멀티/분산 클라우드, 차세대 클라우드를 향한 도전과 기회

- 클라우드바리스타 커뮤니티 제9차 컨퍼런스 -

MC-Meta

멀티 클라우드 메타데이터 통합 관리 기술

커뮤니티개발자@클라우드바리스타 & 대표@마이씨큐

박재홍

시나몬 (Cinnamon) 한잔 어떠세요 ?

CLOUD BARISTA

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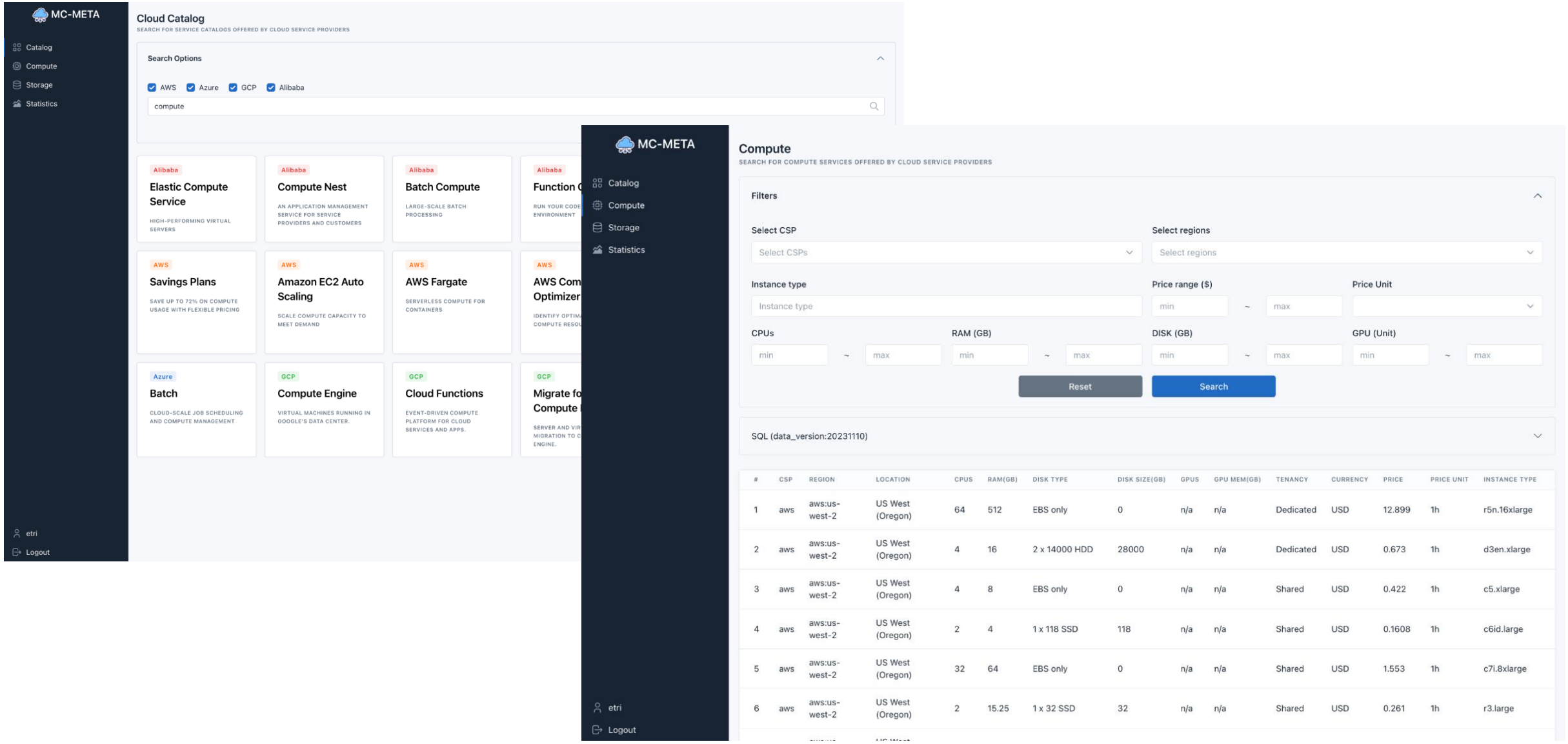
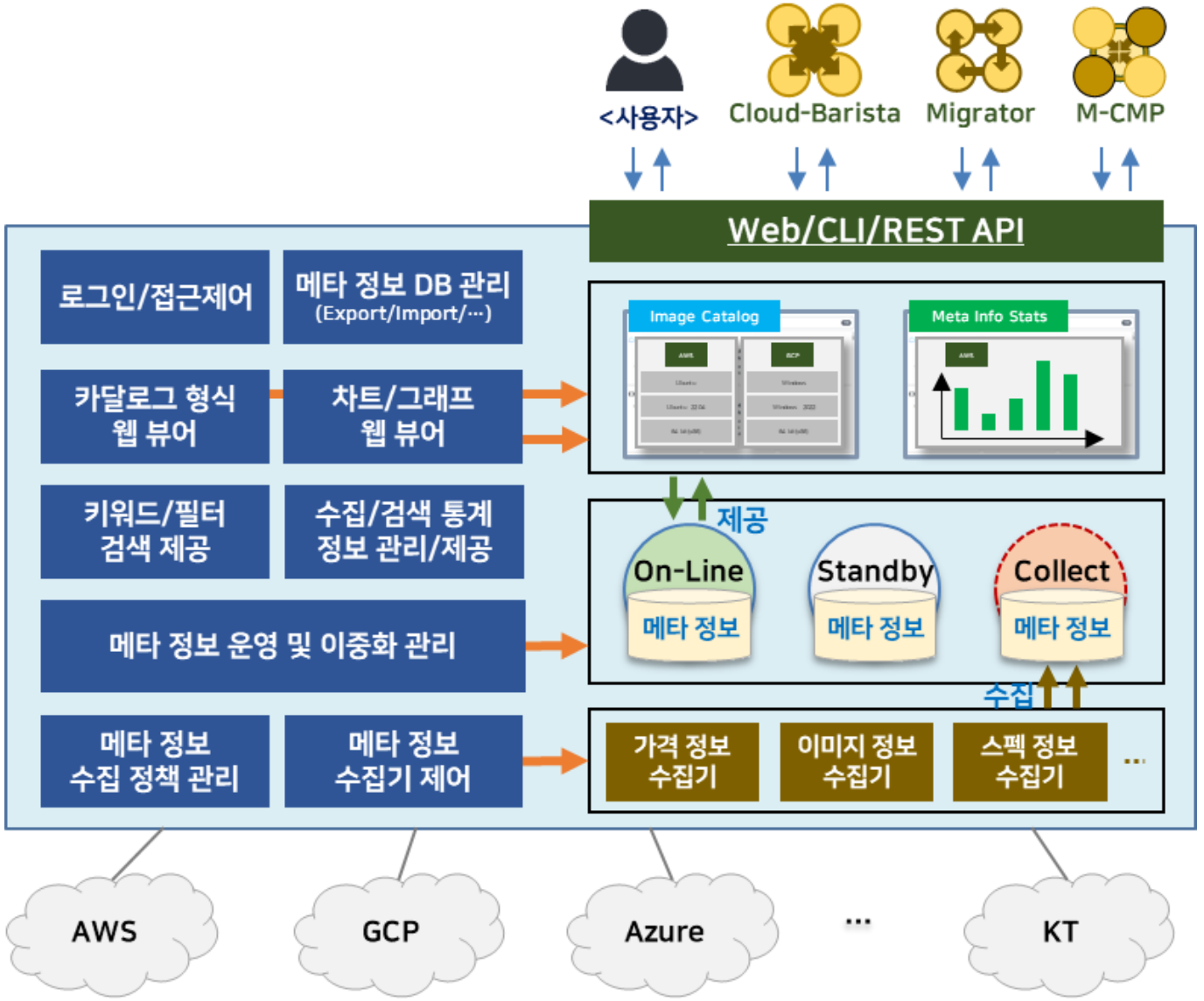
Barista
클라우드바리스타 커뮤니티 제9차 컨퍼런스
MC-Meta 개 요
시나몬 (Cinnamon) 한잔 어떠세요 ?

