

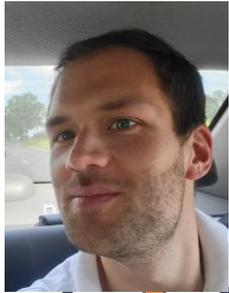


**Practical AI Masterclass in the
biggest European OpenStack
Sovereign Cloud with LLM and
ML**

Open Telekom Cloud

Héctor López Romero & Ferenc Kukucska | Amsterdam | October 2025

World Summit



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Content

What is Open Telekom Cloud?

What is ModelArts?

Use Case 1: Smart Tourist Guide

Use Case 2: Kooseum

Demos of ModelArts ExeML (Zero Coding)

- Image Classification
- Object Detection
- Predictive Analytics

The Open Telekom Cloud in figures

- >910,000 vCPUs available in total
- >4,528,000 GB RAM available in total
- max. 640,000 VMs* available in total
- >2,500 racks used in total
- Open Telekom Cloud
- ~1 Exabyte Storage available (1,000,000,000,000 GB)
- Locations: DE, NL, CH*

Sovereignty is an important factor

Cloud Provider: Security & performance decisive
Must-have criteria for selecting cloud provider

Criteria	Open Telekom Cloud	Competitor
Data sovereignty	Trust in IT-Security, Data privacy & compliance	Performance and stability
Technology sovereignty	Option for Data encryption	Sustainability, e.g. climate neutral
Operation sovereignty	Sustainability	Interoperability
Technology sovereignty	Datacenter in Germany or EU	Datacenter in Germany or EU
Operation sovereignty	Treatworthy country of origin of the cloud provider	Innovation like access to newest solutions
Technology sovereignty	Innovation like access to newest solutions	Openness, e.g. through open source
Technology sovereignty	Openness, e.g. through open source	Low costs
Technology sovereignty	Low costs	Data-X compliance
Technology sovereignty	Data-X compliance	Availability

Open Telekom Cloud

Architecture diagram

Server (on-prem) | AI AGENT | AI Flow Controller | AI AGENT | Server (on-prem)

Workflow Editor Screenshot:

```
graph TD
    Start((Start)) --> Step1[Step 1: ...]
    Step1 --> Step2[Step 2: ...]
    Step2 --> Step3[Step 3: ...]
    Step3 --> Step4[Step 4: ...]
    Step4 --> Step5[Step 5: ...]
    Step5 --> Step6[Step 6: ...]
    Step6 --> Step7[Step 7: ...]
    Step7 --> Step8[Step 8: ...]
    Step8 --> Step9[Step 9: ...]
    Step9 --> Step10[Step 10: ...]
    Step10 --> End((End))
```

Our Datacenters



3 twin core data centers with 9 availability zones for short latencies and zero outage

Regions DE & NL fulfil requirements for georedundancy

High security locations

Swiss cloud as an autarkic Community cloud for Swiss customers

EU-NL - Region

NorthC
Datacenters

Availability Zone 1 (AZ1)
Aalsmeer

Availability Zone 2 (AZ2)
Almere

Availability Zone 3 (AZ3)
Aalsmeer

EU-DE – Region

Availability Zone 1 (AZ1)
Biere

Availability Zone 2 (AZ2)
Magdeburg

Availability Zone 3 (AZ3)
Biere

EU-CH – Swiss Open Telekom Cloud

Availability Zone 1 (AZ1)
Zollikofen

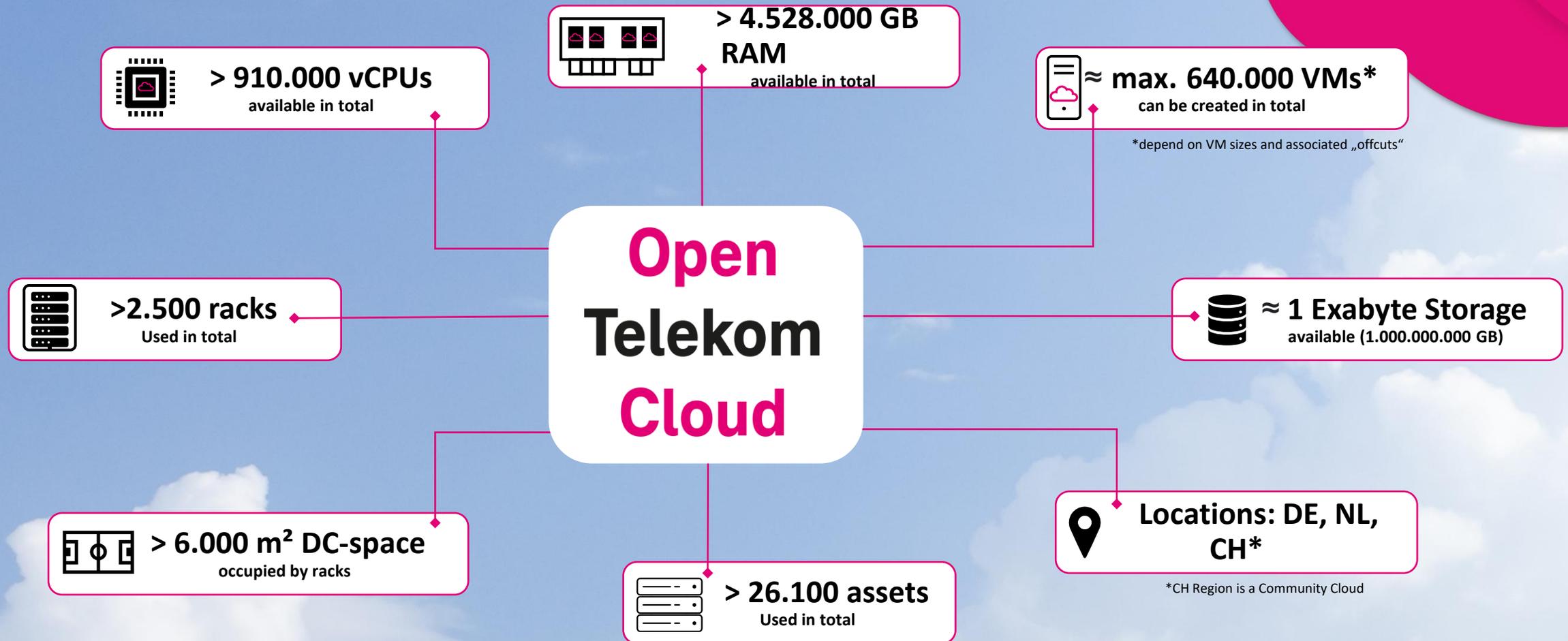
Availability Zone 2 (AZ2)
Bern

Availability Zone 3 (AZ3)
Zollikofen



Open Telekom Cloud

The Open Telekom Cloud in figures



3 pillars of sovereignty



Sovereignty

Data

The data will not be viewed, processed, manipulated, deleted or copied.

