

Factiverse Cloud Technology

Vinay Setty

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What is Factiverse?

- Spinoff from UiS
- Founded in 2020
- Cutting-edge AI/ML for fact-checking
- Won several awards
 - SR-Bank Innovation prize
 - NORA Best AI startup in Norway
 - Digital Trust Challenge AI Park Berlin
 - MediaFutures EU accelerator winner

Team

Proven academic and corporate track record in AI, APIs & media



CEO & CoFounder
Maria Amelie



CTO & CoFounder
Vinay Setty



Head of Business Development
Christina Monets



Head of Product
Gaute Kokkvoll



Front end / Ops
Tobias Tykvert



Back end Dev
Erik Martin



Front end / Ops
Domante Stirbyte



UX Designer / Product
Sofia Campos



SDR
Kate Labunská



Product Marketing
Max Voievoda



CFO
Morten Kompen



Advisor Marketing
Cynthia Harris



What is fact-checking?

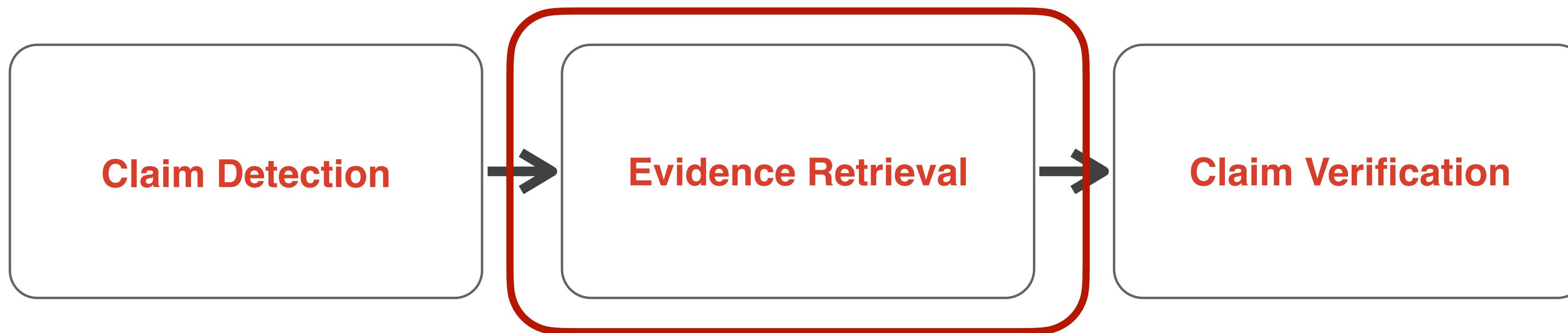


“It is too late to stop climate change.”

Check-worthy
Not check-worthy

A large, rounded rectangular box with a red border contains the quote “It is too late to stop climate change.”. Two arrows point from this box to the words “Check-worthy” and “Not check-worthy”, which are positioned below the quote.

What is fact-checking?

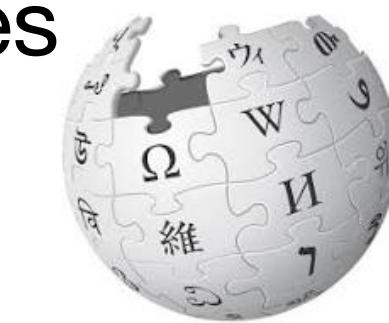


“It is too late to stop climate change.”

Search Engines



Insert your favorite
search engine here

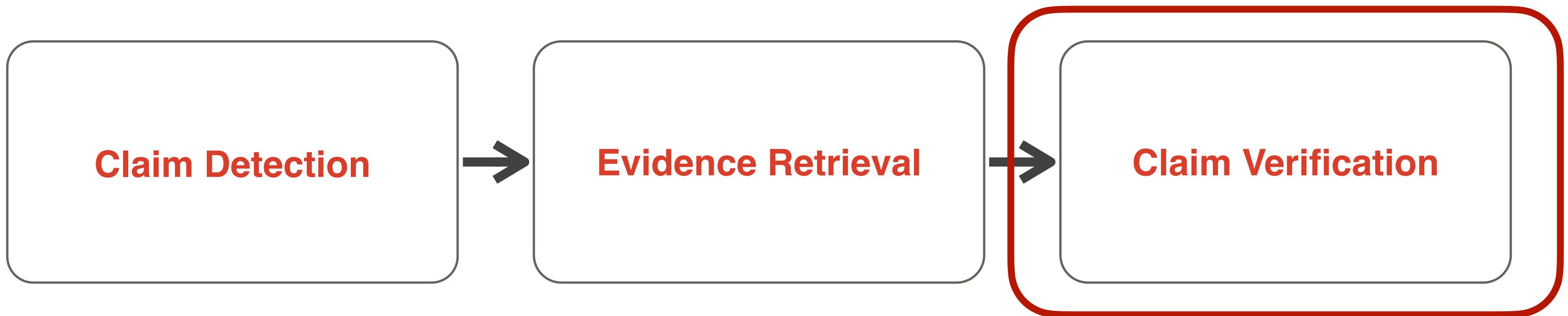


SEMANTIC SCHOLAR



Evidence Candidates

What is fact-checking?



