐! 그런데, RAG가 뭔가요? (AI 탐구)



Miguel Carreira Neves · May 9

https://www.tensorops.ai/post/prompt-eng-vs-rag-vs-fine-tuning-what-do-you-need

RAG에 꼭 필요한 것 (AI 탐구)

What are embedding models?

Embedding models are models that are trained specifically to generate *vector embeddings*: long arrays of numbers that represent semantic meaning for a given sequence of text:

"Ollama is the easiest way to get up and running with large language models."

```
[-0.15521588921546936,
 -0.3130679428577423,
 -0.2622824013233185,
 -0.10730823874473572,
 ...
 0.26006409525871277,
 0.14494779706001282,
 -0.01514953002333641,
 0.04403747618198395]
```

Example embedding models

Model	Parameter Size
`mxbai-embed-large`	334M
`nomic-embed-text`	137M
`all-minilm`	23M

https://ollama.com/blog/embedding-models

CB-Tumblebug + GPU x (Ollama + WebUI) + LLM x RAG x AI Agent

Llama3.1
LLM+Tools

Open WebUI
chat UI

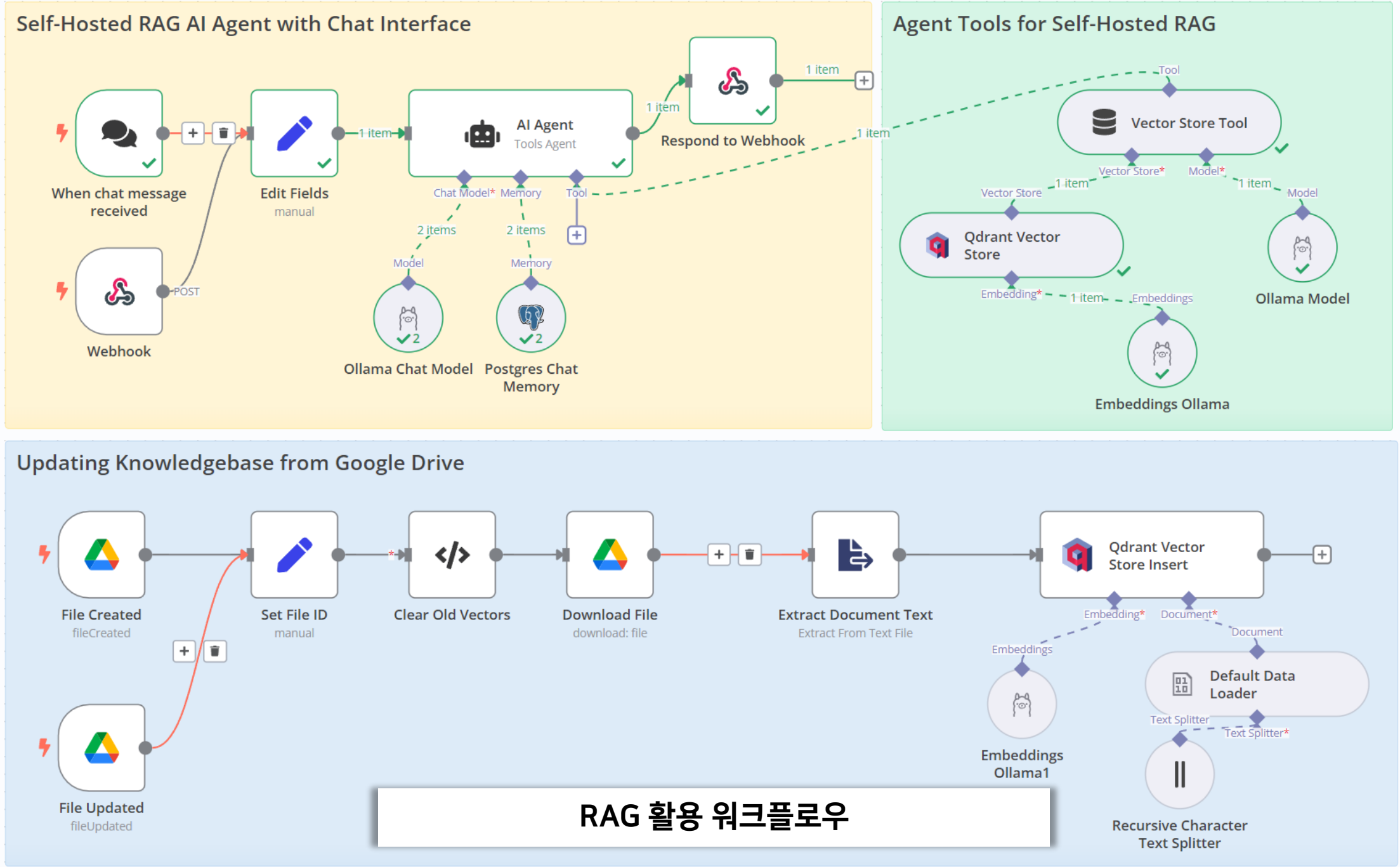
n8n
workflow

Ollama
LLM Server

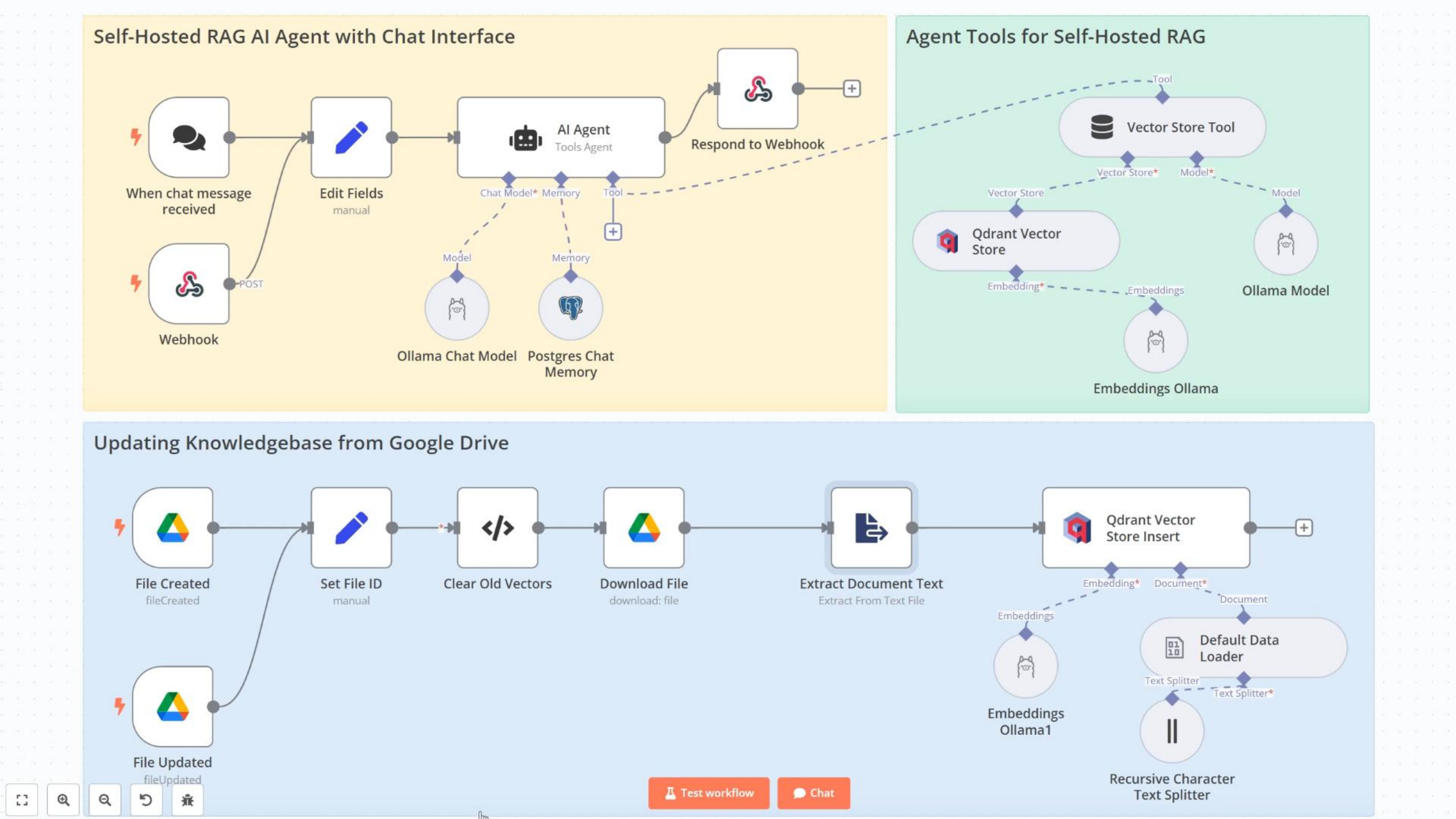
https://github.com/cloud-barista/cb-tumblebug