Possible mechanics :

- Access authorization
- Encryption & key management
- Logging & auditing
- Anonymisation
- Data in local data centre
- Certification (C5)

Operation

Unauthorized access due to operation due to conflicting laws or regulations, for example, is excluded.

Possible mechanics :

- Operational responsibility / place of operation
- Service provider
- Physical & Logical Access

Technology

Avoidance of dependencies due to the choice of services & applications → Vendor Lock-in avoidance

Possible mechanics :

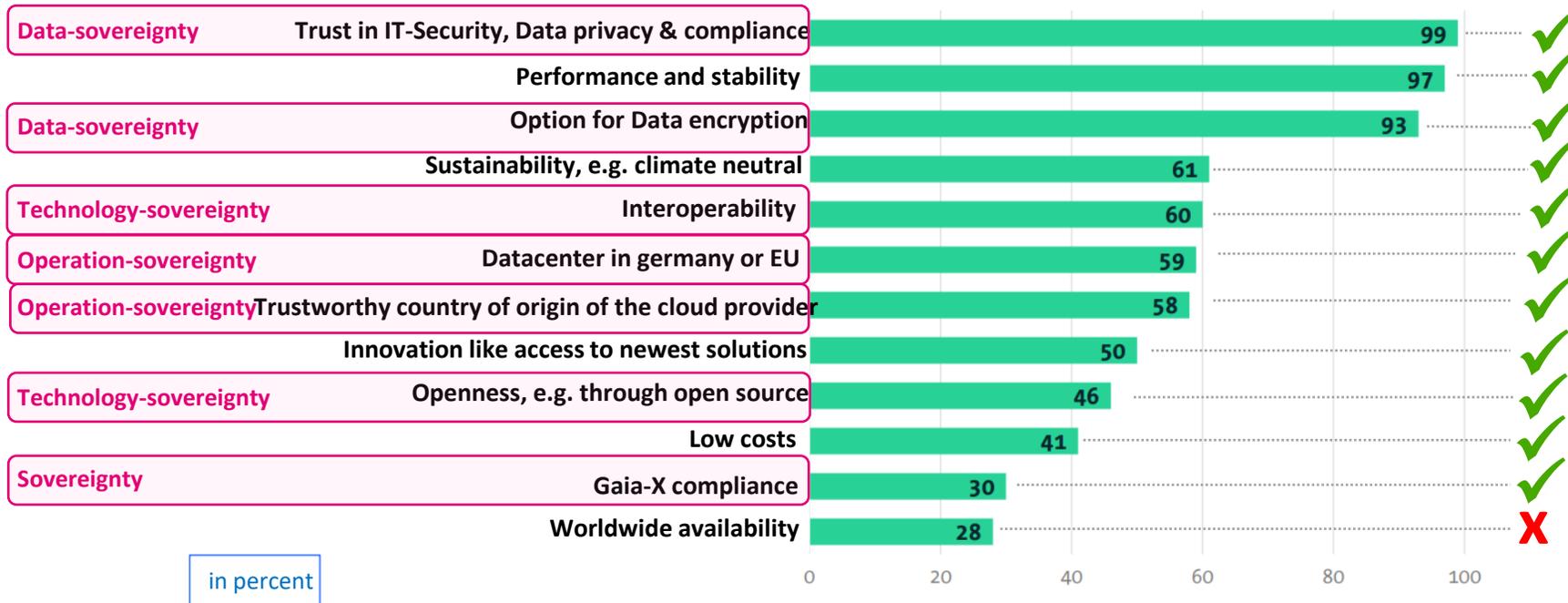
- Open interfaces and open access to data
- Conscious selection of open technologies such as open source
- Multi-vendor/cloud strategy

Sovereignty is an important factor



Cloud Provider: Security & performance decisive

Must-have criteria for selecting cloud provider



Open
Telekom
Cloud

13 Basis: Users, planners and discussants of cloud projects (n=571) - Multiple answers possible – Source: Bitkom Research 2024

bitkom

58% of the criteria focus on sovereignty (Survey from 2024 - before Donald Trump's 2nd term in office)

Open Telekom Cloud

Security in uncertain times



Switch to the **leading European cloud** with a superior product, advanced automation & investments in AI & big data

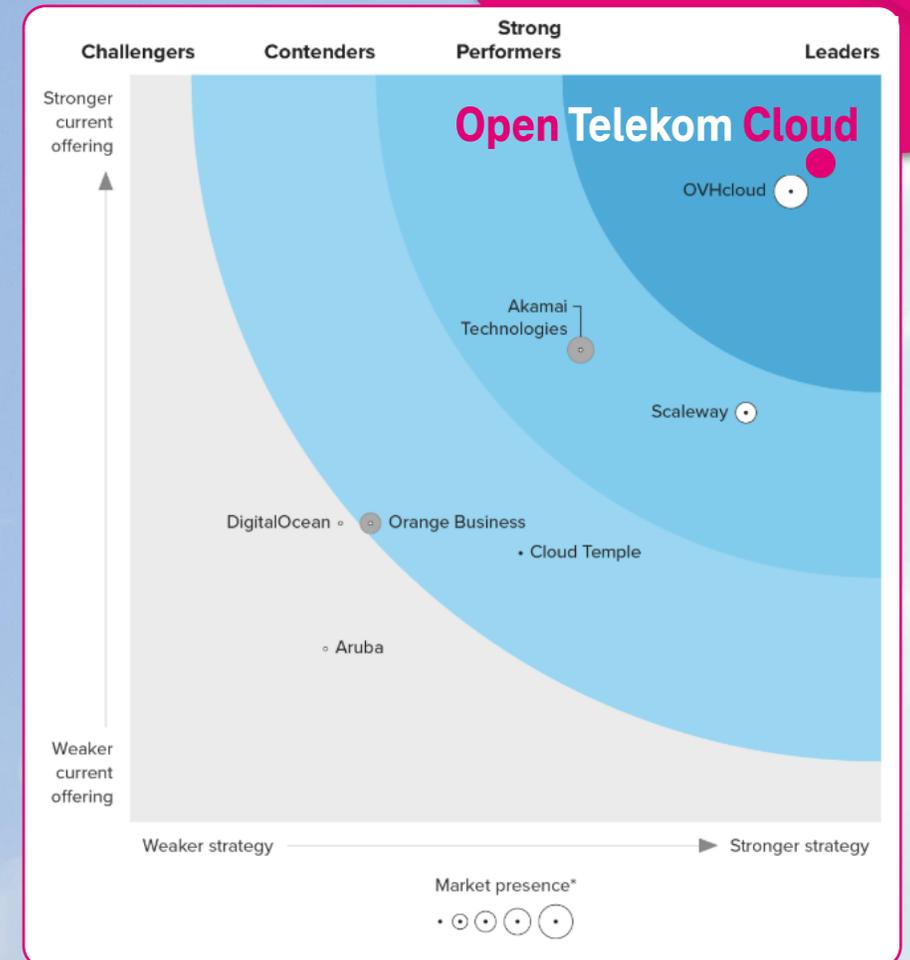
Open Telekom Cloud



Leader in The **Forrester Wave™**: Public Cloud Platforms In Europe, Q3 2024

Its **vision and product roadmap are superior** to others evaluated with **advanced automation of IaaS and PaaS** tasks and **unique investments in AI** to enhance its GPU portfolio, big data services, and AI tools and services

Learn more: <https://www.open-telekom-cloud.com/en/blog/benefits/forrester-wave-2024>



Open Telekom Cloud

The leading European Cloud



**Open
Telekom
Cloud**



Best results in comparison at heise



Due to its relatively **long history**, OTC offers a **comprehensive portfolio of cloud services**.

