CS144 Final Project: Time Machine – A Web App for Multi-Model Time Series Forecasting of Stock Prices

Marc Luzuriaga, Rakil Kim, Pranav Kesani
Henry Samueli School of Engineering, University of California, Los Angeles
CS144: Web Applications
Professor Ryan Rosario
June 11, 2025

PART I: SYSTEM ARCHITECTURE

System Overview:
The architecture of our system is divided into two main components: the Frontend Component and the Backend Component, as indicated in Figure 1.

Within the Frontend Component, there are three key modules:

1. Authentication and User Module – Responsible for managing user authentication and retrieving user-specific data, such as saved stock tickers.
2. Forecast Module – Handles the retrieval of stock market data and the generation of forecasts.
3. WebAssembly Module – Module to add two floats.

The frontend is built as a single-page application using Vite and React, consolidating all modules into a unified Frontend + Vite environment.

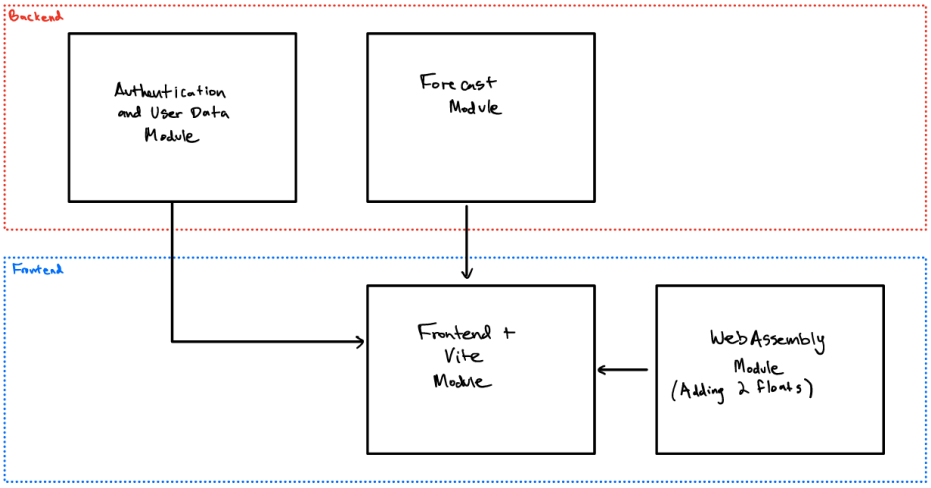

Figure 1: High-Level Architecture Overview

Forecast Module: The Forecast Module utilizes FastAPI to expose multiple RESTful endpoints to the frontend. The primary endpoints fall under the /forecast and /detail namespaces:

1. /forecast: Serves data from various forecasting models, including point predictions and confidence intervals.
2. /detail: Provides raw historical data, such as price_open and price_close, for a given stock ticker.

Both sets of endpoints use utility functions defined in the Python modules shown in Figure 1, and retrieve historical price data from the third-party API Polygon.io.

To generate forecasts, each statistical model is trained on approximately 120–150 recent data points (e.g., hourly or daily observations). Once trained, the model produces n-step-ahead forecasts into the future from the current timestamp.

Each forecast endpoint returns the following in JSON format: (1) Forecasted values at hourly, daily, weekly, and monthly frequencies (2) Corresponding 95% confidence intervals (lower and upper bounds)

The Summary of the Time Series Statistical Methods used to create the forecast are outlined below:

1. PROPHET: Utilizes the open-source Facebook Prophet library, designed for time series forecasting with strong seasonal effects and support for trend change points and holidays. It is robust to missing data and outliers, making it effective for financial time series.
2. ETS (*Error-Trend-Seasonal*): Implements Holt-Winters Exponential Smoothing, which decomposes the series into level, trend, and seasonal components. It is suitable for short-term forecasting with stable seasonal patterns.
3. S-ARIMA (*Seasonal ARIMA*): This model first removes linear trends using Ordinary Least Squares (OLS), then captures seasonality by averaging over seasonal cycles (e.g., weekly or monthly), and finally models the residual series using SARIMAX. It is suited for data with complex seasonal and autocorrelated structures.
4. MAPA (*Multiple Aggregation Prediction Algorithm*): An ensemble approach that applies ETS models to multiple levels of temporal aggregation (e.g., daily, weekly, monthly). The forecasts from each level are combined to improve accuracy, especially for longer forecast horizons.

