인공지능 기술의 대중화(AI Democratization)를 위한

TANGO 커뮤니티 제1회 컨퍼런스

TANGO

TANGO 개발자 가이드

성 명 김홍숙 **소 속** ETRI

주관 ETRI 한국전자통신연구원 (TANGO) 주최 과학기술정보통신부 IITP 정보통신기획평가원 후원 lablup weda tesla System 한국인공지능협회 SNUH 서울대학교병원 고려대학교 KOREA UNIVERSITY 홍익대학교 HONGIK UNIVERSITY CAU 중앙대학교 Georgia Tech

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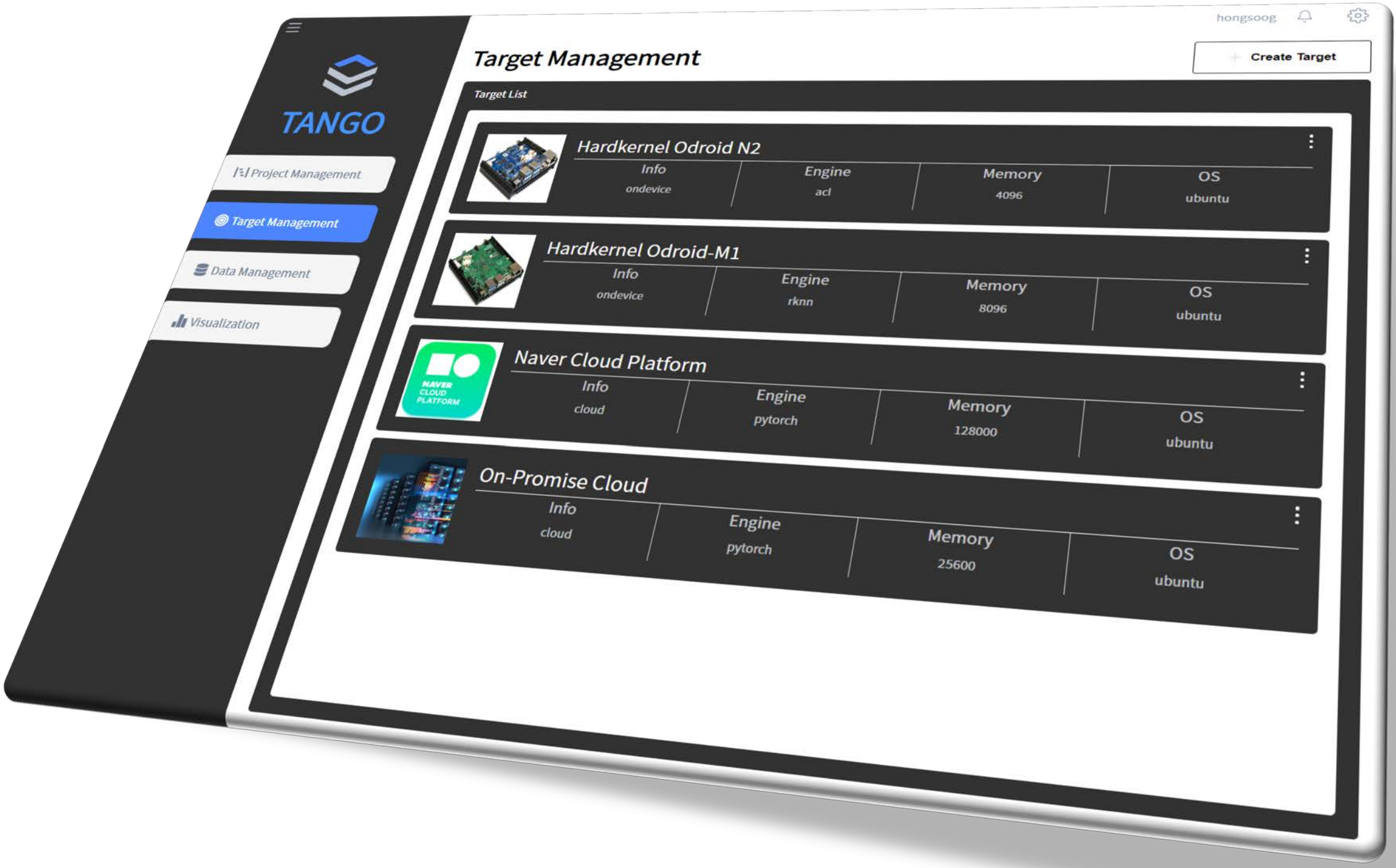
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신경망 자동 생성
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Visualization
AutoNN
Image Gen
Image Deploy
Run Image

1. TANGO as MSA

TANGO based on MSA

- MSA (Micro Service Architecture) using Docker Container
  - structures an application as a collection of services

- A microservice [1]
  - is responsible for a single capability.
  - is individually deployable.
  - consists of one or more processes.
  - owns its own data store.
  - replaceable.

- A small team can maintain a few handfuls of microservices.