Public Cloud aus Europa

Even though most people think of US Hyperscaler when they hear the word "cloud," European providers have long been competitive in many areas. European clouds are an important building block for greater digital sovereignty. (Translated)

Von Prof. Dr. Jens-Henrik Söldner, Dr. Constantin Söldner und Dr. Guido-Arndt Söldner



Public-Cloud-Anbieter aus Europa

	Exoscale	Hetzner	IONOS	Open Telekom Cloud	OVHcloud	plusserver	Scaleway	STACKIT
Firmensitz	Schweiz	Deutschland	Deutschland	Deutschland	Frankreich	Deutschland	Frankreich	Deutschland
Verfügbarkeitszonen	✓	–	✓	✓	✓	✓	✓	✓
VM-Autoscaling	✓	–	✓	✓	✓	–	✓	–
Object Storage	✓	✓	✓	✓	✓	✓	✓	✓
File Storage	–	–	✓	✓	✓	✓	–	–
Virtual Private Cloud (VPC)	✓	✓	✓	✓	✓	✓	✓	✓
Peering zwischen VPCs	✓	–	–	✓	✓	–	✓	✓
Managed VPN	–	–	✓	✓	✓	✓	–	✓
dedizierte private Netzwerkverbindung	–	–	✓	✓	✓	✓	–	✓
Transit-Gateway	–	–	–	✓	✓	–	–	–
Managed NAT	–	–	–	✓	–	✓	✓	✓
Managed Load Balancer	✓	✓	✓	✓	✓	✓	✓	✓
DNS	✓	✓	✓	✓	✓	✓	✓	✓
SSL Certificate Management	✓	✓	✓	✓	✓	✓	✓	✓
Terraform	✓	✓	✓	✓	✓	✓	✓	✓
Serverless Computing	–	–	–	✓	–	–	✓	–
Managed Kubernetes	✓	✓	✓	✓	✓	✓	✓	✓
Managed Datenbanken	✓	–	✓	✓	✓	✓	✓	✓
Metrics/Logs	✓/✓	✓/–	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
Backup-Service	✓	✓	✓	✓	✓	✓	✓	✓
Verschlüsselung mit Customer-managed Keys (CMK)	✓	–	✓	✓	✓	–	✓	–
Import externer Identities (z. B. aus Microsoft AD)/SSO	✓	–	✓	✓	✓	–	–	–
BSI-C5-Zertifizierung	–	–	Typ I	Typ II	–	Typ II	–	Typ I

Find out more: <https://www.open-telekom-cloud.com/en/blog/benefits/european-cloud-alternatives-to-hyperscalers>

Open Telekom Cloud

Open Telekom Cloud – Our services in comparison

Open Telekom Cloud	Azure	Google Cloud	aws
Elastic Cloud Server	Virtual Machine	Compute Engine	Elastic Compute Cloud (EC2)
Bare Metal Server	BareMetal Instances	BareMetal Instances	EC2 Bare Metal Instances
Image Management Service	VM Image Builder	Artifact Registry	EC2 Image Builder
Auto Scaling	Scale Set	Managed Instance Group	Auto Scaling
Dedicated Host	Dedicated Host	Sole-Tenant Node	EC2 Dedicated Host
Cloud Container Engine	Kubernetes Service	Kubernetes Engine	Elastic Kubernetes Service
Software Repository for Container	Container Registry	Container Registry	Elastic Container Registry
Object Storage	Blob Storage	Cloud Storage	Simple Storage Service (S3)
Elastic Volume Service	Disk Storage	Persistent Disk	Elastic Block Storage (EBS)
Scalable File Service	Azure Files	Filestore	Elastic File System
Cloud Backup & Recovery	Azure Backup	Backup & DR Service	AWS Backup
Storage Disaster Recovery	Azure Site Recovery	Backup & DR Service	AWS Elastic Disaster Recovery
Mobile Storage Solution	Azure Data Box	Transfer Appliance	AWS Snow Family
Virtual Private Cloud	Virtual Network	Virtual Private Cloud	Virtual Private Cloud
Elastic Load Balancer	Load Balancing	Cloud Load Balancing	Elastic Load Balancing
Virtual Private Network	VPN Gateway	Cloud VPN	VPN
Direct Connect	Express Route	Cloud Interconnect	Direct Connect
Private Link Access Service	Private Link	Private Service Connect	Private Link
DNS	DNS	Cloud DNS	Route 53
Identity & Access Management	Azure Active Directory	Identity & Access Management	Identity & Access Management

Key Management Service	Key Vault	Key Management Service	Key Management Service
Web Application Firewall	Azure WAF	Cloud Armor	WAF
Anti-DDoS	DDoS Protection	Cloud Armor	Shield
VPC Firewall	Firewall Manager	-/-	Network Firewall
Relational Database Service	SQL Database / Database for MySQL / PostgreSQL servers	Cloud SQL	RDS
Distributed Cache Service	Cache for Redis	Cloud MemoryStore	MemoryDB for Redis
Document Database Service	CosmosDB	Cloud Firestore	DocumentDB
Data Replication Service	Database Migration Service	Database Migration Service	Database Migration Service
Data Warehouse Service	Synapse Analytics	BigQuery	Redshift
Cloud Search Service	Cognitive Search	Cloud Search	Elastic Search
ModelArts	Machine Learning	AutoML	SageMaker
MapReduce Service	HDInsight	Cloud DataProc	EMR
Data Ingestion Service	Data Factory	Cloud Composer	Data Pipeline
Application Operations Management	Log Analytics	Monitoring	X-Ray
Simple Message Notification	Notification Hub	Firebase Cloud Messaging	Simple Notification Service
Distributed Message Notification	Service Bus	Cloud Pub/Sub	Simple Queue Service
Cloud Trace Service	Log Analytics	Logging	CloudTrail
Cloud Eye	Log Analytics	Monitoring	CloudWatch
Log Tank Service	Log Analytics	Logging	CloudTrail
Ressource Management Service	Management Groups	-/-	-/-



Cloud Compliance – Finance



Cloud-Service-Contract

Supplementary conditions for financial service providers (BaFin, ECB or EIOPA supervised)

DORA



Data portability to prevent „Vendor Lock-in“

The Open Telekom Cloud is based on the open standard OpenStack



Data protection and third country transfer

Compliance with Art. 42, 43 DSGVO / § 39 BDSG with data protection certificates



Cloud Computing Compliance Criteria Catalogue (C5)

Implementation of and compliance with the basic criteria according to the C5



Certificates/verifications based on common standards

SOC1/SOC2/C5/ISO27000-family



Tested by federal authorities



Cloud Compliance – Healthcare



Guideline TR-036161 “Requirements for healthcare applications”

Audit aspect organizational security: ISO 27001 and C5 type 2 certificate



Data protection according to EU GDPR

Fulfillment of Art. 42, 43 GDPR / § 39 BDSG with data protection certificates



§ 203 StGB Compliance

Requirements for persons subject to professional secrecy (e.g. doctors, pharmacists, etc.)