For performance optimization, Redis is used to cache responses under the /forecast and /detail namespaces using structured key-value pairs:

1. /forecast cache format: forecast:{type}:{ticker}:{steps} → JSON string containing forecast results
2. /detail cache format: forecast:{type}:{frequency}:{ticker} → JSON string containing historical price data

Each cache entry is assigned a Time-To-Live (TTL) of 1 hour upon insertion to ensure timely updates while reducing redundant API calls.

Given that the frontend frequently accesses historical price data, the /detail endpoint implements subset caching. If the requested time range is a subset of the currently cached detail object, the system retrieves the cached data and applies filtering locally, avoiding unnecessary requests to the third-party API (Polygon.io).

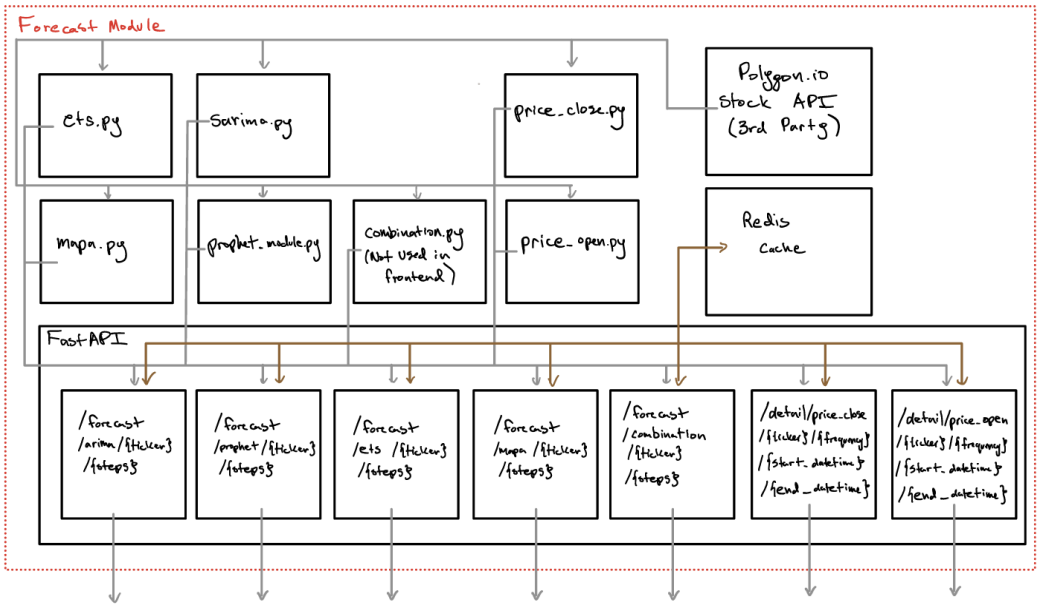

Figure 2: Forecast Module Architecture

Frontend Module:

The frontend module uses React as the frontend framework, vite as the built tool, uPlot for plotting, Tailwind CSS for the CSS framework, and vite-plugin-pwa for making it a Progressive Web App. Here is how everything bundles together:

1. Build-time: Vite bundles React code and writes Tailwind's generated styles inline, then vite-plugin-pwa injects the manifest and a Workbox service worker that preaches everything into a /dist folder.
2. Data fetching: React uses the standard fetch API to call the FastAPI backend which sends the responses in JSON. When the user inputs a stock ticker, a useEffect hook fires to fetch data. FastAPI may get data from Redis if the data was cached which makes displaying the data almost instant. The data is parsed and displayed as a line graph using uPlot.
3. Offline: When the app is offline, the service worker will still display the precached static shell with the HTML, CSS, and JS files. React will show a message saying that the app is attempting to fetch data until connection is restored.