[1] Manning Microservice in .Net, 2021

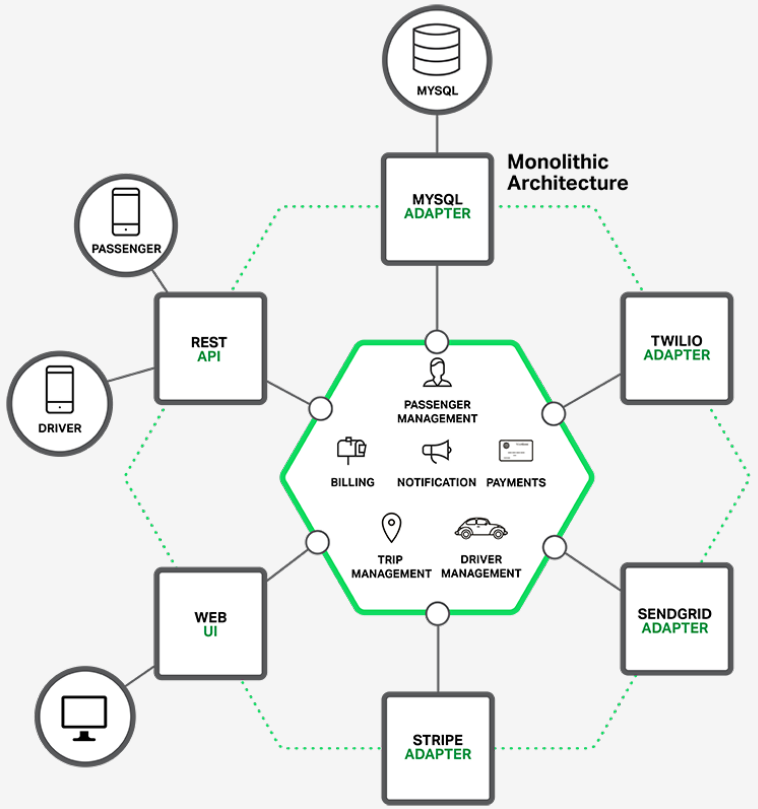
TANGO based on MSA

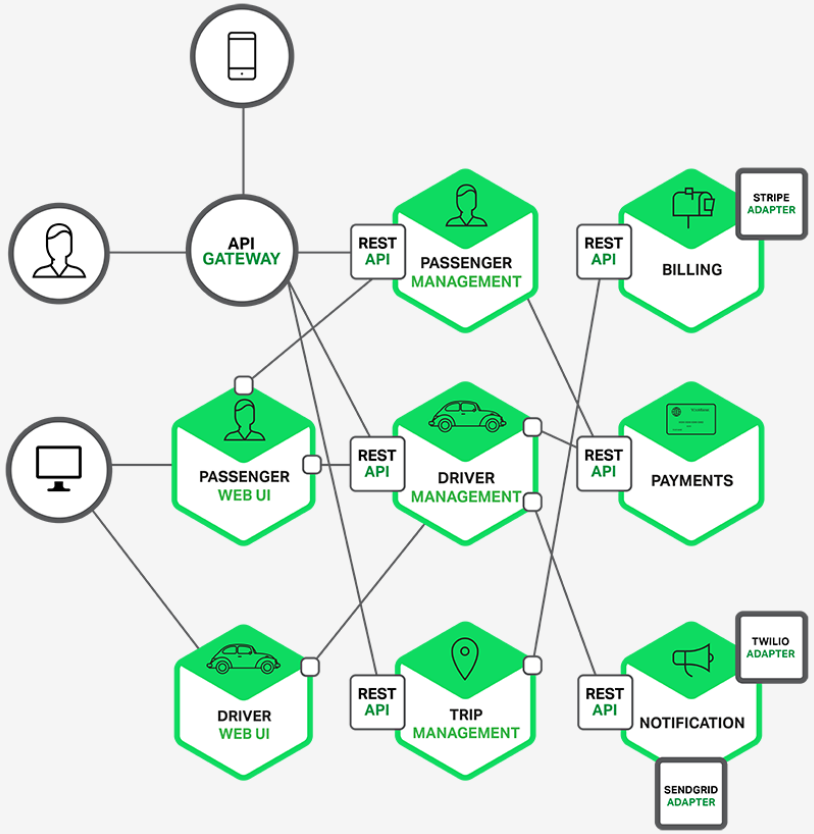
- Microservices are independently deployable modules[2].

- MSA Benefits[3]:
  - Highly maintainable and testable
  - Loosely coupled
  - Independently deployable
  - Organized around business capabilities
  - Owned by a small team

[2] Manning - Microservices - A Practical Guide on Principles, Concepts, and Recipes 2019
[3] https://microservices.io/