Qdrant
vector Database

Nomic
embed-text


Self-Hosted RAG AI Agent with Chat Interface
When chat message received
Webhook
POST
Edit Fields
manual
1 item
AI Agent
Tools Agent
Chat Model*
Memory
Tool
2 items
Model
Memory
Ollama Chat Model
Postgres Chat Memory
1 item
Respond to Webhook
Agent Tools for Self-Hosted RAG
Tool
Vector Store Tool
Vector Store*
Model*
Vector Store
Model
Qdrant Vector Store
Embedding*
Embeddings
Ollama Model
Embeddings Ollama
Updating Knowledgebase from Google Drive
File Created
fileCreated
File Updated
fileUpdated
Set File ID
manual
Clear Old Vectors
Download File
download: file
Extract Document Text
Extract From Text File
Qdrant Vector Store Insert
Embedding*
Document*
Document
Embeddings
Embeddings Ollama1
Default Data Loader
Text Splitter
Text Splitter*
Recursive Character Text Splitter

RAG 활용 워크플로우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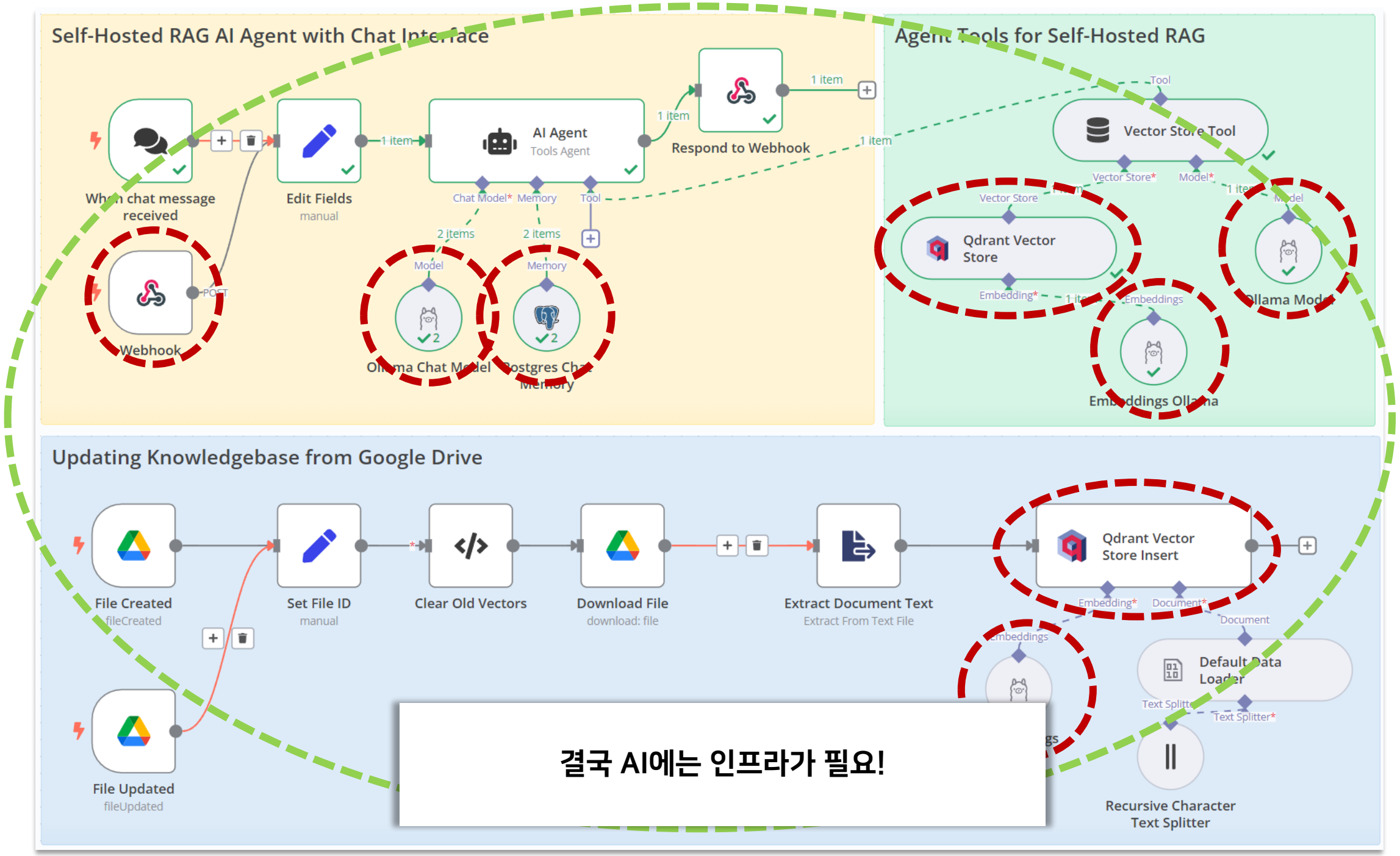
Updating Knowledgebase from Google Drive
File Created
fileCreated
File Updated
fileUpdated
Set File ID
manual
Clear Old Vectors
Download File
download: file
Extract Document Text
Extract From Text File
Qdrant Vector Store Insert
Embedding*
Document*
Embeddings
Embeddings Ollama1
Document
Default Data Loader
Text Splitter
Text Splitter*
Recursive Character Text Splitter
Test workflow
Chat