§ 35 SGB I Compliance

Requirements for social insurance carriers (e.g. health insurance companies, etc.)



IT Security Act 2.0 Compliance

KRITIS-compliant hosting (e.g. for hospitals)



Tested by federal authorities

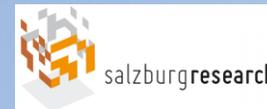


Trusted by numerous customers

From all industries & in all sizes



Click at the logos to read the story!



- > 4.000 more customers
- > 200 start-ups from TechBoost
- > 35 partner companies from Circle partner program

Open Telekom Cloud

Open Telekom Cloud

ModelArts

AI DEVELOPER FRAMEWORK



Advantages of ModelArts as AI Developer Framework

Ultra-fast

10 mins

Training ResNet50 on millions of ImageNet images with 128 nodes

Ultra-simple

0 coding 0 AI experience

Semi-automatic labelling, automatic parameter optimization, automatic network design



100x higher data preparation efficiency



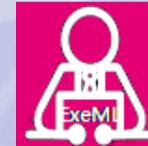
Pre-trained models speed up model building



50% less time for model training



One-click deployment to everywhere



ExeML Auto-Learning



End-to-end process management



Fast to learn



Fast training



Fast deployment

OPEN TELEKOM CLOUD

Creating a Secure Connected World



AI Development Lifecycle with ModelArts

For different AI developers:



Application developers



Data Scientists



AI Architect

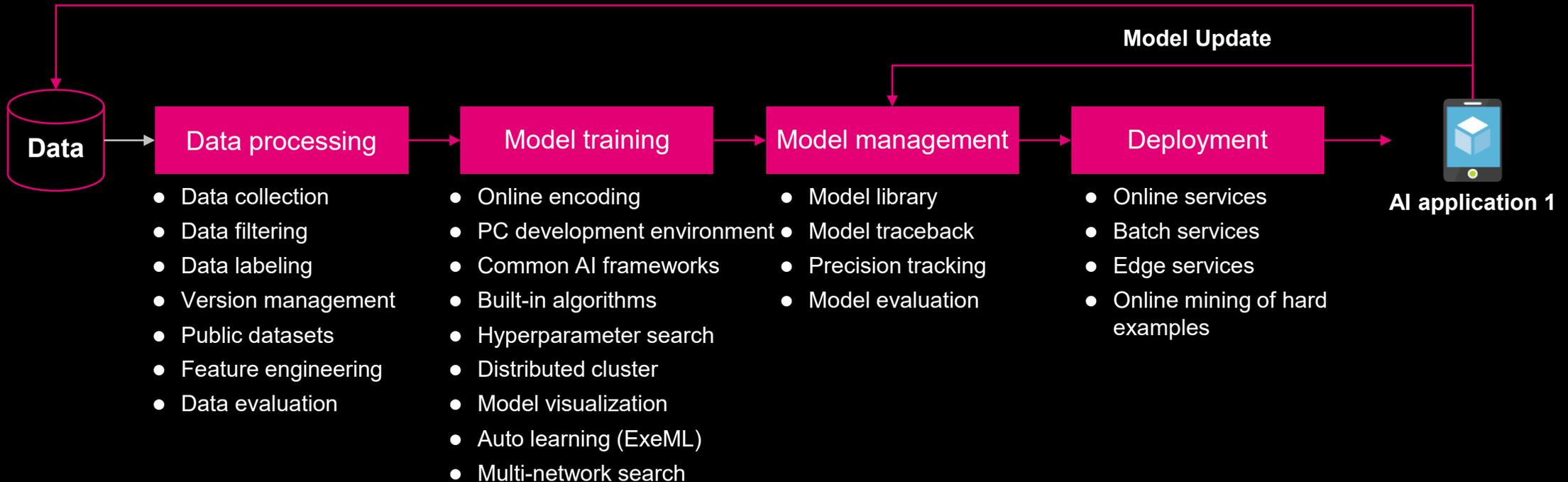


ML-Engineer

Lifecycle management

Data Optimization

Model Update

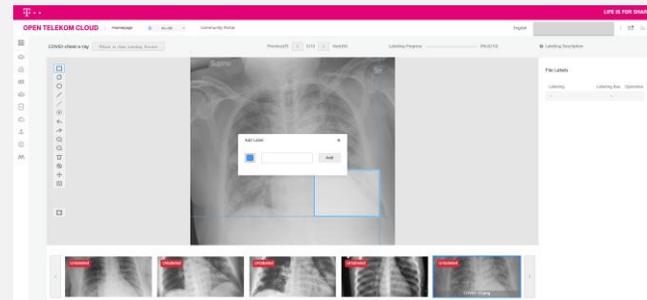
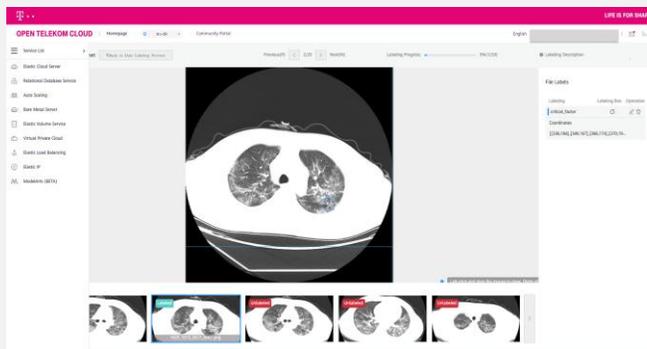


powered by

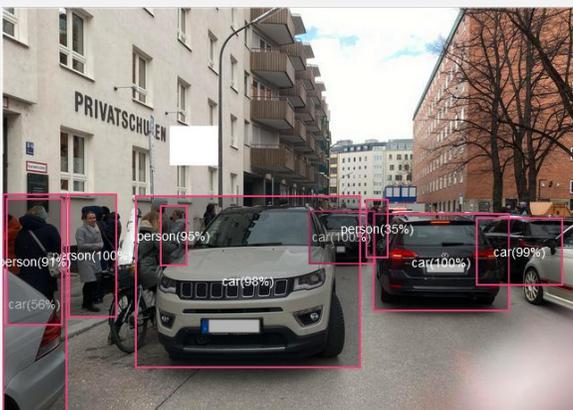
Open Telekom Cloud

Demos of ModelArts ExeML (Zero Coding)

