

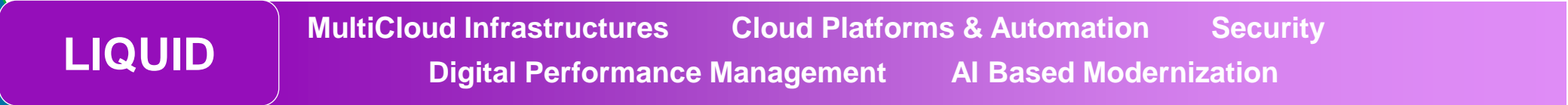
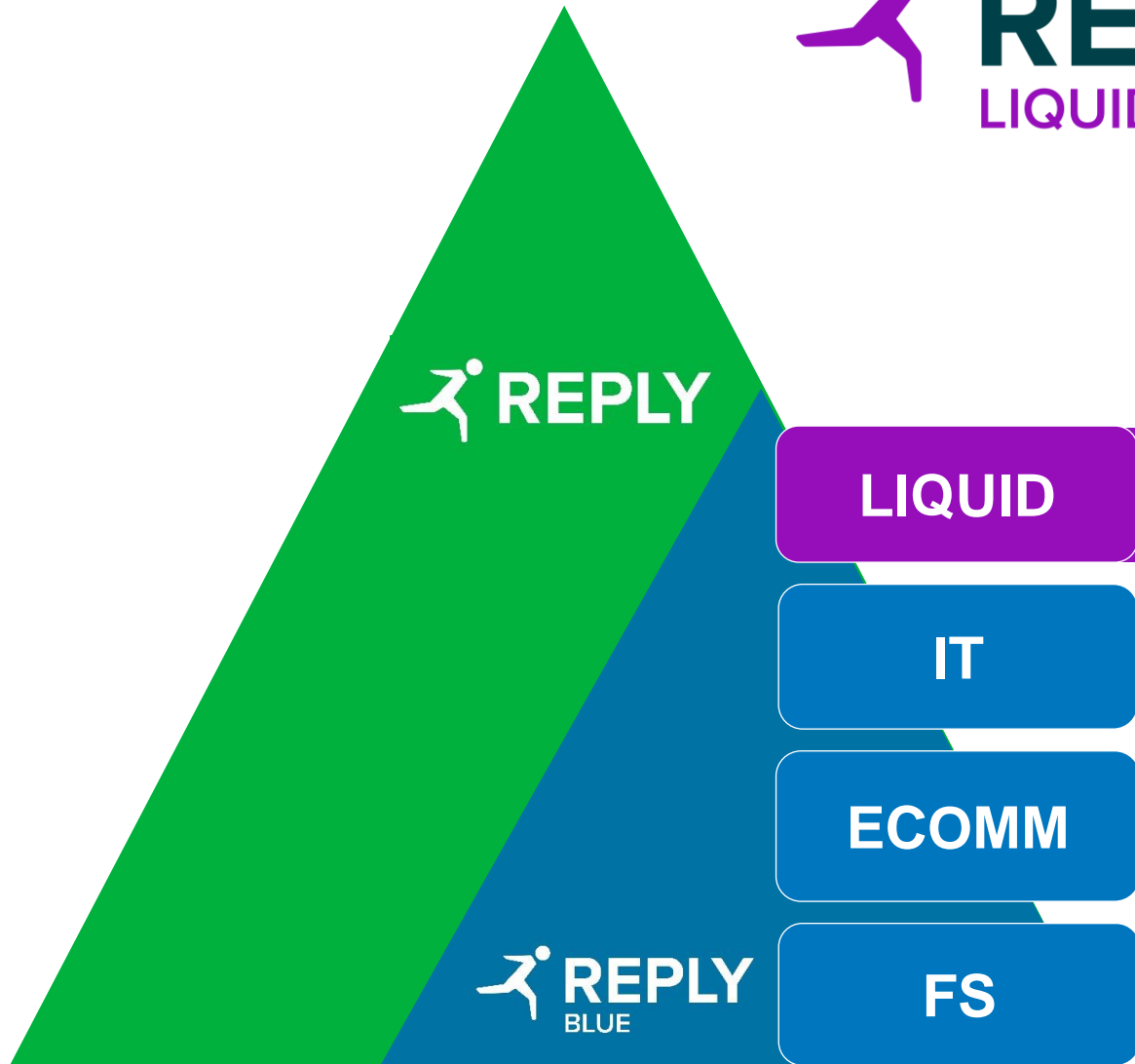
LIQUID REPLY MULTI CLOUD INFRASTRUCTURES