AI Fact-Check Editor

Factiverse

Home FAQ Pricing API Vinay

File Edit Format Examples Clear ?

Exploring Europe's Popular Countries

Europe's allure lies in its cultural richness, stunning landscapes, and historical significance. Let's embark on a journey to discover these captivating countries and learn some intriguing facts along the way.

Italy.

Italy, a Mediterranean gem, tops the list of Europe's most popular countries. Fun facts include:

Vatican City, the world's smallest country, is an independent city-state within Rome, serving as the spiritual and administrative headquarters of the Roman Catholic Church.

Italy boasts an impressive number of UNESCO World Heritage sites, with a total of 30.

The oldest pizzeria, Antica Pizzeria Port'Alba, opened in Naples in 1738, and pizza Margherita was named after Queen Margherita of France.

France.

France enchants visitors with its sophistication, art, and culinary excellence. Fascinating facts include:

The Eiffel Tower was initially built as a temporary structure for the 1889 Exposition Universelle and has become an iconic symbol of France.

France is renowned for its exceptional cuisine and boasts over 1,200 varieties of cheese, including Camembert, Roquefort, and Brie.

318 words tiny

Analyze >

13 ALL 7 SUPPORTED 1 MIXED 5 DISPUTED

You can check facts in over 40 different languages

Italy, a Mediterranean gem, tops the list of Europe's most popular countries.

3 Supporting

1 Disputing

Fun facts include: Vatican City, the world's smallest country, is an independent city-state within Rome, serving as the spiritual and administrative headquarters of the Roman Catholic Church.

15 Supporting

Italy boasts an impressive number of UNESCO World Heritage sites, with a total of 30.

4 Supporting

1 Mixed

7 Disputing

The oldest pizzeria, Antica Pizzeria Port'Alba, opened in Naples in 1738, and pizza Margherita was named after Queen Margherita of France.

Custom GPT

The screenshot shows a dark-themed workspace interface. On the left sidebar, there are icons for ChatGPT, Factivverse AI Fact-check (selected), Consensus, and Explore GPTs. Below these are sections for "Today" and "Previous 7 Days" with links to various posts. At the bottom of the sidebar is an "Invite members" button.

The main area has a header "Factivverse AI Fact-check" with a dropdown arrow. A message bubble from "F" (Factivverse AI Fact-check) says "Talked to aiplugin.factiverse.ai". The message content discusses the claim that the Gulf Stream is weakening, stating it has been analyzed using real-time evidence from multiple search engines and found seven pieces of evidence, with six supporting and one disputing the claim.

Supporting Evidence:

1. Woods Hole Oceanographic Institution ([whoi.edu](#)): A study confirms that the Gulf Stream transport has slowed by 4% over the past four decades with 99% certainty, but the cause (climate change or natural factors) remains unclear.
2. University College London ([ucl.ac.uk](#)): Research suggests that the Gulf Stream was stronger during the last ice age and could weaken due to climate change, which might reduce tropical heat reaching Europe and cause higher sea levels in North America.
3. Climate Signals ([climatesignals.org](#)): The Gulf Stream System has weakened by 15% in recent decades, likely due to melting ice sheets reducing ocean salinity and water density, leading to a "cold blob" south of Greenland.
4. EcoWatch ([ecowatch.com](#)): A study published in Geophysical Research Letters confirms a 4% slowdown of the Gulf Stream in the past 40 years, but the cause is still being investigated.
5. Live Science ([livescience.com](#)): A study concludes that the Gulf Stream is almost certainly weakening, but the link to climate change is not definitively established.

At the bottom, there's a message input field with "Message Factivverse AI Fact-check" and a send button. A note at the bottom right states: "check.factiverse.ai workspace chats aren't used to train our models. ChatGPT can make mistakes."