Image Classification



Object Detection



Predictive Analytics

Label Column: attr_5
Label Column Data Type: Discrete value

Data Preview

attr_1	attr_2	attr_3	attr_4	attr_5	attr_6	attr_7	attr_8
303.9	313.0	1480	39.9	175	No Failure	1	0
300.3	311.6	1463	41.6	102	No Failure	0	0
300.9	313.8	1695	30.2	188	No Failure	0	1
297.3	308.7	1655	34.1	21	No Failure	0	1
301.5	319.4	1425	54.4	7	No Failure	1	0
298.0	308.7	1503	36.3	5	No Failure	0	0
300.3	311.2	1381	65.2	136	Power Failure	0	1
301.2	319.3	1379	43.2	56	No Failure	0	1
300.7	311.7	1532	40.0	0	No Failure	0	1
298.2	308.4	1512	34.9	181	No Failure	1	0

Total Records: 100

Service Test

URL: https://7e6243d47ab1474d8f6564b6166888b3.apigw.eu-de.otc.1-systems.com/v1/infer/2bf86f1-9230-46ac-8da4-f85b6b37cefd

```
Code
3 "count":1,
4 "req_data":
5 {
6   "attr_1":"298.3",
7   "attr_2":"309.3",
8   "attr_3":"1337",
9   "attr_4":"56.1",
10  "attr_5":"206",
11  "attr_6":"",
12  "attr_7":"1",
13  "attr_8":"0"
14 }
15 }
16 }
17 }
```

Return Result

```
1 {
2   "result": {
3     "count": 1,
4     "resp_data": [
5       {
6         "attr_5": 0,
7         "attr_7": 1,
8         "attr_8": 206,
9         "attr_9": 56.1,
10        "attr_3": 1337,
11        "attr_2": 309.3,
12        "attr_1": 298.3
13      }
14    ]
15  }
16 }
```

Prediction

Landslide classification dataset



Manufacturing: Object detection efficiency based on ML models

ModelArts as E2E solution

Up & Running

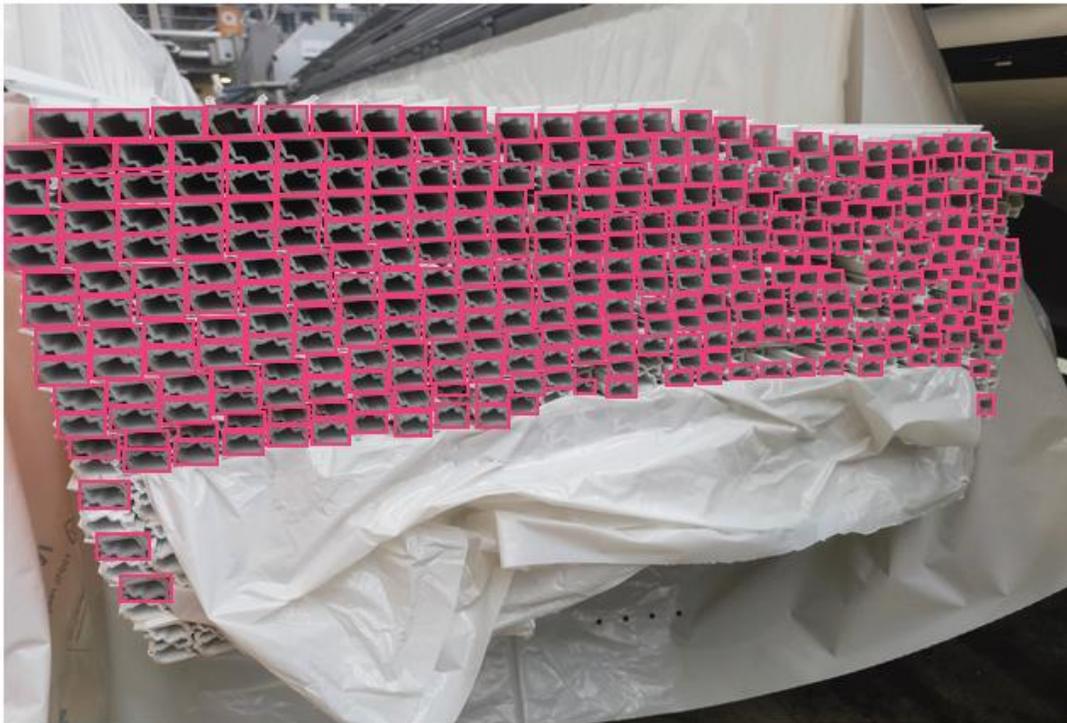
Non-AI skills required

Control your cost effectively.

Training via API, UI or Jupyter Notebook

Request Path / Image File Upload Predict

Test Image Preview



Test Result

✓ atelier_automl_upredict_success

```
1 {  
2   "detection_count": 345,  
3   "detection_boxes": [  
4     ]
```

ModelArts as Open Telekom Cloud AI E2E development platform provides DATA PREPARATION, OPEN SOURCE FRAMEWORKS, MODEL TRAINING, VERSIONING, and MODEL DEPLOYMENT. All of this in a very intuitive way for data labeling, preparation, and quality control with higher input (supports labeling for hundreds of thousands of images) and enables multi-model versioning for a complete CD/CI pipeline.