MC-Meta = 멀티클라우드용 다나와




Cloud Barista
클라우드바리스타 커뮤니티 제9차 컨퍼런스
MC-Meta 구조 & 기능
시나몬 (Cinnamon) 한잔 어떠세요 ?

MC-Meta 구조


<사용자>
Cloud-Barista
Migrator
M-CMP
Web/CLI/REST API
로그인/접근제어
메타 정보 DB 관리
(Export/Import/…)
카달로그 형식
웹 뷰어
차트/그래프
웹 뷰어
키워드/필터
검색 제공
수집/검색 통계
정보 관리/제공
메타 정보 운영 및 이중화 관리
메타 정보
수집 정책 관리
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수집기 제어
Image Catalog
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On-Line
메타 정보
Standby
메타 정보
Collect
메타 정보
수집
가격 정보
수집기
이미지 정보
수집기
스펙 정보
수집기
…
AWS
GCP
Azure
…
KT

MC-Meta 기능

- 이종의 클라우드 메타 정보를 주기적으로 수집 및 통합하여 표준화된 형식으로 제공
  - 수집정보의 예) image 정보, spec 정보, 가격(price) 정보 등
- 멀티 클라우드 메타 정보에 대한 키워드 및 필터링 검색 기능 제공
- 클라우드 서비스 제공자별 메타 정보 수집기 제공
- (향후 수집 대상 확장을 위해) plug-in 방식의 확장 가능한 수집기 드라이버 구조 제공
- 수집 이력 통계 정보, 클라우드별 제공 서비스 변화, 변경 추이 등의 정보 제공
  - 예) image 개수 증가율, 신규 spec 정보 등
- 지원 인터페이스
  - GUI
  - CLI
  - RESTful API


Cloud
Barista
클라우드바리스타 커뮤니티 제9차 컨퍼런스
MC-Meta 데이터 통합 프로세스
시나몬 (Cinnamon) 한잔 어떠세요 ?

클라우드 서비스 카테고리 통합

고마운 분

Ilyas F
ilyas-it83

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Sr. Technical Program Manager

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Microsoft
Bangalore, India
it83.mohammed@gmail.com
bornoncloud.com

Public Cloud Services Comparison

About

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Category	Service	aws	Azure	Google Cloud	IBM Cloud	ORACLE CLOUD	Alibaba Cloud	HUAWEI CLOUD
Compute	Shared Web hosting	AWS Amplify	Web Apps	Firebase	Web hosting services		Web Hosting Simple Application Server	
Compute	Virtual Server	Amazon EC2	Azure Virtual Machine	Compute Engine	Classic Virtual Server Virtual Server for VPC (x86 & s390x) Power Systems Virtual Servers Hyper Protect Virtual Server (LinuxONE) Quantum Services	Oracle Cloud Infrastructure Compute,	Alibaba ECS	Huawei Cloud Elastic Cloud Server
Compute	Bare Metal Server	Amazon EC2 Bare Metal Instance	Azure Bare Metal Servers (Large Instance Only for SAP Hana)	Bare Metal Solution	Bare Metal Servers	Oracle Bare Metal Servers	ECS Bare Metal Instance	Huawei Cloud Bare Metal Server
Compute	VMware	VMC on AWS	Azure VMware Solution	Google Cloud VMware Engine	VMware Solutions Shared VMware Solutions Dedicated VMware Regulated Workloads VMware Solutions Dedicated - Security & Compliance Readiness Bundle	Oracle Cloud VMWare Solution		
Compute	Virtual Dedicated Host	Amazon EC2 Dedicated Hosts AWS Nitro Enclaves	Azure Dedicated Host	Sole Tenant Node (Beta)	Dedicated Virtual Servers Infrastructure (VSi) Dedicated host for VPC	Dedicated Virtual Machine Hosts	Dedicated Host	Huawei Cloud Dedicate Host