Live Fact-Checking

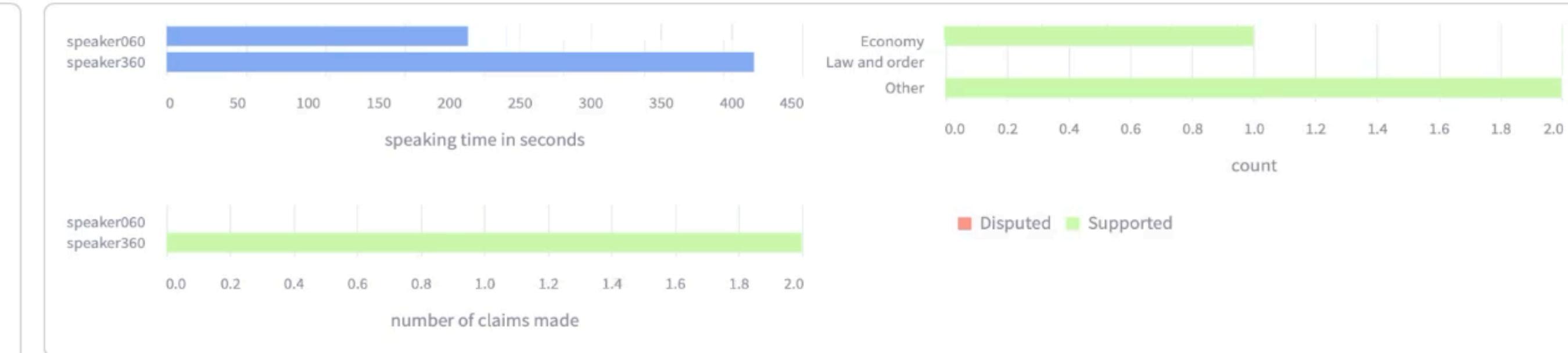


Live transcript:

JOBS. WE'LL MAKE SURE WE HAD A SITUATION WHERE WE NOW, WE'VE BROUGHT DOWN THE PRICE OF PRESCRIPTION DRUGS, WHICH IS A MAJOR ISSUE FOR MANY PEOPLE. TO 15 FOR AN INSULIN SHOT AS opposed to 400. TO PAY MORE THAN \$200 FOR ANY DRUG, ALL THE DRUGS THEY CAN INCLUDE BEGINNING NEXT YEAR. AND WE'RE GOING TO MAKE THAT AVAILABLE TO EVERYBODY, TO ALL AMERICANS. SO WE'RE WORKING TO BRING DOWN THE PRICE AROUND THE KITCHEN TABLE. AND THAT'S WHAT WE'RE GOING TO GET DONE.

? President Trump?

? We're the greatest economy in the history of our country. have never done so well. everybody was amazed by and other countries were copying us. We got hit with COVID, and when we did, we spent the money necessary so we wouldn't end up in a Great Depression, the likes of which we had in 1929. by the time we finish. So we did a great job. We got a lot of credit for the economy, a lot of credit for the military and no wars and so many other things.



Topic: Other

Our administration has brought down the price of prescription drugs, including insulin shots. | Supported

The sources support this claim:

- Prescription drug prices, including insulin, have decreased for seniors
- Biden-Harris Administration is taking action to further lower prescription drug prices

We have found evidence from: whitehouse

- [whitehouse: FACT SHEET: President Biden Takes New Steps to Lower Prescription Drug and Health Care Costs, Expand Access to Health Care, and Protect Consumers](#)

Topic: Law and order

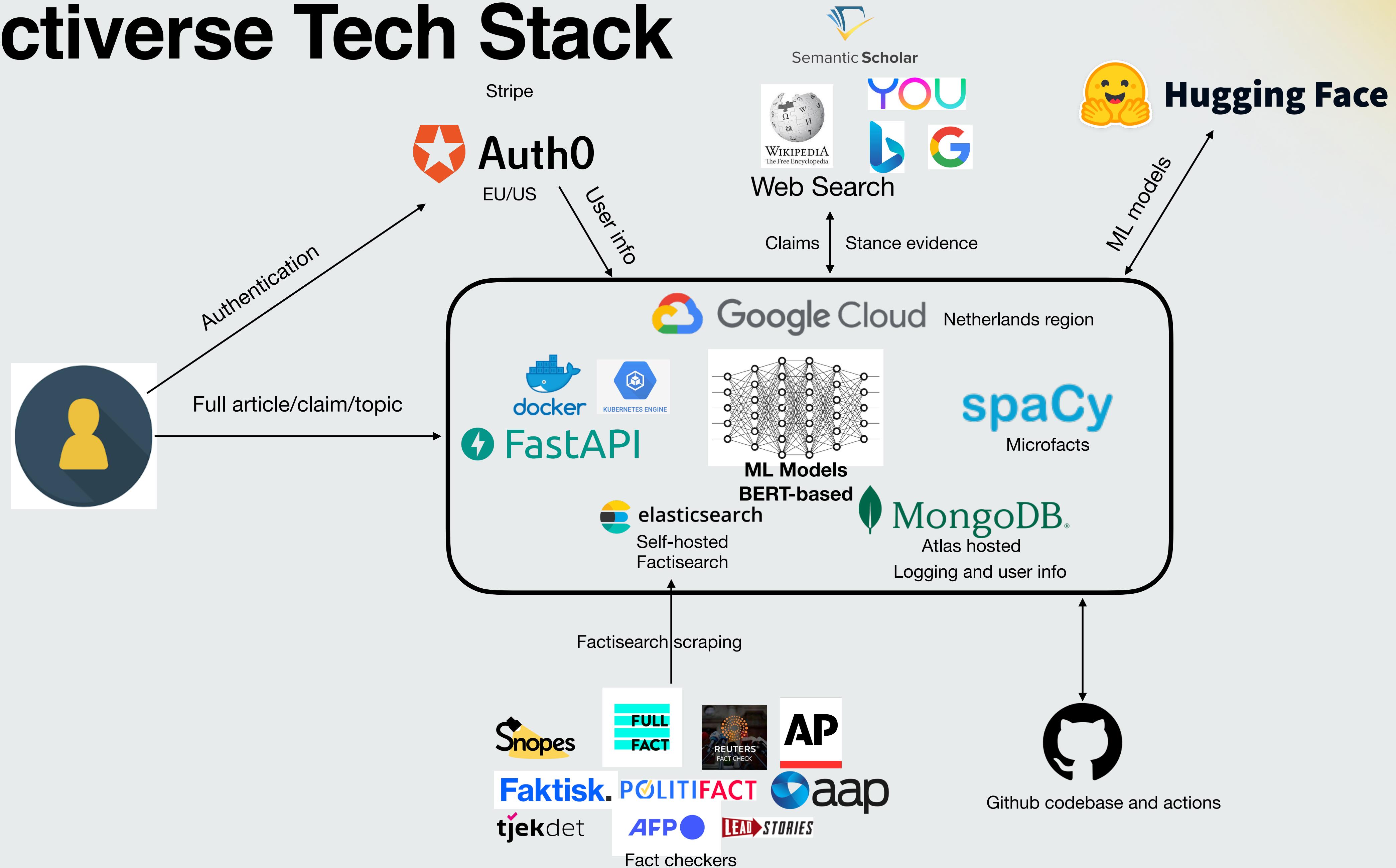
We have taken steps to restore order and create jobs.