powered by

Open Telekom Cloud

AI Use Case ONE

AI TOUR GUIDE



AI Tour Guide

AI-Powered Personalized Travel Planner & Interactive Tour Guide

A cloud-based app helping tourists

- Plan
- Explore
- Enjoy

destinations through

- AI-generated personalized itineraries
- interactive experiences
- gamification



OPEN TELEKOM CLOUD

Creating a Secure Connected World



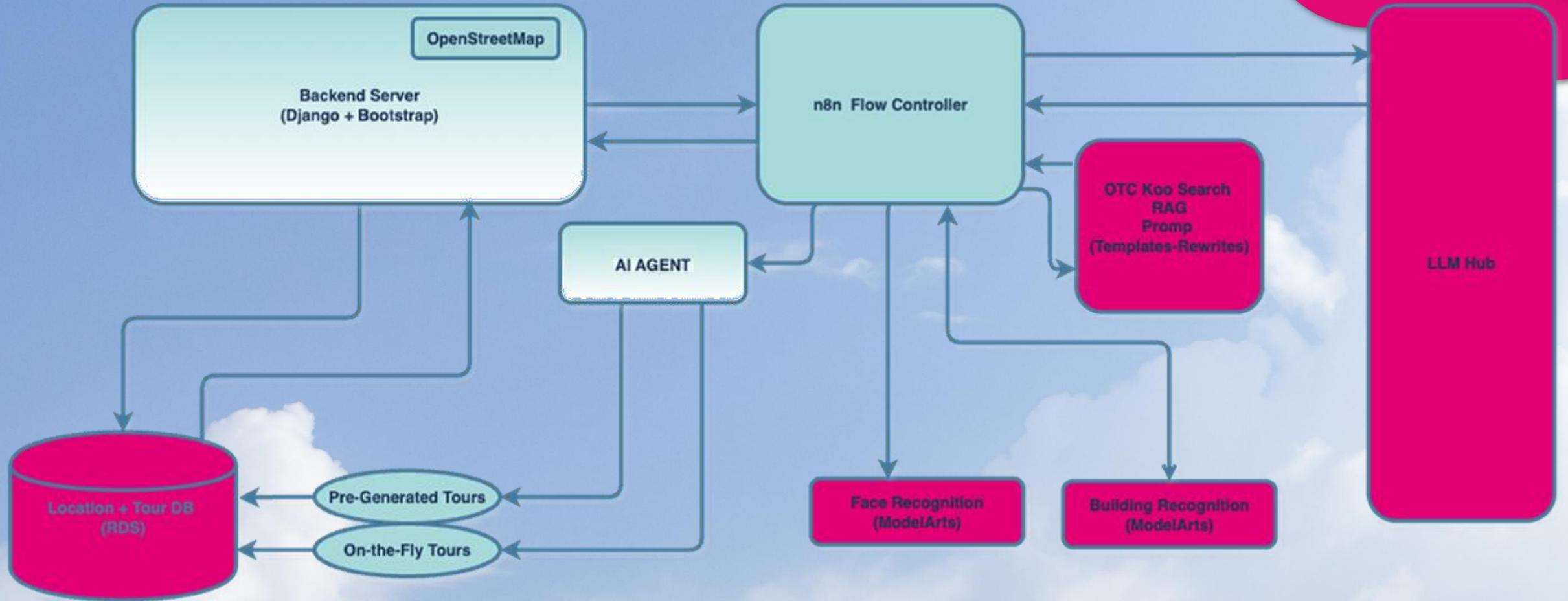
Technologies



OTC Service	Function
Object Storage Service	Picture storage
Relational Database Service	Tour + Location database
ModelArts	AI Inference
Cloud Container Engine	Kubernetes Deployment
Software Repository for Containers	Docker Image Storage
Koosearch	RAG (Vector Store)

Tool	Function
DeepFace	Face recognition
XGBoost	Tour recommendation
Qwen	Large Language Model

Architecture diagram



Locations, Tourlocations, Tours



Name	Type	Latitude	Longitude	Image	District	City	Address	Short Description	Long Description	Location Image
Chain Bridge	Bridge	47.4980	19.0452	chain.jpg	V. ker.	Budapest	Széchenyi Lánchíd	Iconic suspension bridge	Connects Buda and Pest...	chain_cover.jpg

Tour	Location	Position	Distance to Next (km)
Budapest Walking	St. Stephen's Basilica	1	0.8
Budapest Walking	Chain Bridge	2	1.2
Budapest Walking	Buda Castle	3	1.5

Name	Short Description	Long Description	Location Count	Duration (mins)	Distance (km)	Created At	Difficulty	With Kids	With Dogs	With Car	Should Climb	Tour Image
Castle Tour	Explore Buda Castle	A guided walking tour ...	5	90	3.2	2025-09-25 08:00	Medium	Yes	No	No	Yes	castle.jpg



OTC Tourist Guide

Login

Register

Available Tours

Available Locations

Create tour

3 Nearest Locations

Current position

Community

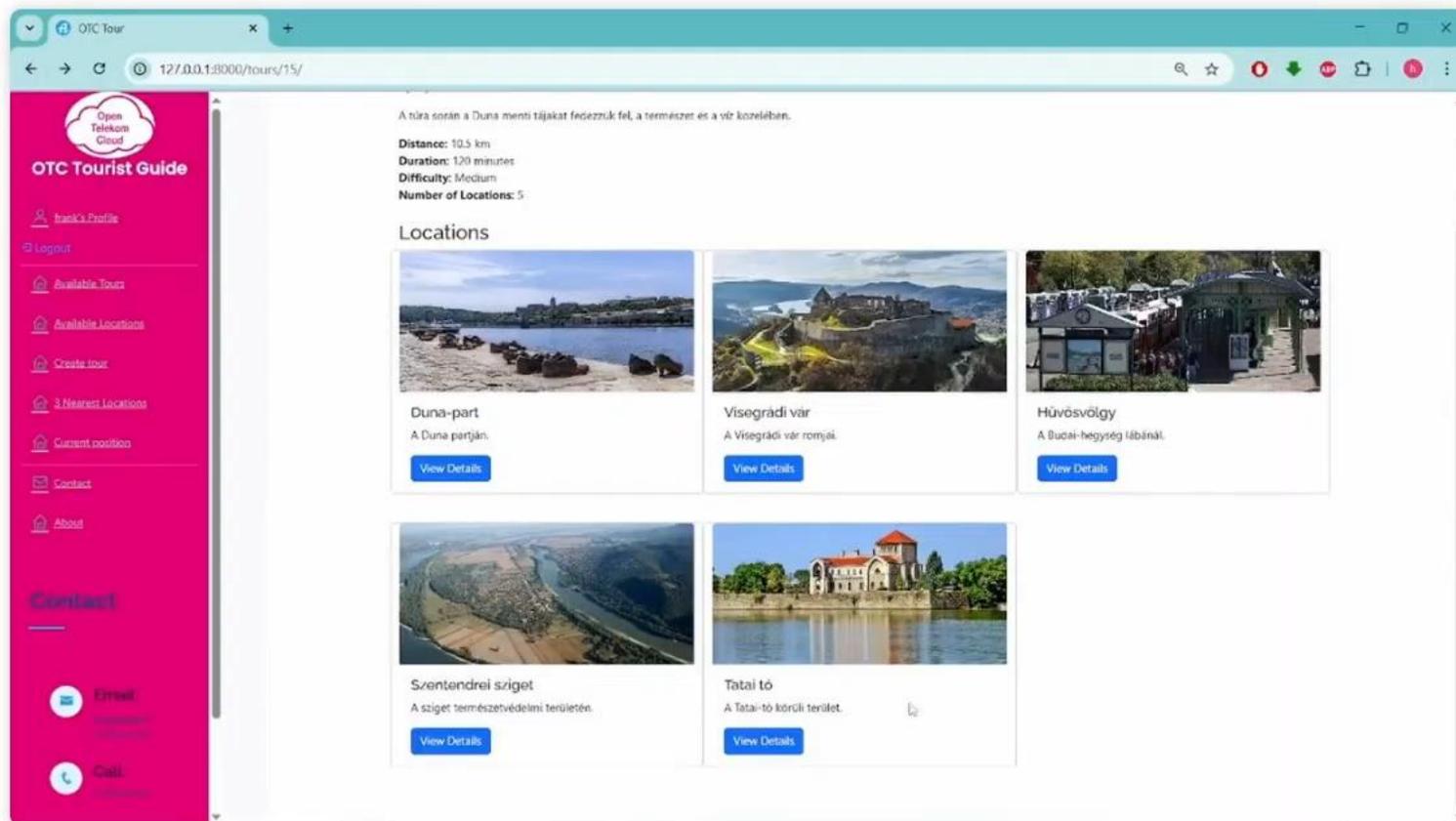
Contact

About

Contact

Welcome to the AI Tourist Guide

Discover exciting destinations, learn about the culture, and explore nearby attractions with our smart guide.