Authentication and User Data Module:

The user authentication API is served by an Express server and uses Mongoose to perform schema validation on a database managed by MongoDB Atlas. It utilizes a JSON web token (JWT) stored in the browser's local storage to authenticate a user on protected endpoints. It provides the following endpoints:

1. /api/register: Create a new account
    - Input: username, email, password

    - Output: None
2. /api/login: Login with an account to obtain a JWT
    - Input: email, password
    - Output: JWT
3. /api/user: Obtain user information
    - Input: JWT, email
    - Output: username, email, tickers
4. /api/addticker: Add a ticker, if it doesn't exist already, to a user account
    - Input: JWT, email, ticker
    - Output: None
5. /api/removeticker: Remove a ticker, if it exists, from a user account
    - Input: JWT, email, ticker
    - Output: None

PART II: SECURITY/PRIVACY FEATURES

We used an Object Document Model known as Mongoose to mitigate NoSQL injection risks, and used appropriate middleware and encoding strategies to defend against CSRF and XSS.

PART III: MEETING PROJECT REQUIREMENTS

IMPORTANT NOTE: In order to locally run the Forecast Module, you must have access to the .env holding the API Key to the third party API and place it within the "forecast_module" directory. You are able to download the .env file here.

In this part, we outline an explanation of how the project met each requirement. The following list will contain an explanation of how we met each requirement. The number associated with the explanation corresponds to the technical requirement number indicated on the spec (e.g. 2. corresponds to "Must be aesthetically pleasing on screens as small as 320px . In other words, it must be responsive."):

Technical Requirement Explanations:

1. We used the uPlot library in order to plot our time series data using the Canvas HTML5 Element. Evidence of this element can be found within the "/frontend/src/components/Plot.jsx" file, where there exists a UplotReact wrapper that utilizes the HTML5 canvas element. You are also able to view the canvas element upon inspect of the plot within the browser.
2. The canvas HTML5 element used to display data is dynamic and adjusts accordingly to the screen size. Furthermore, the form to select the type of forecast and the interval is

converted from a horizontal option format to a dropdown format in order to be accessible as possible for smaller screen users.

3. We were able to use the VitePWA library in order to convert our web application into a PWA. Hence, the general layout should be available, but graphs under no internet connection are shown loading.
4. We were able to have our domain under HTTPS with Kubernetes.
5. We used containers in order to hold the stock forecasts, as well as portfolio information. Horizontal and Vertical Scrolling is implemented within the containers instead of the Page.
6. Had a "futuristic" theme of gradients of gray, as well as included a favicon reflecting the theme of our project, which involves analyzing time.
7. We were able to use Tailwind as a production CSS processor.
8. We were able to authenticate users using cookies with JWT. There is a banner presented at the bottom of the page informing users of their rights and our application's use of cookies
9. We sanitized user input using express-mongo-sanitize with Mongoose to mitigate NoSQL injection risks, and used appropriate middleware and encoding strategies to defend against CSRF and XSS.
10. Utilized a Redis Caching layer in order to cache time series data and historical stock prices for the backend forecasting module. Evidence of the implementation of the Redis caching could be found under "/forecast_module/app/api/redis.py". We were also able to use MongoDB in order to store user data such as the saved stock tickers within their portfolio. Evidence of use of MongoDB could be found under "/auth/app.js".
11. We used Express.js as the Backend Framework for our authentication system (Evidence under "auth/app.js"). We were also able to use Node.js as a JavaScript Runtime Engine.
12. Application uses VitePWA plugin in order to function as a PWA with a service worker (Evidence can be found under "/frontend/vite.config.js". If a user is offline, they are still able to load the page but with the plots in an indefinite loading state.
13. We were able to compile a WebAssembly module from Rust in order to add two floats (Evidence under "/frontend/src/rust" folder)
14. Created the Forecast API endpoint in order to generate forecasts and expose the data to an end-user. Evidence of such an endpoint can be found under the "/forecast_module" directory.
15. We used React + Vite as front-end frameworks.
16. Implemented accessibility features such as ARIA, Semantic HTML, Tab Navigation, Improved Color contrast where appropriate. Evidence could be found under the "/frontend/src/components" folder.
17. Deployed project on to Google Kubernetes Engine and used CI/CD principles via Github Actions. (Evidence within the ".github/workflows/gke-deploy.yaml" file)

18. Manual Tests: Manual tests to test each API endpoint of the backend forecasting module could be found under the "/forecast_module/tests/tests.py" file.