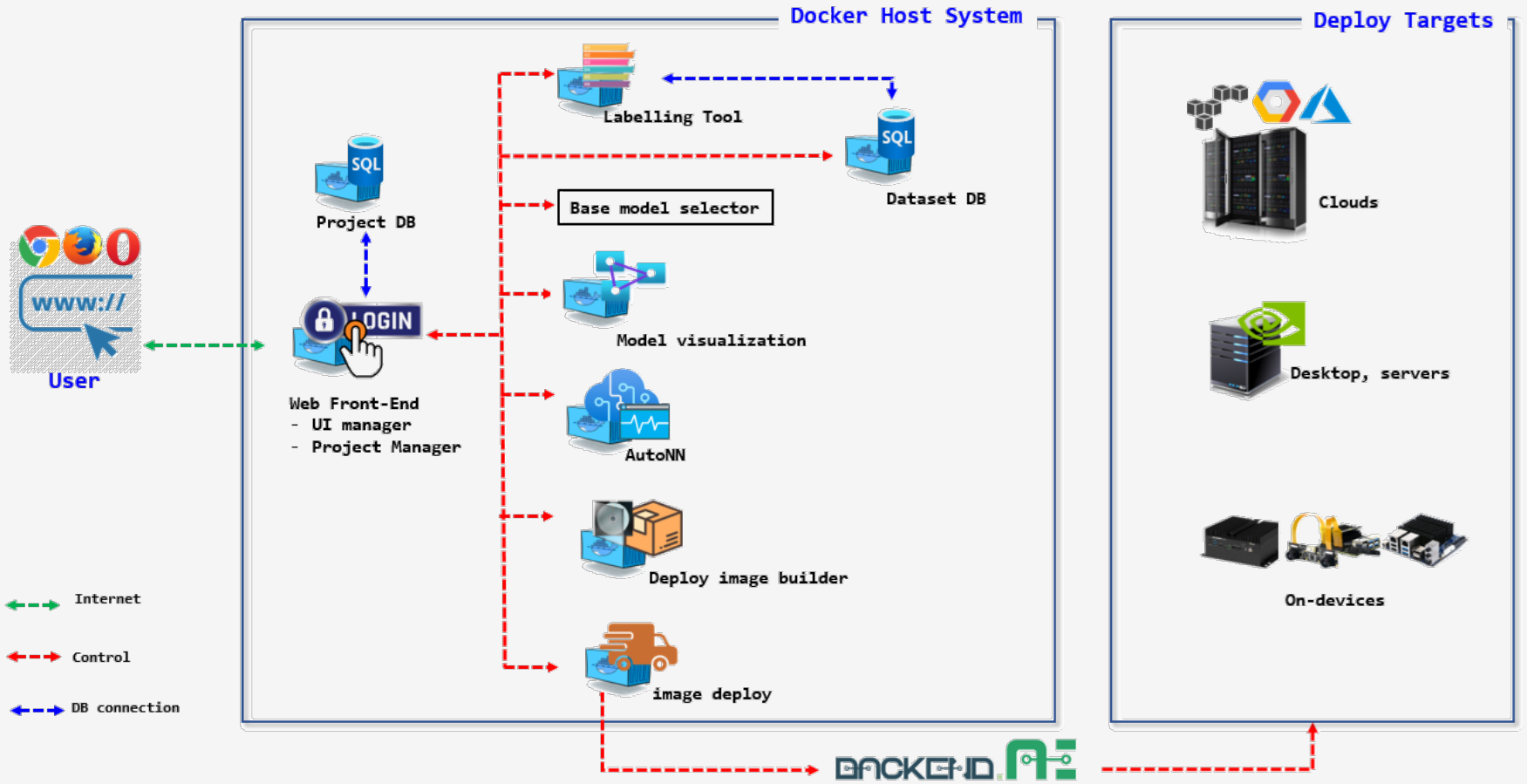
2. TANGO as MSA





source: https://www.nginx.com/blog/introduction-to-microservices/

MSA in TANGO



source: https://github.com/ML-TANGO/TANGO

2. Developer Guides

TANGO Wiki

- https://github.com/ML-TANGO/TANGO/wiki
- All Documents maintained as Wiki
    - Guides
        - TANGO Architecture
        - Exchange Data among Containers
        - Rest API
        - Container Port Map
    - HowTo
        - Common HowTos
    - References
        - Git, GitHub, Docker, Docker-compose