Predefined Tours

Experience seamless and high-performance virtual tours with our tourist guide services powered by Open Telekom Cloud. Benefit from the reliable infrastructure that ensures excellent service availability, protecting your data with the highest security standards of the European market.

User, Feedback, Photo submission, Quiz



User Name	User Photos	Password Change	Photo Submissions	User Tours
johndoe	12 photos	Last changed: 2025-09-20	5 submissions	3 tours

User	Tour	Rating	Comment	Created At
johndoe	Budapest Walking	★★★★☆	Very nice experience!	2025-09-25 07:30

User	Person Name	Latitude	Longitude	Created At	Location	Image
SampleUser	John Doe	47.4979	19.0402	2025-09-25 06:00	Budapest	image.jpg

Location	Question Text	Option 1	Option 2	Option 3	Option 4	Correct Option	Created At	Updated At
Paris	What is the capital of France?	Berlin	Madrid	Paris	Rome	Option 3	2025-09-25 10:00	2025-09-25 10:30



AI Use Case 2 KooSeum

AI EXHIBITION CURATOR



KooSeum-AI Exhibition Curator

The project is a museum Q&A system using KooSearch service on Open Telekom Cloud with LLMs, n8n and Open WebUI, allowing visitors to search artworks or topics via text, image, or voice, with answers from the Museum's Knowledge Base (KooSearch).

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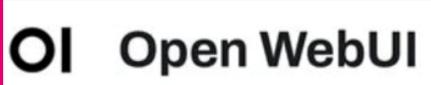
Objectives



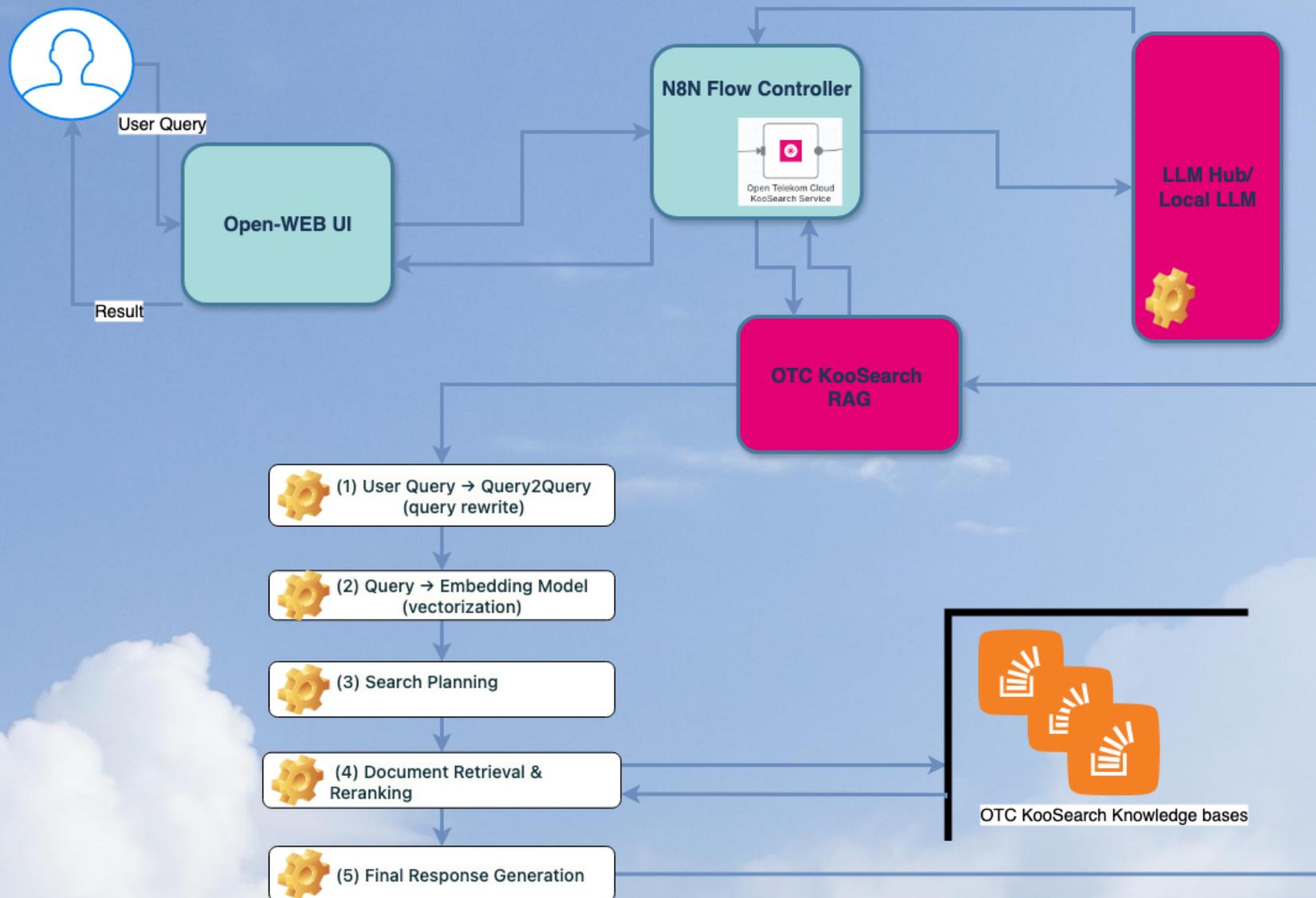
- ✓ Build an intelligent Q&A knowledge search system for the museum
- ✓ Utilize Retrieval Augmented Generation (RAG)
- ✓ Support multi-modal inputs (text, images, voice)
- ✓ Enable museum staff to upload and update knowledge bases dynamically.
- ✓ Provide accurate, context-sensitive answers
- ✓ Enhance development experience with workflow automation (n8n) and deliver intuitive user experience with Open WebUI.