PART IV: EVIDENCE OF CI/CD LOGS

2025-06-11T23:37:24.0781988Z Current runner version: '2.325.0'
2025-06-11T23:37:24.0808416Z ##[group]Operating System
2025-06-11T23:37:24.0809412Z Ubuntu
2025-06-11T23:37:24.0810179Z 24.04.2
2025-06-11T23:37:24.0810866Z LTS
2025-06-11T23:37:24.0811900Z ##[endgroup]
2025-06-11T23:37:24.0812595Z ##[group]Runner Image
2025-06-11T23:37:24.0813408Z Image: ubuntu-24.04
2025-06-11T23:37:24.0814139Z Version: 20250609.1.0
2025-06-11T23:37:24.0815426Z Included Software: https://github.com/actions/runner-images/blob/ubuntu24/20250609.1/images/ubuntu/Ubuntu2404-Readme.md
2025-06-11T23:37:24.0817005Z Image Release: https://github.com/actions/runner-images/releases/tag/ubuntu24%2F20250609.1
2025-06-11T23:37:24.0818345Z ##[endgroup]
2025-06-11T23:37:24.0819100Z ##[group]Runner Image Provisioner
2025-06-11T23:37:24.0819946Z 2.0.437.1
2025-06-11T23:37:24.0820595Z ##[endgroup]
2025-06-11T23:37:24.0822176Z ##[group]GITHUB_TOKEN Permissions
2025-06-11T23:37:24.0824501Z Contents: read
2025-06-11T23:37:24.0825242Z Metadata: read
2025-06-11T23:37:24.0826164Z Packages: read
2025-06-11T23:37:24.0827018Z ##[endgroup]
2025-06-11T23:37:24.0829694Z Secret source: Actions
2025-06-11T23:37:24.0830917Z Prepare workflow directory
2025-06-11T23:37:24.1345467Z Prepare all required actions
2025-06-11T23:37:24.1384942Z Getting action download info
2025-06-11T23:37:24.6336862Z ##[group]Download immutable action package 'actions/checkout@v4'
2025-06-11T23:37:24.6338297Z Version: 4.2.2
2025-06-11T23:37:24.6339572Z Digest: sha256:ccb2698953eaebd21c7bf6268a94f9c26518a7e38e27e0b83c1fe1ad049819b1
2025-06-11T23:37:24.6340892Z Source commit SHA: 11bd71901bbe5b1630ceea73d27597364c9af683
2025-06-11T23:37:24.6341893Z ##[endgroup]
2025-06-11T23:37:24.7170506Z ##[group]Download immutable action package 'google-github-actions/auth@v2'
2025-06-11T23:37:24.7171545Z Version: 2.1.10
2025-06-11T23:37:24.7172519Z Digest: sha256:b93ace6ed195e6261bd53d67ebdb3482b6d8175506667fb99ef8b161f9ebcf10
2025-06-11T23:37:24.7173661Z Source commit SHA: ba79af03959ebeac9769e648f473a284504d9193
2025-06-11T23:37:24.7174607Z ##[endgroup]
2025-06-11T23:37:24.9791352Z ##[group]Download immutable action package 'google-github-actions/setup-gcloud@v2'
2025-06-11T23:37:24.9792473Z Version: 2.1.4
2025-06-11T23:37:24.9793375Z Digest: sha256:212b6c2d21b05c51134986e891b36db26ed3162d1f230f0846cd924f96728f2d
2025-06-11T23:37:24.9794506Z Source commit SHA: 77e7a554d41e2ee56fc945c52dfd3f33d12def9a
2025-06-11T23:37:24.9795369Z ##[endgroup]
2025-06-11T23:37:25.3065163Z Complete job name: Setup, Build, Publish (tm-auth, auth/)
2025-06-11T23:37:25.3749464Z ##[group]Run actions/checkout@v4
2025-06-11T23:37:25.3750584Z with:

2025-06-11T23:37:25.3751201Z repository: Prof-Rosario-UCLA/team34
2025-06-11T23:37:25.3752296Z token: ***
2025-06-11T23:37:25.3752870Z ssh-strict: true
2025-06-11T23:37:25.3753469Z ssh-user: git
2025-06-11T23:37:25.3754091Z persist-credentials: true
2025-06-11T23:37:25.3754908Z clean: true
2025-06-11T23:37:25.3755562Z sparse-checkout-cone-mode: true
2025-06-11T23:37:25.3756345Z fetch-depth: 1
2025-06-11T23:37:25.3756973Z fetch-tags: false
2025-06-11T23:37:25.3757779Z show-progress: true
2025-06-11T23:37:25.3758415Z lfs: false
2025-06-11T23:37:25.3758989Z submodules: false
2025-06-11T23:37:25.3759614Z set-safe-directory: true
2025-06-11T23:37:25.3760568Z env:
2025-06-11T23:37:25.3761179Z PROJECT_ID: ***
2025-06-11T23:37:25.3761809Z GKE_CLUSTER: time-machine
2025-06-11T23:37:25.3762505Z GKE_ZONE: us-west1
2025-06-11T23:37:25.3763126Z IMAGE_TAG: latest
2025-06-11T23:37:25.3763750Z ##[endgroup]
2025-06-11T23:37:25.5686991Z Syncing repository: Prof-Rosario-UCLA/team34
2025-06-11T23:37:25.5690218Z ##[group]Getting Git version info
2025-06-11T23:37:25.5691677Z Working directory is '/home/runner/work/team34/team34'
2025-06-11T23:37:25.5693725Z [command]/usr/bin/git version
2025-06-11T23:37:25.5741177Z git version 2.49.0
2025-06-11T23:37:25.5770117Z ##[endgroup]
2025-06-11T23:37:25.5783575Z Temporarily overriding HOME='/home/runner/work/_temp/50f49cdb-cc2a-4d69-a0f2-271357348256' before making global git config changes
2025-06-11T23:37:25.5787196Z Adding repository directory to the temporary git global config as a safe directory
2025-06-11T23:37:25.5797016Z [command]/usr/bin/git config --global --add safe.directory /home/runner/work/team34/team34
2025-06-11T23:37:25.5829715Z Deleting the contents of '/home/runner/work/team34/team34'
2025-06-11T23:37:25.5833136Z ##[group]Initializing the repository
2025-06-11T23:37:25.5837114Z [command]/usr/bin/git init /home/runner/work/team34/team34
2025-06-11T23:37:25.5899609Z hint: Using 'master' as the name for the initial branch. This default branch name
2025-06-11T23:37:25.5902827Z hint: is subject to change. To configure the initial branch name to use in all
2025-06-11T23:37:25.5906347Z hint: of your new repositories, which will suppress this warning, call:
2025-06-11T23:37:25.5909844Z hint:
2025-06-11T23:37:25.5912280Z hint: git config --global init.defaultBranch <name>
2025-06-11T23:37:25.5915183Z hint:
2025-06-11T23:37:25.5918335Z hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
2025-06-11T23:37:25.5922268Z hint: 'development'. The just-created branch can be renamed via this command:
2025-06-11T23:37:25.5924503Z hint:
2025-06-11T23:37:25.5925756Z hint: git branch -m <name>
2025-06-11T23:37:25.5928022Z Initialized empty Git repository in /home/runner/work/team34/team34/.git/
2025-06-11T23:37:25.5933806Z [command]/usr/bin/git remote add origin https://github.com/Prof-Rosario-UCLA/team34
2025-06-11T23:37:25.5952316Z ##[endgroup]
2025-06-11T23:37:25.5955931Z ##[group]Disabling automatic garbage collection
2025-06-11T23:37:25.5959018Z [command]/usr/bin/git config --local gc.auto 0
2025-06-11T23:37:25.5987048Z ##[endgroup]
2025-06-11T23:37:25.5990545Z ##[group]Setting up auth
2025-06-11T23:37:25.5993224Z [command]/usr/bin/git config --local --name-only --get-regexp core\.sshCommand
2025-06-11T23:37:25.6023521Z [command]/usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'core\.sshCommand' && git config --local --unset-all 'core.sshCommand' || :"
2025-06-11T23:37:25.6293163Z [command]/usr/bin/git config --local --name-only --get-regexp http\.https\:\/\/github\.com\/\.extraheader
2025-06-11T23:37:25.6322402Z [command]/usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'http\.https\:\/\/github\.com\/\.extraheader' && git config --local --unset-all 'http.https://github.com/.extraheader' || :"
2025-06-11T23:37:25.6537375Z [command]/usr/bin/git config --local http.https://github.com/.extraheader AUTHORIZATION: basic ***
2025-06-11T23:37:25.6582596Z ##[endgroup]
2025-06-11T23:37:25.6590770Z ##[group]Fetching the repository
2025-06-11T23:37:25.6594124Z [command]/usr/bin/git -c protocol.version=2 fetch --no-tags --prune --no-recurse-submodules --depth=1 origin +9b4f408a81e83852ed242a169f18d0f25e00a785:refs/remotes/origin/main
2025-06-11T23:37:26.2612632Z From https://github.com/Prof-Rosario-UCLA/team34
2025-06-11T23:37:26.2614699Z * [new ref] 9b4f408a81e83852ed242a169f18d0f25e00a785 -> origin/main
2025-06-11T23:37:26.2640564Z ##[endgroup]
2025-06-11T23:37:26.2642616Z ##[group]Determining the checkout info
2025-06-11T23:37:26.2644700Z ##[endgroup]
2025-06-11T23:37:26.2646729Z [command]/usr/bin/git sparse-checkout disable
2025-06-11T23:37:26.2686978Z [command]/usr/bin/git config --local --unset-all extensions.worktreeConfig
2025-06-11T23:37:26.2717233Z ##[group]Checking out the ref
2025-06-11T23:37:26.2721051Z [command]/usr/bin/git checkout --progress --force -B main refs/remotes/origin/main
2025-06-11T23:37:26.2821478Z Switched to a new branch 'main'