INTERNSHIP PROPOSAL 2025

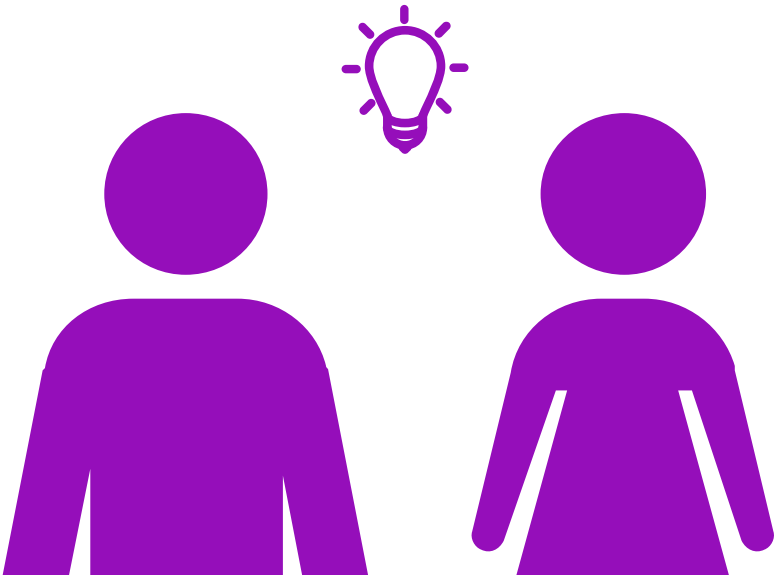
01 LIQUID REPLY



Liquid Reply è la società del Gruppo Reply specializzata nella **definizione di strategie e architetture Hybrid e Multicloud** e nello sviluppo di **piattaforme Cloud Native**.



~190 PERSONE



**MULTICLOUD NETWORK
TRAFFIC ORCHESTRATION**

**MULTICLOUD ROUTE AI
OPTIMIZATION**

MULTICLOUD NETWORK TRAFFIC ORCHESTRATION

MULTICLOUD ROUTE AI OPTIMIZATION

4



M.D.

Description

Multi-cloud is when an organization uses and **orchestrates more than one cloud platform** to deliver application services.

DNS and route management can be difficult in a multi-cloud environment without the integration of a third party tool.

During the internship the candidate will work on **implementing a multi-cloud infrastructure with a multi-cloud DNS solution and network traffic route orchestrator** that integrates AI for real-time network optimization on both network load and cloud network cost.

The main challenge is to develop a **high performance multi-cloud network AI orchestrator** that uses CSP native tools and monitoring feedback to optimize network traffic via the management of the VPC/Vnet routing tables.

The aim is to create a robust multi-cloud infrastructure **with AI integration for route optimization**, resulting in reduced latency, improved failover capabilities, and optimized costs. The project will measure success through key performance indicators such as reduced response times, cost savings, and improved network reliability

Internship target

Design and implement a multi-cloud network route AI orchestrator

Technological scope

Pulumi/Terraform, AWS, Azure, GCP, IBM Cloud

Prerequisites and technical skills expected on entry

Linux operating system, modern programming languages, Cloud computing

Technical and soft skills acquired during the internship

Multi Cloud infrastructure architectures & Multi Cloud Delivery Strategies



MULTICLOUD NETWORK TRAFFIC ORCHESTRATION

MULTICLOUD ROUTE AI OPTIMIZATION

5



M.D.