2. Developer Guides

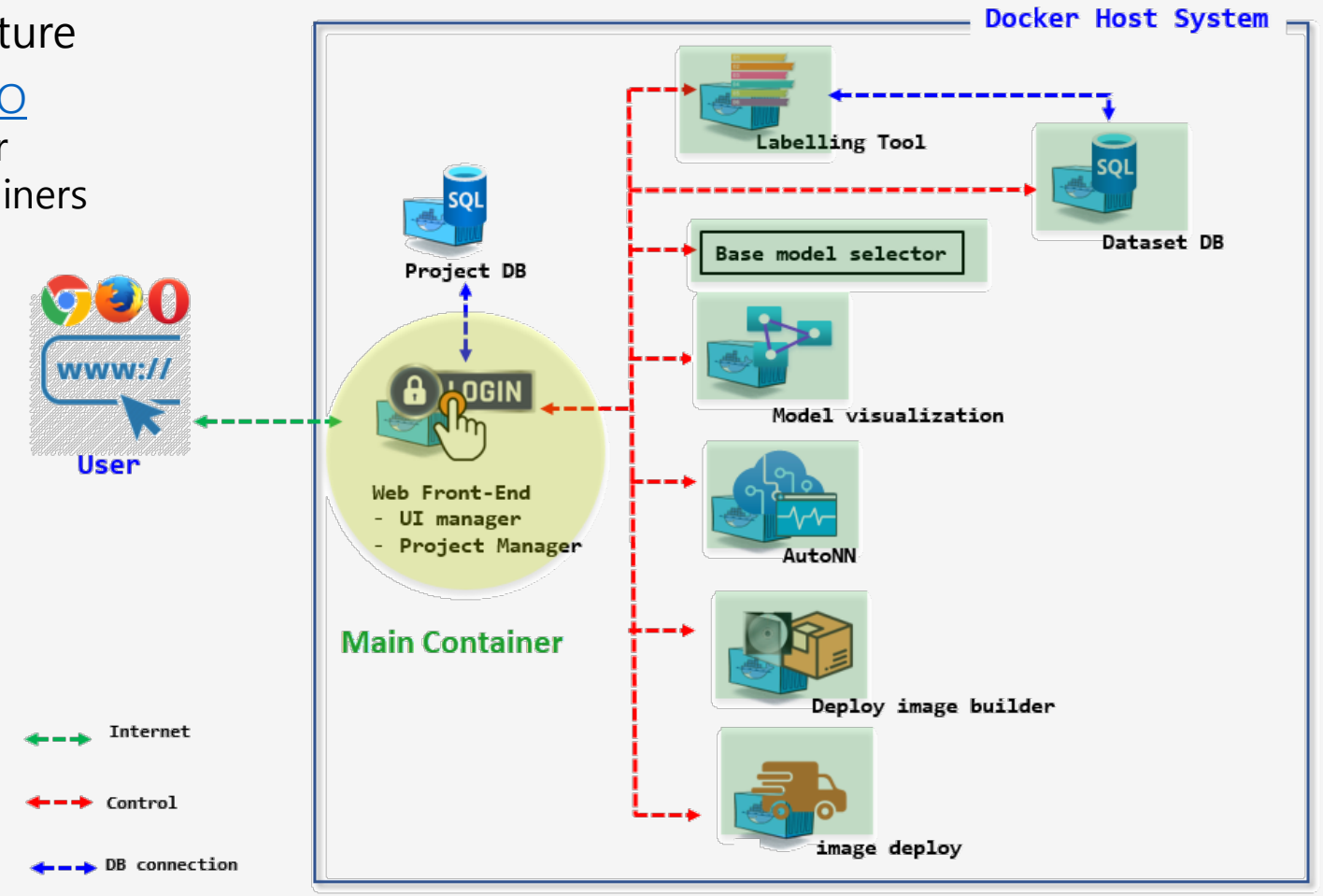
1/4 TANGO Architecture

- Containers in TANGO
- From TANGO Project Creation To Deployment onto Target Devices
- Overall Control Flow in TANGO Project

2. Developer Guides

1/4 TANGO Architecture

- Containers in TANGO
  - Main Container
  - Member Containers



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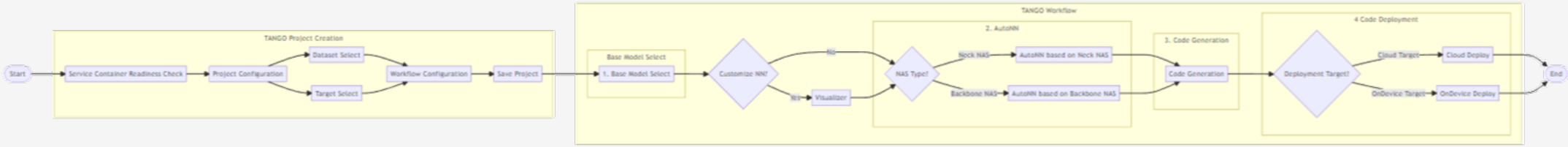
1/4 TANGO Architecture

- From TANGO Project Creation To Deployment onto Target Devices
- Overall Control Flow in TANGO Project
  - Project Configuration
    - Member Container Readiness Check
    - Dataset, Target Selection
    - Workflow Definition

  - Project Workflow
    - using REST API: `start()`, `stop()`, `status_request()`, `status_report()`



2. Developer Guides

2/4 Exchange Data among Containers

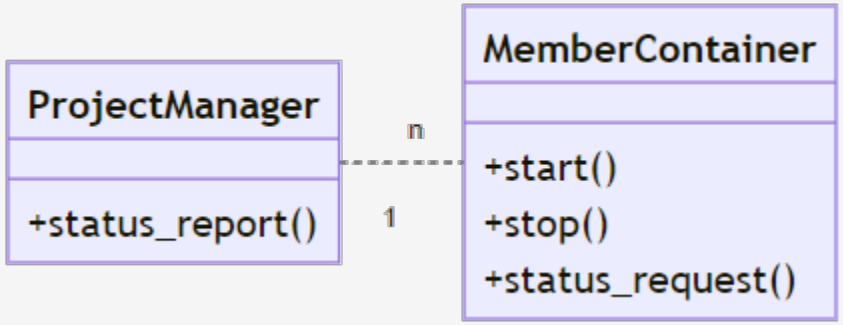
- using Docker host volume
- via volumes: in docker-compose.yaml

```
$ tree ./TANGO/
./TANGO/
└── shared
    ├── common
    │   └── user_id
    │       └── project_id
    │           ├── project_info.yaml     // generated by project manager
    │           ├── data_set.yaml         // generated by labelling
    │           ├── basemodel.yaml        // generated by Base Model Select
    │           ├── model_x.json          // generated by Visualizer
    │           ├── neural_net_info.yaml  // generated by AutoNN
    │           ├── best.onnx             // generated by AutoNN
    │           ├── best.pt               // generated by AutoNN
    │           ├── model.py              // generated by AutoNN
    │           ├── deployment.yaml       // generated by Code_Gen
    │           ├── nn_model              // folder genearted by Code_gen
    │           └── nn_model.zip          // zip of nn_model foler for OnDevice
    │
developers
    │
    └── datasets
        └── coco
            ├── train        // folder for train images
            ├── train.txt
            ├── test         // folder for test images
            ├── test.txt
            ├── val          // foler for val images
            └── val.txt
```