https://github.com/ilyas-it83/CloudComparer

클라우드 서비스 카테고리 통합

NCP(ncloud), NHN Cloud, KT Cloud, Tencent 등의 클라우드 서비스 분석 내용 추가

Category	Service	AWS	Azure	GCP	Alibaba	ncloud	nhncloud	tencent	IBM	Oracle	Huawei
Compute	Shared Web hosting	AWS Amplify	Web Apps	Firebase	Web Hosting Simple Application Server				Web hosting services		
Compute	Virtual Server	Amazon EC2	Azure Virtual Ma	Compute Engine	Alibaba ECS	ncloud server	nhncloud compute	cloud virtual ma	Classic Virtual S Virtual Server fo Power Systems Vi Hyper Protect Vi Quantum Services	Oracle Cloud Infr	Huawei Cloud Elastic Cloud Server
Compute	Bare Metal Server	Amazon EC2 Bare M	Azure Bare Metal	Bare Metal Solut	ECS Bare Metal Instance				Bare Metal Server	Oracle Bare Meta	Huawei Cloud Bare Metal Server
Compute	VMware	VMC on AWS	Azure VMware Solu	Google Cloud VMware Engine					VMware Solutions VMware Solutions VMware Regulated VMware Solutions	Oracle Cloud VMWare Solution	
Compute	Virtual Dedicated Host	Amazon EC2 Dedic AWS Nitro Enclav	Azure Dedicated H	Sole Tenant Node	Dedicated Host				Dedicated Virtua Dedicated host fo	Dedicated Virtua	Huawei Cloud Dedicate Host
Compute	High Performance Computing	High Performance AWS ParallelClus Elastic Fabric A NICE DCV	Azure High Perfor	High performance computing					IBM Spectrum LSF IBM Spectrum Symp	Oracle Dedicated Virtual Machine Hosts	
Compute	Container Registration Servi	Amazon Elastic Co	Azure Container R	Artifact Registry	Container Registry				IBM Cloud Contair	Oracle Cloud Infr	Software Repository for Container
Compute	Container Management Servic	Amazon Elastic Co Amazon Elastic K Red Hat Openshi Bottlerocket	Azure Kubernetes Azure Container I Azure Red Hat Ope	Kubernetes Engine	Container Service Container Service for Kubernetes				IBM Cloud Kuberne Redhat Openshift IBM Cloud Code En	Container Engine	Cloud Container Instance Cloud Container Engine
Compute	Serverless compute for cont	AWS Fargate AWS Proton	Azure Container I Azure Container A	Google Cloud Run					IBM Cloud Code Engine		
Compute	Serverless container platfo	AWS App Runner	Azure Container A	Google Cloud Run					IBM Cloud Code En	Oracle Functions	
Compute	Micro Services App Developm	AWS Lambda	Azure Service Fab Azure Functions Event Grid	Google Cloud Fun EventArc	Function Compute				IBM Cloud Code En IBM Cloud Functio	Oracle Functions	FunctionGraph
Compute	Serverless app repository	AWS Serverless Application Repository									
Compute	Virtual Private Servers	Amazon Lightsail	Azure App Service Environment		Simple Application Server				Classic Virtual Server Virtual Server for VPC		Hyper Elastic Cloud Server

클라우드 서비스 메타정보 스키마 통합

compute

csp	region	location	cpu_cnt	cpu_mem	disk_type	disk_size	gpu_cnt	gpu_mem	tenancy	currency	price	price_unit	instance_type
aws	✅	✅	✅	✅	✅	✅	✅	✅	✅	✅	✅	✅	✅
[illegible]	✅	✅	✅	✅	☑	☑	☑	☑	☑	✅	✅	✅	✅
gcp	✅	☑	✅	✅	☑	☑	☑	☑	☑	✅	✅	✅	✅
alibaba	✅	✅	✅	✅	☑	✅	✅	✅	☑	✅	✅	✅	✅

✅	확실
☑	불확실

storage

csp	region	name	size	max_size	io	io_max	bandwidth	bandwidth_max	price
aws	✅	✅	✅	✅	✅	✅	✅	✅	✅
azure	☑	☑	☑	☑	☑	☑	☑	☑	☑
gcp	☑	☑	☑	☑	☑	☑	☑	☑	☑
alibaba	☑	☑	☑	☑	☑	☑	☑	☑	☑