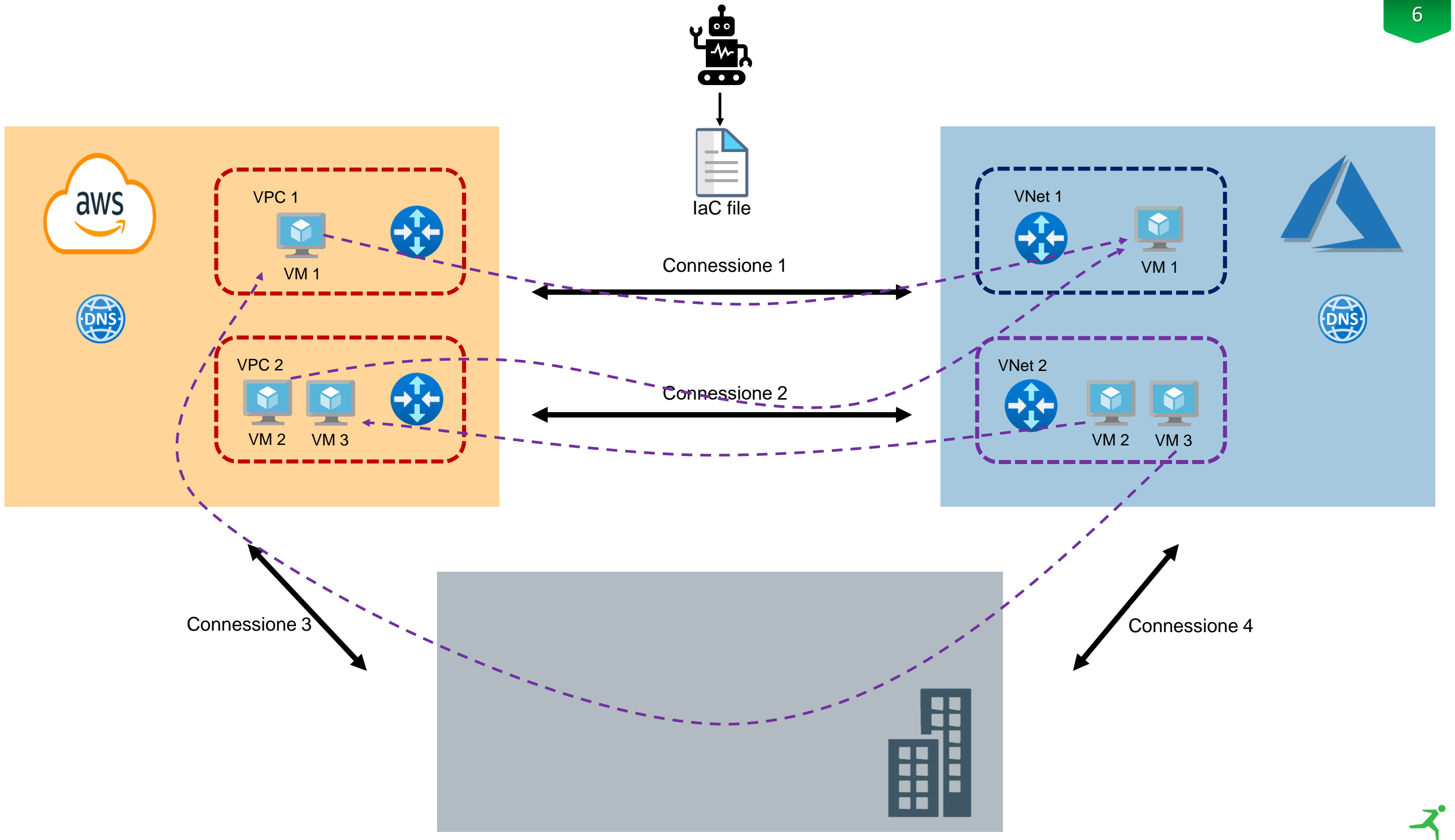
Execution steps

- 1) Create a **multi-cloud infrastructure via IaC** (Pulumi or Terraform) based on two different cloud providers (i.e., AWS and Azure) that should be composed of:
 - I. At least 2 workloads on each CSP (i.e., 2 VMs)
 - II. Network resources like VPC/Vnets with routing tables, multiple VPN or CSPs interconnections, DNS manager
 - III. A monitoring tool on each CSP (i.e., Cloudwatch)
 - IV. A set of resources for the execution of the AI agent
- 2) Manage the multi-cloud **DNS solution**
 - I. Integrate the native CSPs DNS solution (like Route53) between each other to allow network connections
- 3) Implement the **monitoring tool to analyze network statistics** that will be required to feed the agent for network optimization
- 4) Implementation of the **AI agent for a proactive management of network routing tables**

The agent will be able to:

 - I. Analyze network statistics
 - II. Perform route table editing for traffic improvement
 - III. Edit the IaC code to modify the routing tables on the CSPs
 - IV. Execute a pipeline for the Pulumi/Terraform deploy
- 5) Execute a **performance analysis**
 - I. The analysis can be based primary on network latencies and on cloud costs





COST OPTIMIZATION STRATEGIES USING GEN AI

COST OPTIMIZATION STRATEGIES FOR CLOUD INFRASTRUCTURE USING GENERATIVE AI



Description

The widespread adoption of cloud services has transformed the way organizations manage their IT infrastructure. Major cloud service providers (**CSPs**) such as AWS, Azure, and Google Cloud offer scalable and flexible solutions, but the associated costs can escalate rapidly. **Generative AI** (GenAI) has emerged as a powerful tool with the potential to analyze and optimize these costs through predictive analysis and automated recommendations.