2. Developer Guides

3/4 REST API

- Exposed API from Main Container
  - `status_report()`
- Exposed API form Member Containers
  - `start()`
  - `stop()`
  - `status_request()`



Note on API provider and consumer

- Don't confuse between API provider and API consumer.

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3/4 REST API

Core APIs in TANGO

- In HTTP GET Message format

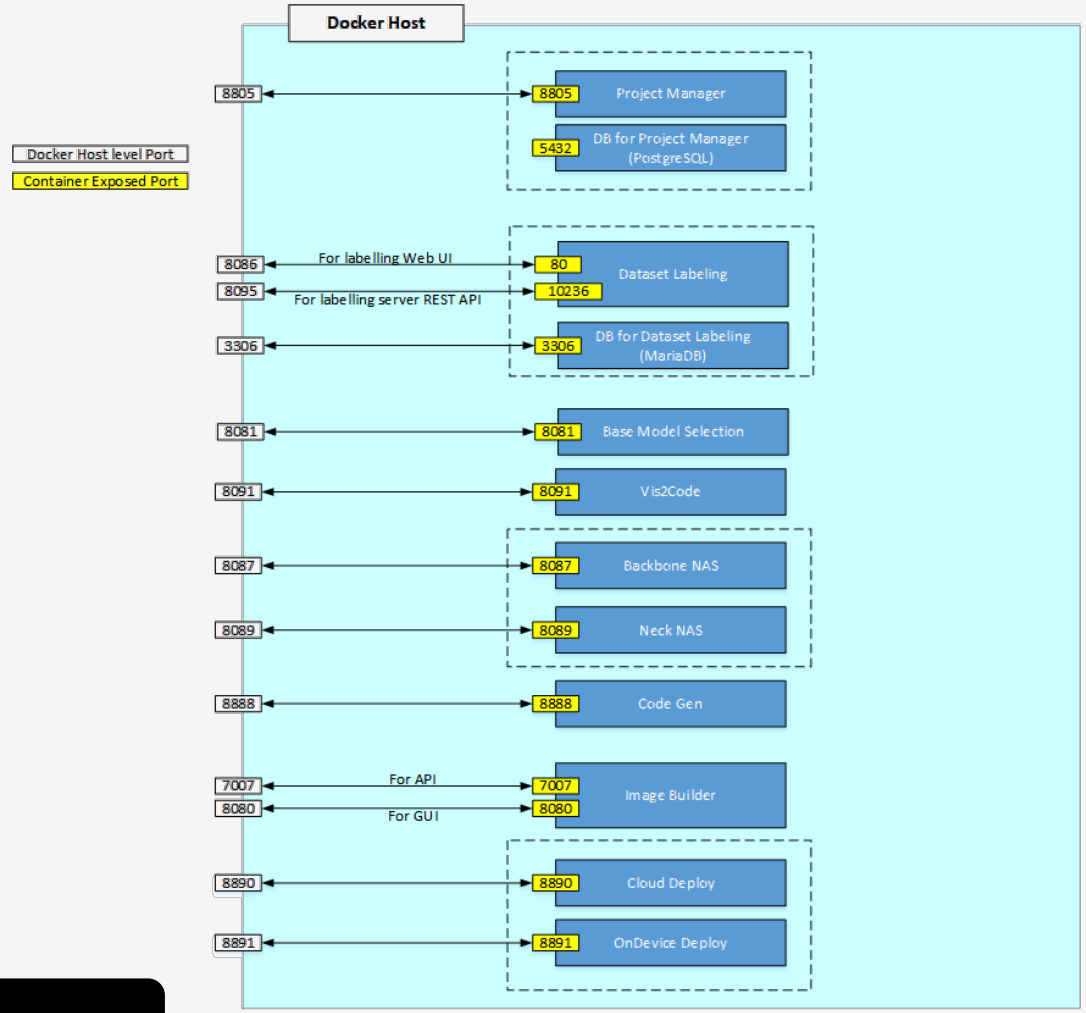
Type	Expose REST APIs
Main	http://<DOCKER_HOST_IP>:<PROJECT_MANAGER_PORT>/**status_report**? container_id=<container_id>&user_id=<user_id>&project_id=<project_id>&status=<status>
Member	http://<DOCKER_HOST_IP>:<MEMBER_CONTAINER_PORT>/**start**? user_id=<user_id>&project_id=<project_id>
	http://<DOCKER_HOST_IP>:<MEMBER_CONTAINER_PORT>/**stop**? user_id=<user_id>&project_id=<project_id>
	http://<DOCKER_HOST_IP>:<MEMBER_CONTAINER_PORT>/**status_request**? user_id=<user_id>&project_id=<project_id>