No evidence found

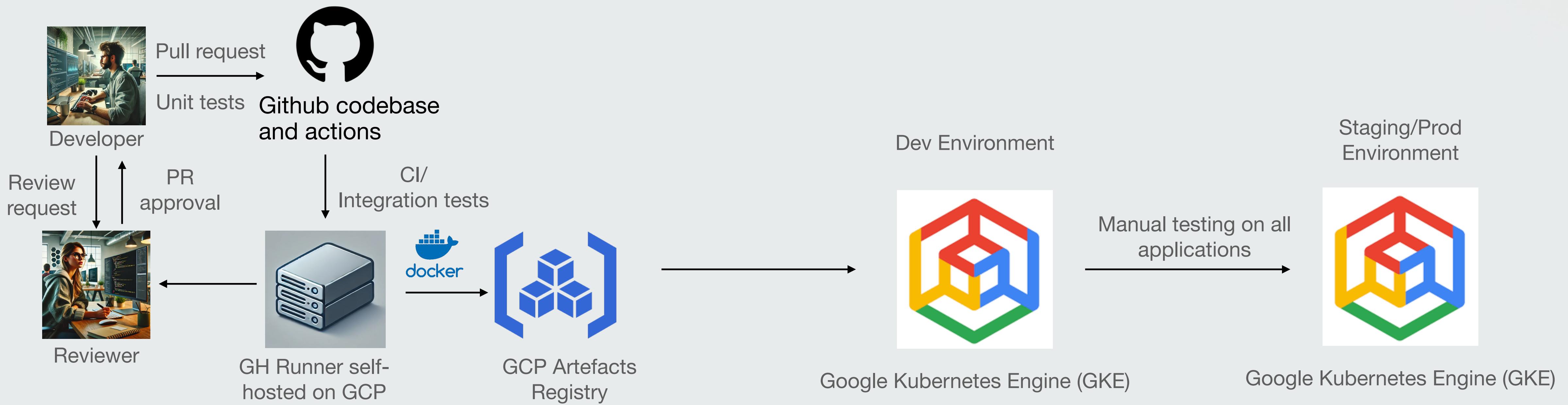
Topic: Economy

The price of a basket of groceries that cost 100 when I took office now costs more than 120. | Supported