✅	확실
☑	불확실

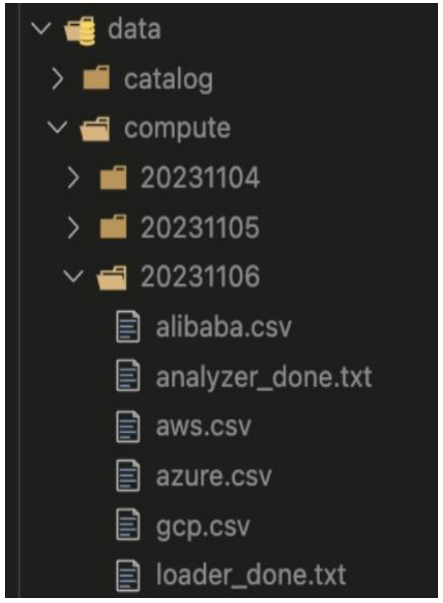
image

csp	region	id	name	platform	description
aws	✅	✅	✅	✅	✅
azure	✅	✅	✅	✅	✅
gcp	✅	✅	✅	✅	✅
alibaba	✅	✅	✅	✅	✅

✅	확실
☑	불확실

데이터 수집 & 통합 프로세스

FileSystem



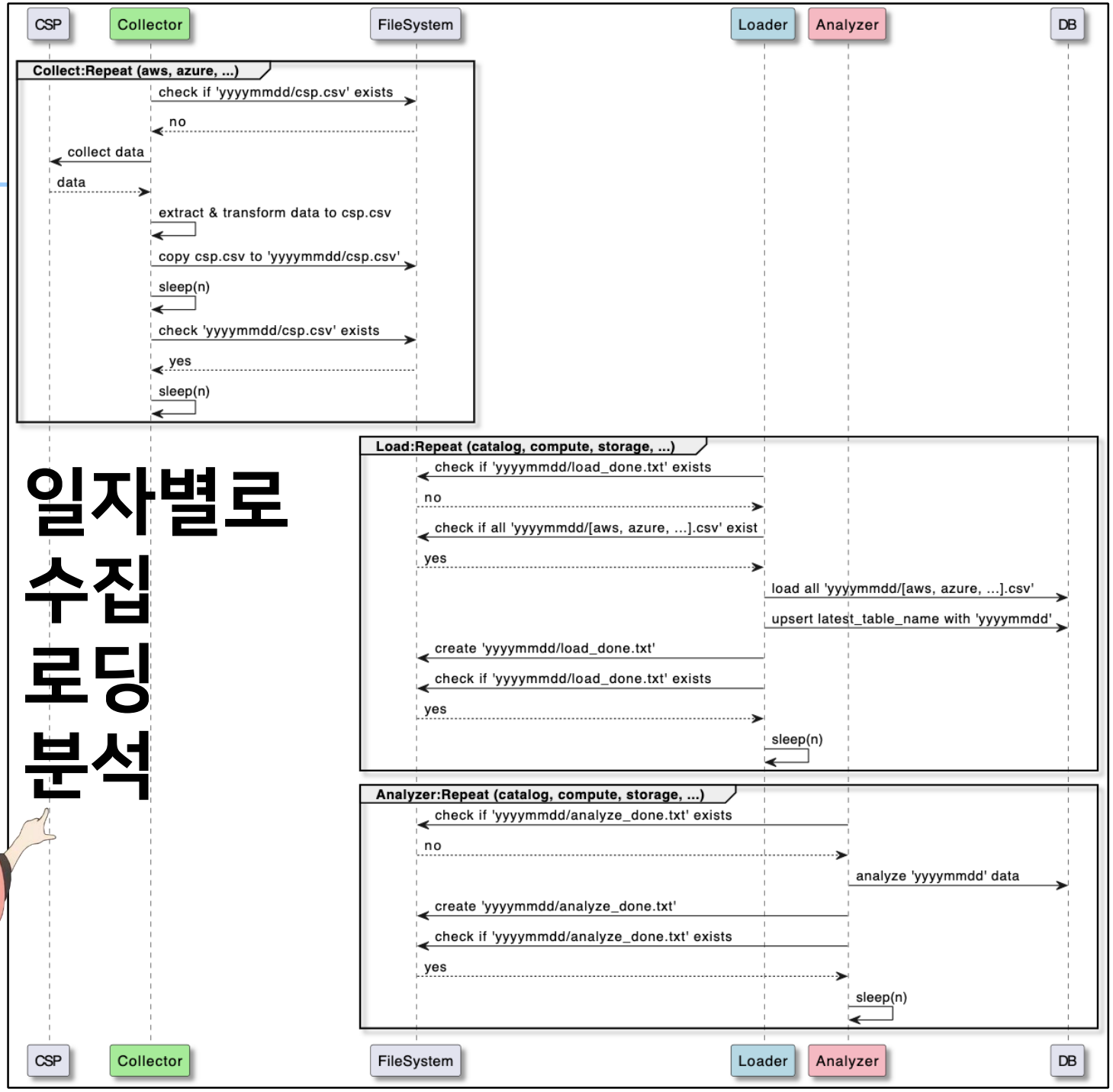
DB

데이터 테이블
- catalog_yyyymmdd (*)
- compute_yyyymmdd (*)
- storage_yyyymmdd (*)
- image_yyyymmdd (*)

통계 테이블
- catalog (1)
- compute (1)
- storage (1)
- image (1)

최신 테이블 이름 정보 테이블
- latest_table (1)

일자별로 수집 로딩 분석



데이터 수집 & 통합 프로세스 / 데이터 변환

예) aws compute price 데이터

데이터 파싱 추출 변환

예) aws compute price 데이터변환 코드의 예

```python
# Match pattern like "2 x 1000 HDD"
match = re.match(r'(\d+) x (\d+) (\w+ \w+|\w+)', s)
if match:
    count, size, stype = match.groups()
    # Convert "NVMe SSD" to "SSD"
    if stype == "NVMe SSD":
        stype = "SSD"

    # GB NVMe
    # GB SSD
    if stype == "GB NVMe" or stype == "GB SSD":
        stype = "SSD"

    return (int(count) * int(size), stype)

# Match pattern like "2400 GB NVMe SSD"
match_gb = re.match(r'(\d+) GB (\w+ \w+|\w+)', s)
if match_gb:
    size, stype = match_gb.groups()
    # Convert "NVMe SSD" to "SSD"
    if stype == "NVMe SSD":
        stype = "SSD"
    return (int(size), stype)
```

데이터 수집 & 통합 프로세스

예) 수집 결과 데이터 (CSV)

```
aws,aws:us-west-2,US West (Oregon),64,512.0,EBS only,0,None,None,Dedicated,USD,12.899,1h,r5n.16xlarge,None
aws,aws:us-west-2,US West (Oregon),4,16.0,2 x 14000 HDD,28000,None,None,Dedicated,USD,0.673,1h,d3en.xlarge,None