- All TANGO member container should implement following APIs at least;
  - `start()`,
  - `stop()`, and
  - `status_request()`

2. Developer Guides

4/4 Container Port Map

- for identifying the containers
- all containers publish its port
  - via `ports:` in `docker-compose.yaml`



3. How service defined and TANGO app runs?

Dockerfle, Docker Compose, and docker-compose.yaml

- A **`Dockerfile`** is a simple text file that contains the commands a user could call to assemble an image
- **Docker Compose** is a tool for defining and running multi-container Docker applications.
- **Docker Compose**
  - define the services that make up your app in **`docker-compose.yml`** so they can be run together in an isolated environment.
  - gets an app running in one command by just running '*`docker-compose up`*'.
- **Docker compose** uses the `Dockerfile`
  - if you add the *`build`* command to your project's **`docker-compose.yml`** .

4. How to build TANGO

```
# Change working directory to TANGO top directory
$ cd ~/work/TANGO

# Build TANGO Docker images and run containers
$ docker-compose up -d --build
or
$ docker-compose up -d

# Cleanup TANGO images, containers and volumes
$ docker-compose down --rmi all --volumes
or
$ docker-compose down --rmi all
```

QnA
Quit and Adios!

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감사합니다.

Supple. - Screen shots

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TANGO

- Project Management
- Target Management
- Data Management
- Visualization

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Target Management

+ Create Target

Target List

Hardkernel Odroid N2

Info	Engine	Memory	OS
ondevice	acl	4096	ubuntu

Hardkernel Odroid-M1

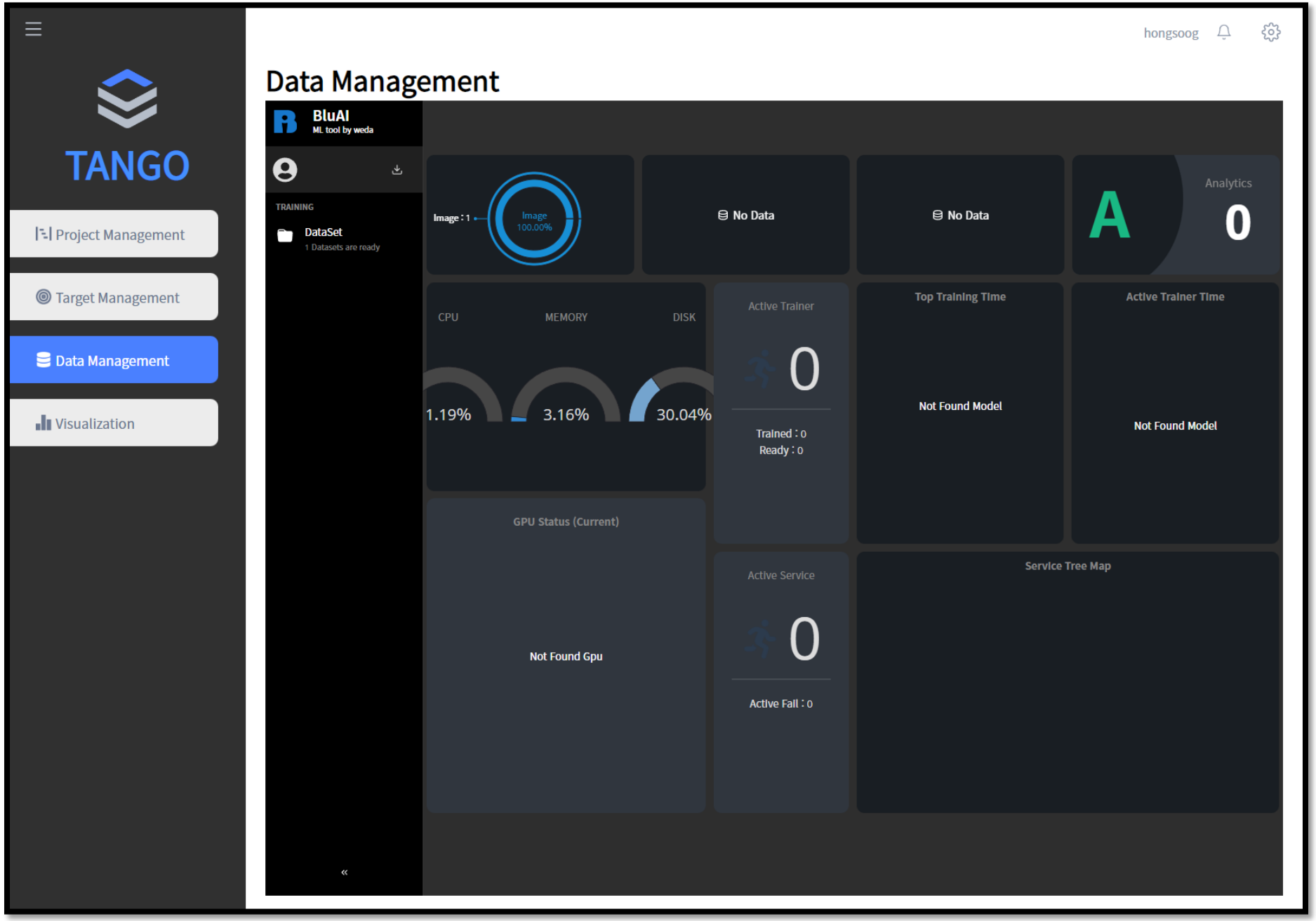
Info	Engine	Memory	OS
ondevice	rknn	8096	ubuntu