결국 AI에는 인프라가 필요!

Dashboard Configuration

IP	localhost
Port	1323
Username	default
Password	•••••••
Refresh(s)	5
Req Log	Select ID

Map Control

Toggle Map/API

MC-Infra Provisioning

Policy	Location-based
Provider	ALL
vCPU	1
Mem(Gi)	0.5
SpecID	Ex: 2xlarge
Image(OS)	Ubuntu 22.04
Disk(GB)	Ex: 250

Accelerator Config

CB-TB로, AI 인프라 생성에 자유를!!

(돈이 들지만, 최대한 싸게 모셔 볼게요..)

Dashboard Configuration

IP	localhost
Port	1323
Username	default
Password	•••••••
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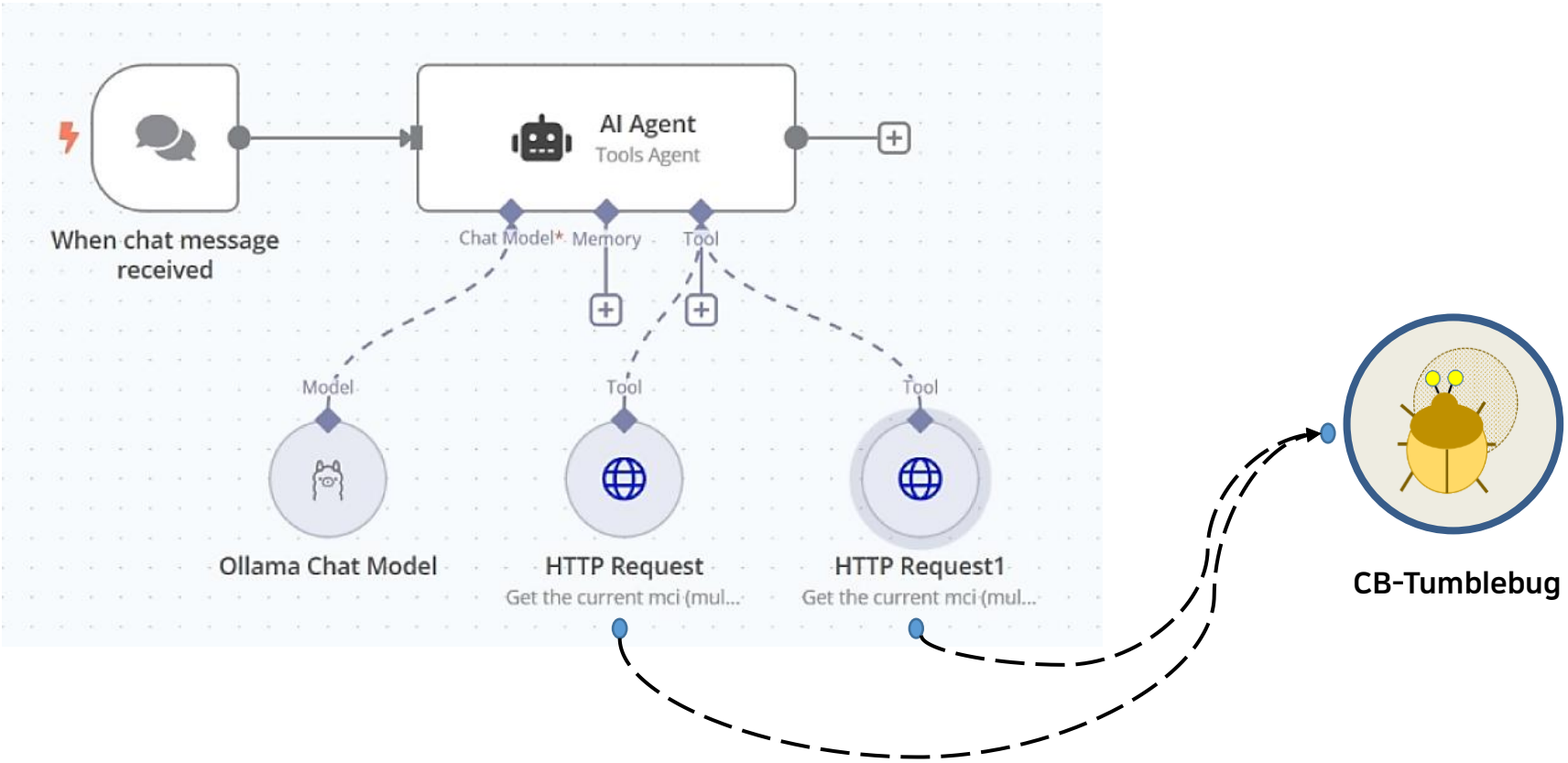
Accelerator Config

CB-TB로, AI 인프라 생성에 자유를!!

(돈만 있으면.. ㅜㅜ)

한 스텝 더 들어가 볼까요?



MC-Infra의 현재 현황을 알려주는 AI Agent
(함께 만들어볼까요?)

Add first step...

Take Home Message, and Your Action

CB-Tumblebug (Multi-Cloud Infra Management) 👋

go report A+ | go 74.0% | go.mod v1.23.0 | repo size 35.9 MB | reference | Visual Codebase | API Doc Swagger

license Apache-2.0 | release v0.9.0 | release(dev) v0.9.22 | build passing | Slack SIG-TB

all contributors 49

접속: github.com/cloud-barista/cb-tumblebug

★ 함께 만들어가는 오픈소스★

- 사랑과 관심: 구독(Fork) & 좋아요(Star)
- 그리고 컨트리뷰션이 필요합니다! ☺

- Golang
- Apache 2.0

멀티 클라우드에 진심인 사람들의 이야기

AI 서비스의 혁신적 활용을 위한 컴퓨팅 인프라, 멀티 클라우드

Cloud-Barista Community the 10th Conference

감사합니다.

https://github.com/cloud-barista

문의 : shsonkorea@etri.re.kr / 042-860-5286

본 발표자료에는 네이버에서 제공한 나눔글꼴이 적용되어 있습니다.