Technologies



Technology	Function
	Containers for n8n & Open WebUI
	User interface for text, image, and voice input
	Workflow automation
	Core Retrieval Augmented Generation as a Service on Open Telekom Cloud Cloud Search Service with Management features like Knowledge Bases, FAQ Management, FAQ Import, Task Management & Version Management
	Large Language Model

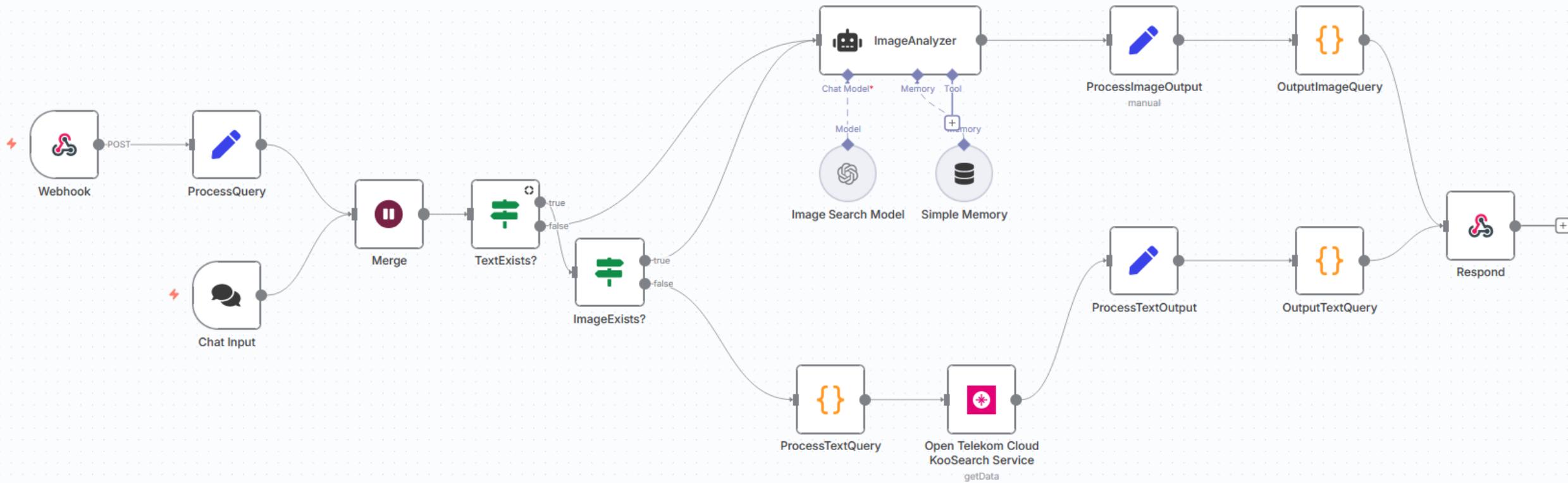
Architecture diagram



KooSearch Flow:



n8n Workflow



Execute workflow

Open chat



Custom Console | Edit

Favorites

Elastic Cloud Server	Bare Metal Server	Auto Scaling	Object Storage Service	Virtual Private Cloud
FunctionGraph	Cloud Search Service	ModelArts	Identity and Access Management	Data Lake Insight
Data Warehouse Service	MapReduce Service	Optical Character Recognition	DataArts Studio	+ Add Favorite

Recently Visited Services

Cloud Search Service

Cloud Eye [eu-de]

In alarm	0
Insufficient data	0
Alarms from last 7 days	0

ECS Resource Monitoring

CPU usage 2.12%

Disk read rate 67.22 KB/s

Inbound network speed 0 Kbit/s

Status Dashboard

Current Status: ✔

[View status of each service](#)

The Latest News And Updates

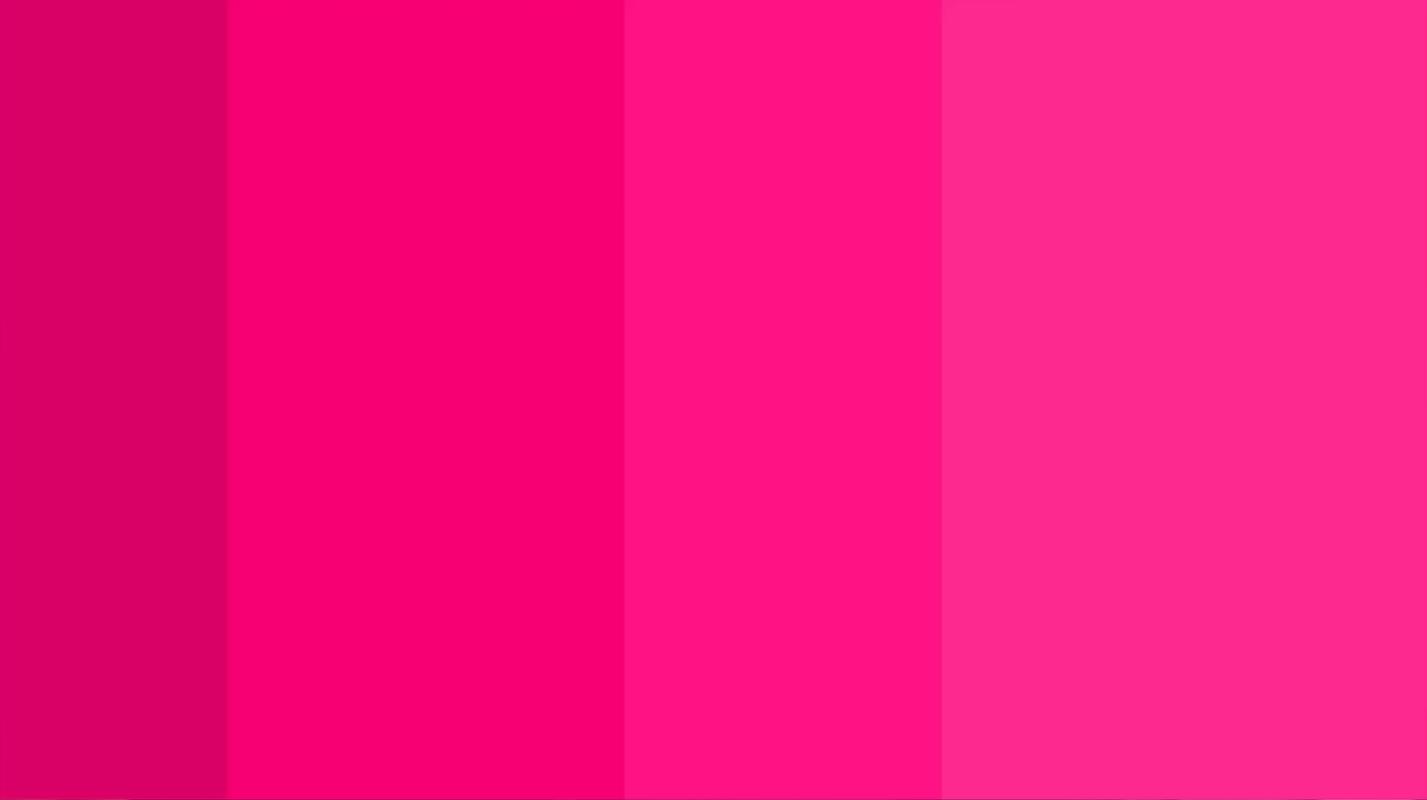
23.09.2025
What's new with OpenStack?
 OpenStack, the operating system of the Open Telekom Cloud, is continuously evolving. At the OpenInfra Summit, developers and users will showcase what's coming and what's possible with OpenStack. Open Telekom Cloud supports the community and contributes through multiple program sessions.

12.09.2025
[Find out more](#)

[Release Notes](#)
[Blog](#)

Welcome to Open Telekom Cloud AI Use Case Kooseum

Questions?



Open Telekom Cloud