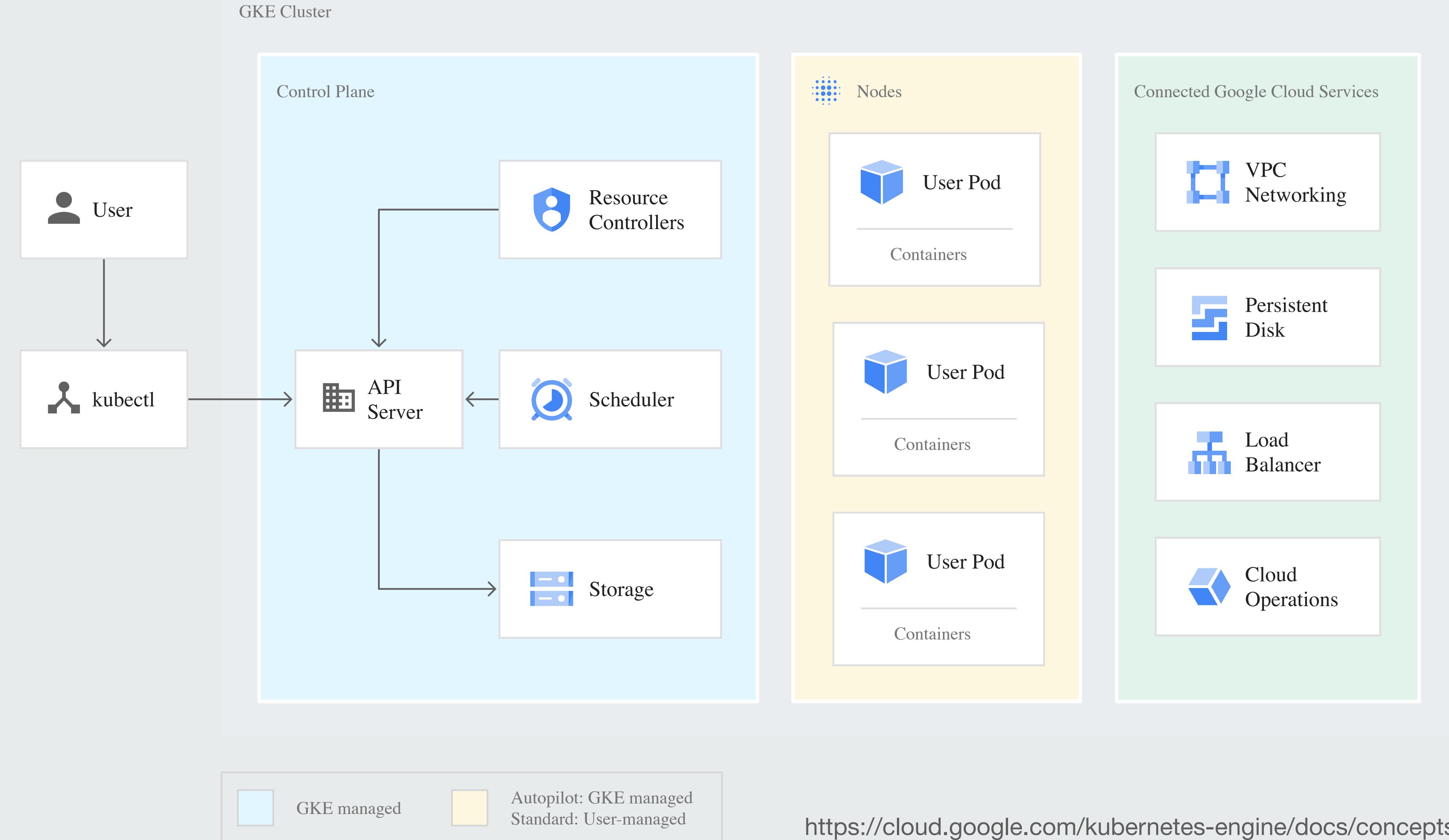
Factiverse Tech Stack



DevOps Setup



GKE Architecture

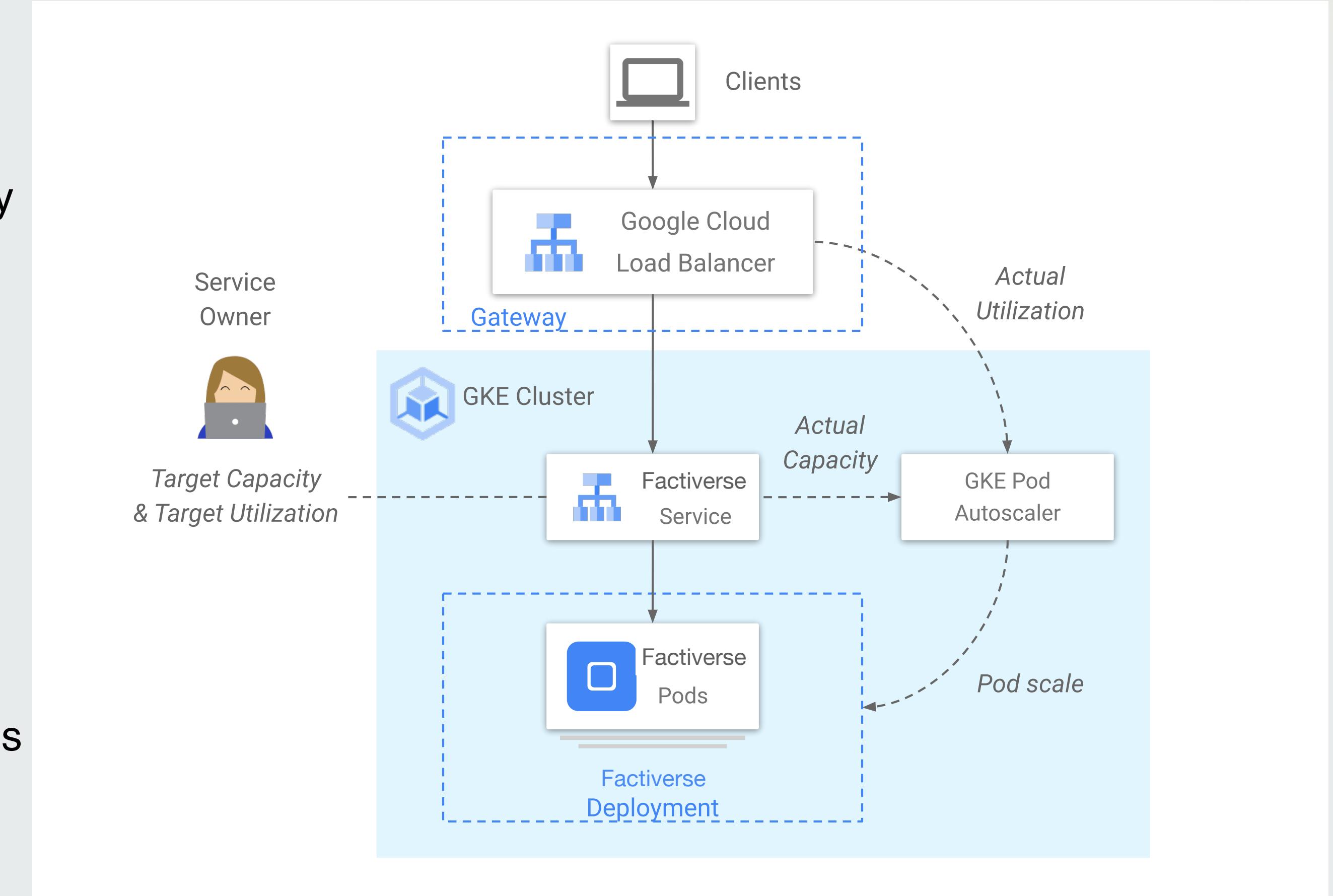


Google Cloud Services Connected to GKE

- **Google Cloud Storage:** Provides scalable and secure object storage that can be used for storing container images, backups, and application data.
- **Artifact Registry:** Stores and manages container images, which are pulled by GKE during cluster creation or updates.
- **Cloud Monitoring and Logging:** Offers monitoring and logging capabilities to track the performance and health of clusters and applications running on GKE.
- **Cloud IAM (Identity and Access Management):** Manages access control and permissions, ensuring secure access to GKE resources.
- **Google Cloud Load Balancing:** Distributes traffic among the different nodes in a GKE cluster, optimizing resource use and ensuring availability.
- **Cloud Pub/Sub:** Facilitates asynchronous messaging between services running on GKE, enabling scalable communication.
- **Cloud SQL and BigQuery:** These managed database services can be integrated with GKE to provide relational and data warehousing capabilities.
- **VPC (Virtual Private Cloud):** Provides network segmentation and control for GKE clusters, enabling secure and efficient communication within Google Cloud.