Naver Cloud Platform

Info	Engine	Memory	OS
cloud	pytorch	128000	ubuntu

On-Promise Cloud

Info	Engine	Memory	OS
cloud	pytorch	25600	ubuntu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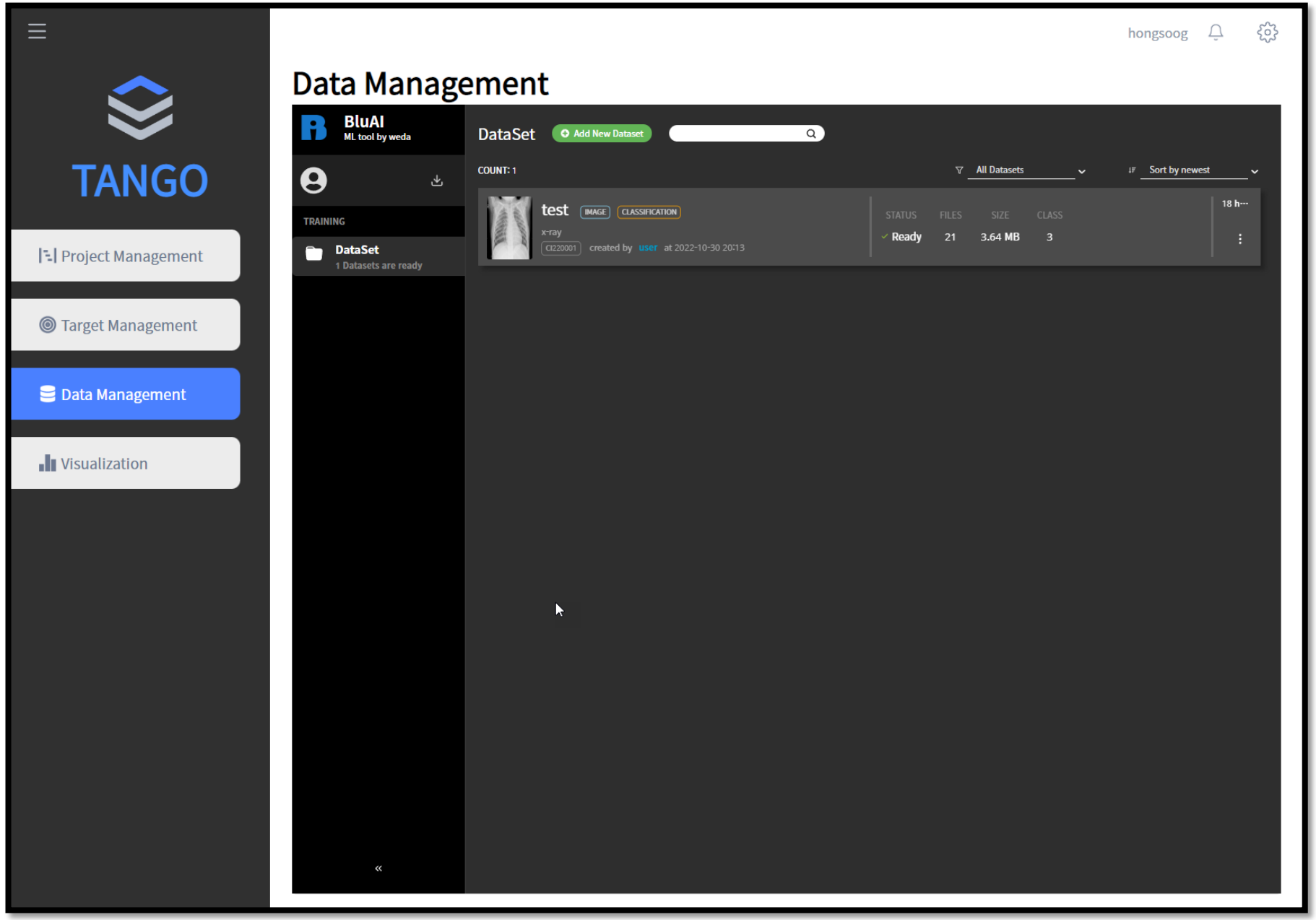
ML tool by weda
TRAINING
DataSet
1 Datasets are ready
Image : 1
Image
100.00%
No Data
No Data
A
Analytics
0
CPU
MEMORY
DISK
1.19%
3.16%
30.04%
Active Trainer
0
Trained : 0
Ready : 0
Top Training Time
Not Found Model
Active Trainer Time
Not Found Model
GPU Status (Current)
Not Found Gpu
Active Service
0
Active Fail : 0
Service Tree Map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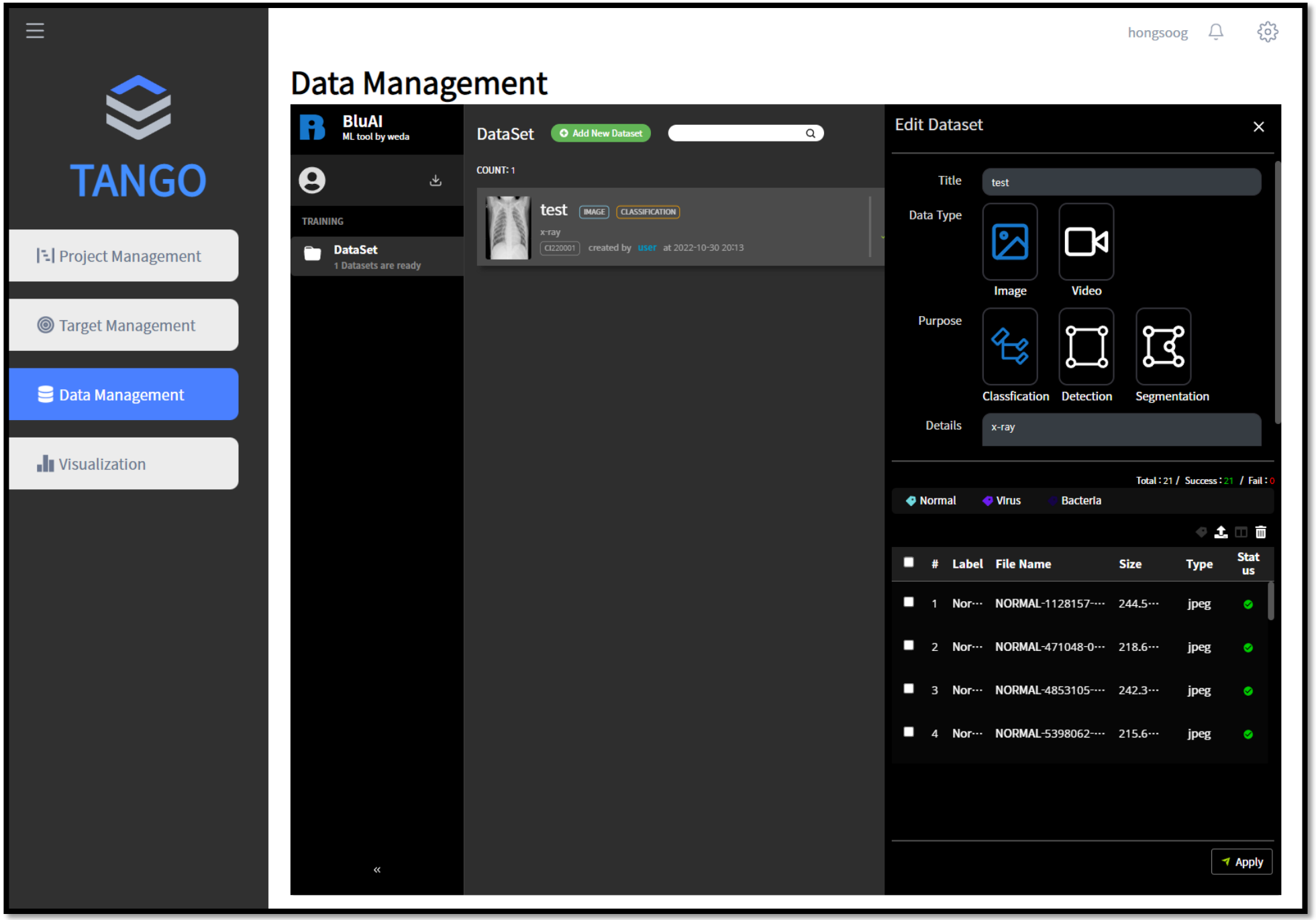
TRAINING
DataSet
1 Datasets are ready
DataSet
Add New Dataset
COUNT: 1
All Datasets
Sort by newest
test
IMAGE
CLASSIFICATION
x-ray
CI220001
created by user at 2022-10-30 20:13
STATUS
FILES
SIZE
CLASS
Ready
21
3.64 MB
3
18 h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Edit Dataset
Title
test
Data Type
Image
Video
Purpose
Classfication
Detection
Segmentation
Details
x-ray
Total : 21 / Success : 21 / Fail : 0
Normal
Virus
Bacteria
Label File Name Size Type Status
1 Nor··· NORMAL-1128157···· 244.5··· jpeg
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4 Nor··· NORMAL-5398062···· 215.6··· jpeg
Apply

TANGO

- Project Management
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- Data Management
- Visualization

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Diagonosys of tuberculosis

Description: Diagonosys of tuberculosis based on X-ray images [설명 수정]

Information

Dataset

Target

New Target

Configuration

Task Type	(●) Classification ( ) Detection
AutoNN Config	Dataset file : dataset.yaml Base Model : basemodel.yaml
Nas Type	( ) Backbone Nas (●) Neck Nas

신경망 자동 생성

Current Work - [ ]