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aws,aws:us-west-2,US West (Oregon),32,64.0,EBS only,0,None,None,Shared,USD,1.553,1h,c7i
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aws,aws:us-west-2,US West (Oregon),16,64.0,EBS only,0,None,None,Dedicated,USD,7.96122,1
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aws,aws:us-west-2,US West (Oregon),1,3.75,1 x 410 SSD,410,None,None,Shared,USD,0.744,1h
aws,aws:us-west-2,US West (Oregon),32,256.0,EBS only,0,None,None,Dedicated,USD,6.90821,
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```

```
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```

```
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```

```
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```

대시보드 / 메타베이스 / 라이센스

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https://www.metabase.com/

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Cloud Barista
클라우드바리스타 커뮤니티 제9차 컨퍼런스
MC-Meta 시연
시나몬 (Cinnamon) 한잔 어떠세요 ?

MC-Meta 향후 계획

- 통합 CSP
  - 현재: AWS, Azure, GCP, Alibaba
  - 미래: 보다 많은 CSP 통합 예정

- 통합 메타정보
  - 현재: 카탈로그, Compute, Storage, Image(30%), 통계정보
  - 이슈: 통합 메타정보를 위한 스키마 추상화에 막대한 공수 필요, 개발자원부족

- MC-Meta 향후 개발 계획
  - 목표 변경
    - 범용 메타정보 제공에서 클라우드바리스타 중심의 메타정보 제공
    - 통합범위 축소
    - 통합비용 감소

CB-Spider

- CB-Spider API 활용한 추상화된 메타 정보 수집

- 수집/검색/동기화/통계 및 설정 관리 등 본연의 기능 개발/안정화에 집중