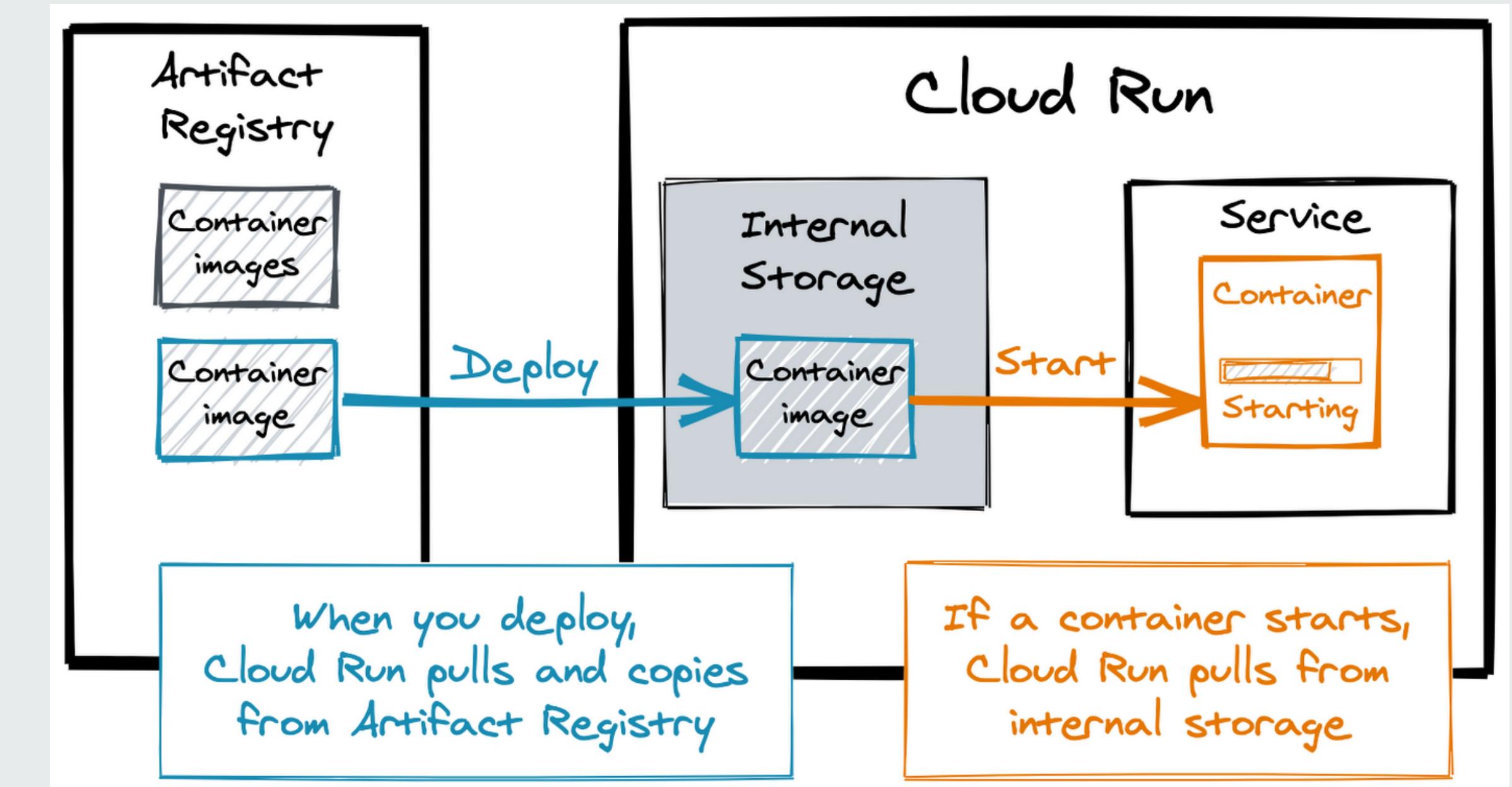
GKE Auto Scaling

- **Google Cloud Load Balancer:** managed service that distributes incoming traffic from clients to pods
- **GKE Pod Autoscaler:** The autoscaler automatically adjusts the number of pods based on the current load and utilization.
- **Horizontal Scaling (Scale Out):** Adding more instances or machines to your existing infrastructure.
- **Vertical Scaling (Scale Up):** Adding more resources (CPU/Memory) to existing nodes.
- **Hybrid Scaling:** Start with minimal number of nodes with minimum capacity, scale up until they are saturated and then scale out.



Google Cloud Run

- **Serverless Container Platform:** Serverless platform that automatically scales containerized applications based on demand.
- **Ease of Use:** Directly deploy a container or even individual scripts without much effort.
- **Pay-per-Use:** You only pay for the exact resources (CPU, memory, and networking) your application uses, making it cost-effective for variable workloads.
- **Automatic Scaling:** Cloud Run automatically scales your container instances up or down based on incoming traffic, handling sudden spikes in demand without manual intervention.
- **Factiverse:** Cloud Run for deploying frontend applications.