The objective of this thesis is to **use GenAI models** to **optimize** cloud infrastructure **costs** for organizations using major CSPs. The research aims to provide a comprehensive framework that organizations can adopt to improve their cloud infrastructure management while minimizing costs.

Challenges:

- Integrating GenAI models with existing cloud management systems.
- Ensuring the accuracy and reliability of GenAI predictions and recommendations.
- Balancing cost optimization with performance and scalability requirements.
- Addressing security and compliance issues related to cloud data and AI models.

Internship target

The candidate will conduct a detailed investigation into how Generative AI can be utilized to optimize cloud infrastructure costs. This will involve design a GenAI solution, integrating it with cloud management tools, and validating the effectiveness through case studies. The candidate will also provide actionable insights and recommendations for businesses on implementing these cost-saving measures.

Technological scope

Cloud Platforms(AWS, Azure, Google Cloud), Generative AI Frameworks, Data Analytics Tools

Prerequisites and technical skills expected on entry

Programming Skills (Python), Cloud Computing, Data Analysis

Technical and soft skills acquired during the internship

Cloud Cost Optimization, Data Analytics, Advanced GenAI skills applied to cloud infrastructures



AUTOMATED IAC COVERAGE USING GEN AI



AUTOMATED IAC COVERAGE USING GEN AI

Description

The widespread adoption of cloud services has transformed the way organizations **manage** their IT infrastructure. Major cloud service providers (**CSPs**) such as AWS, Azure, and Google Cloud offer scalable and flexible services, but the associated management complexity can quickly escalate. **Generative AI** (GenAI) has emerged as a powerful tool with the potential to analyze and optimize the deployment and the management of IT environments.

The objective of this thesis is to **use GenAI models** to **optimize** cloud infrastructure **delivery** and **management** for organizations using major CSPs. The research aims to provide a comprehensive framework that organizations can adopt to **automate** the **infrastructure as code (IaC) adoption**.

Challenges:

- Integrating GenAI models with existing cloud management systems
- Ensuring the accuracy and reliability of GenAI predictions and recommendations
- Create a framework to automate the IaC coverage for CSP services

Internship target

The candidate will conduct a detailed investigation into how Generative AI can be utilized to optimize cloud infrastructure management. This will involve design a GenAI solution, integrating it with cloud management tools, and validating the effectiveness through case studies. The candidate will also provide actionable insights and recommendations for businesses on implementing the solution.

Technological scope

Cloud Platforms(AWS, Azure, Google Cloud), Generative AI Frameworks

Prerequisites and technical skills expected on entry

Programming Skills (Python), Cloud Computing

Technical and soft skills acquired during the internship

IaC, Cloud Computing, Advanced GenAI skills applied to cloud infrastructures



BUSINESS CONTINUITY USING GEN AI



BUSINESS CONTINUITY USING AI

Description

The widespread adoption of cloud services has changed the way organizations manage their IT infrastructure. Major cloud service providers (**CSPs**) such as AWS, Azure and Google Cloud offer scalable and flexible services, but the **availability** of the associated applications can be left to the end customer. **Generative AI** (GenAI) has emerged as a powerful tool with the potential to analyze and optimize the resilience and availability of IT environments.

The objective of this thesis is to use **GenAI** models to **optimize** the **availability** and management of cloud infrastructure for organizations using major CSPs. The research aims to provide a comprehensive framework that organizations can adopt to **optimize their environments**, gain **insights** and gain **actions** to apply.

Challenges:

- Integrating GenAI models with existing cloud management systems
- Ensuring the accuracy and reliability of GenAI predictions and recommendations
- Create a framework to gain insights for CSP services optimization

Internship target

The candidate will conduct a detailed investigation into how Generative AI can be utilized to optimize cloud infrastructure **availability**. This will involve design a GenAI solution, integrating it with cloud management tools, and validating the effectiveness through case studies. The candidate will also provide actionable insights and recommendations for businesses on implementing the solution.

Technological scope

Cloud Platforms(AWS, Azure, Google Cloud), Generative AI Frameworks

Prerequisites and technical skills expected on entry

Programming Skills (Python), Cloud Computing

Technical and soft skills acquired during the internship

IaC, Cloud Computing, Advanced GenAI skills applied to cloud infrastructures