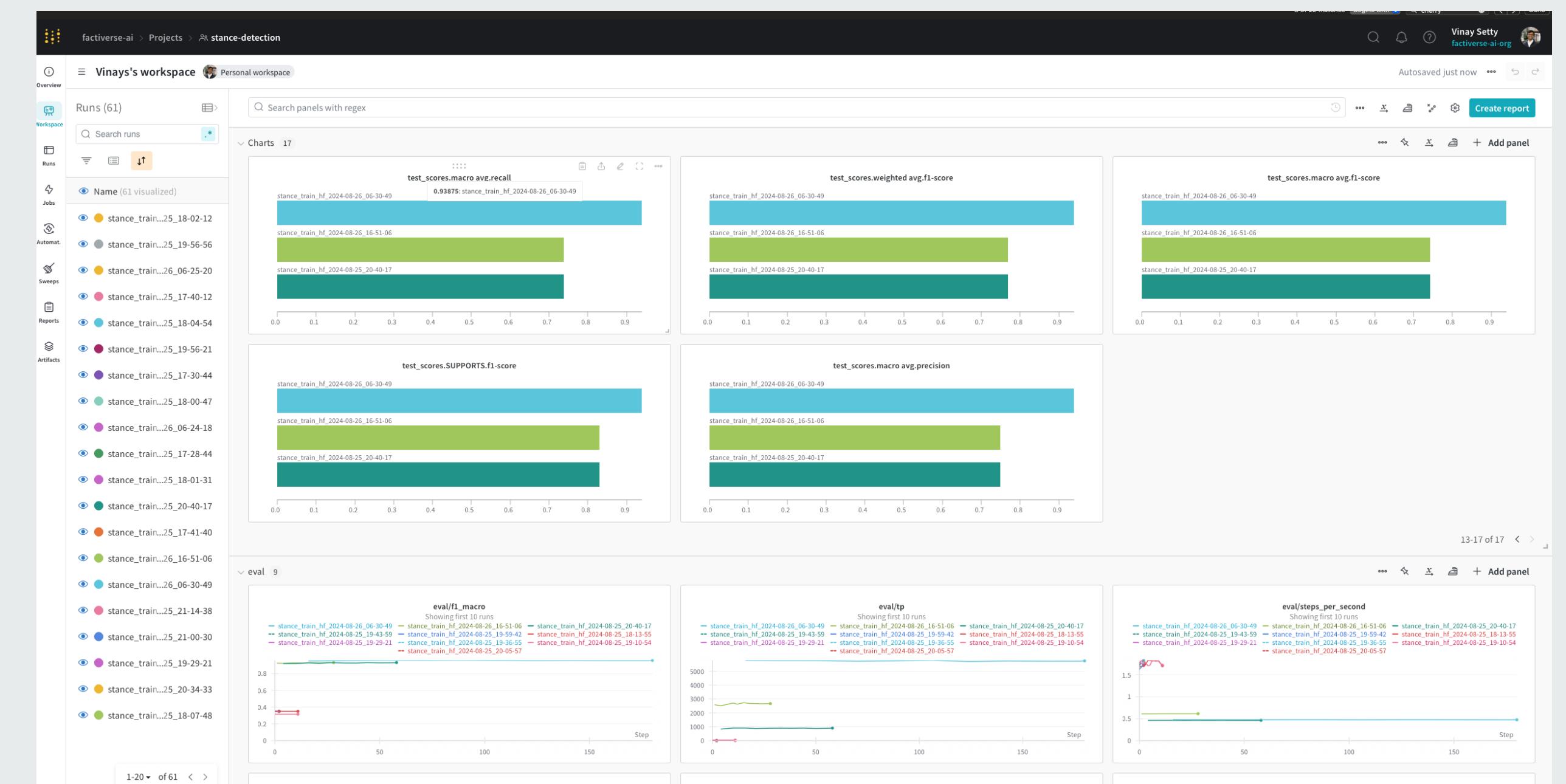
GPU Resources

- **Training ML models:**

- we use standalone GPU servers (often switching between cloud providers due to cost and availability)
- You could use ML training platforms like AWS SageMaker or GCP Google Cloud AI Platform (expensive and less flexible)
- We want full control over model training and deployment
- Models are trained and best models are uploaded to private repository on Hugging Face.
- Model training is reported to weights and biases (wandb)

- **For inference or serving ML models**

- GKE pods pull the models from Hugging Face and store them in local storage (bucket).
- Currently we only use CPU nodes
- Working on redesigning the architecture using CloudRun with GPUs.



Infrastructure as code

- **Infrastructure as Code (IaC)** is a method of managing and provisioning computing infrastructure through machine-readable configuration files, rather than through physical hardware configuration or interactive configuration tools.
- Benefits
 - **Automation:** Automates the setup, management, and scaling of infrastructure.
 - **Consistency:** Ensures that the same environment is created every time the configuration is applied.
 - **Version Control:** Infrastructure changes can be tracked and versioned using version control systems, enabling rollback and audit trails.
 - **Scalability:** Facilitates scaling infrastructure efficiently by replicating the same configurations across environments.
 - **Flexibility:** Relatively easier switch between cloud providers

Terraform - The Most Popular IaC Tool

- Developed by: HashiCorp.
- Language: HashiCorp Configuration Language (HCL), which is declarative.
- Cloud Support: Multi-cloud (AWS, Azure, GCP, and many others).
- State Management: Maintains a state file to track infrastructure changes, ensuring the infrastructure matches the configuration.

Other Popular IaC tools

- **Pulumi:**

- Language: Supports general-purpose programming languages like Python, TypeScript, JavaScript, Go, and C#.
- Pros: Familiar language ecosystems for developers, support for existing programming libraries and tooling.
- Cons: Can be more complex due to the imperative nature of traditional programming languages.

- **AWS CloudFormation:**

- Tightly Integrated with AWS: Allows users to define and provision AWS infrastructure using JSON or YAML templates.
- Pros: Seamless integration with AWS services, built-in support.
- Cons: Limited to AWS, steep learning curve due to JSON/YAML.

- **Ansible:**

- Uses YAML: Ansible playbooks are written in YAML for configuration management and application deployment.
- Pros: Easy to learn, agentless.
- Cons: Less powerful for large-scale cloud provisioning compared to Terraform or Pulumi.
- And many more: Azure Resource Manager (ARM) Templates, Google Cloud Deployment Manager, Chef, Puppet, SaltStack, CloudBolt etc.

Summary

- Intro to Factiverse and fact-checking
- Factiverse case-study
 - Applications
 - Tech stack
 - Cloud architecture
- Google Cloud Platform
 - GKE (Google Kubernetes Engine)
 - Google cloud run
- Infrastructure as Code (IaC)
 - Terraform vs Pulumi
 - Terraform example



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