2025-06-11T23:37:26.2823996Z branch 'main' set up to track 'origin/main'.
2025-06-11T23:37:26.2830843Z ##[endgroup]
2025-06-11T23:37:26.2862053Z [command]/usr/bin/git log -1 --format=%H
2025-06-11T23:37:26.2884520Z 9b4f408a81e83852ed242a169f18d0f25e00a785
2025-06-11T23:37:26.3270514Z ##[group]Run google-github-actions/auth@v2
2025-06-11T23:37:26.3271864Z with:
2025-06-11T23:37:26.3305927Z   credentials_json: ***

2025-06-11T23:37:26.3307314Z   create_credentials_file: true
2025-06-11T23:37:26.3308693Z   export_environment_variables: true
2025-06-11T23:37:26.3309967Z   universe: googleapis.com
2025-06-11T23:37:26.3311143Z   cleanup_credentials: true
2025-06-11T23:37:26.3312336Z   access_token_lifetime: 3600s
2025-06-11T23:37:26.3313888Z   access_token_scopes: https://www.googleapis.com/auth/cloud-platform
2025-06-11T23:37:26.3315556Z   id_token_include_email: false
2025-06-11T23:37:26.3316709Z env:
2025-06-11T23:37:26.3317816Z   PROJECT_ID: ***
2025-06-11T23:37:26.3318898Z   GKE_CLUSTER: time-machine
2025-06-11T23:37:26.3320046Z   GKE_ZONE: us-west1
2025-06-11T23:37:26.3321109Z   IMAGE_TAG: latest
2025-06-11T23:37:26.3322156Z ##[endgroup]
2025-06-11T23:37:26.4274830Z Created credentials file at "/home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json"
2025-06-11T23:37:26.4491846Z ##[group]Run google-github-actions/setup-gcloud@v2
2025-06-11T23:37:26.4493522Z with:
2025-06-11T23:37:26.4494941Z   project_id: ***
2025-06-11T23:37:26.4496159Z   version: latest
2025-06-11T23:37:26.4497223Z   skip_install: false
2025-06-11T23:37:26.4498463Z env:
2025-06-11T23:37:26.4499496Z   PROJECT_ID: ***
2025-06-11T23:37:26.4500592Z   GKE_CLUSTER: time-machine
2025-06-11T23:37:26.4501756Z   GKE_ZONE: us-west1
2025-06-11T23:37:26.4502829Z   IMAGE_TAG: latest
2025-06-11T23:37:26.4504679Z   CLOUDSDK_AUTH_CREDENTIAL_FILE_OVERRIDE: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:26.4507395Z   GOOGLE_APPLICATION_CREDENTIALS: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:26.4510005Z   GOOGLE_GHA_CREDS_PATH: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:26.4511919Z   CLOUDSDK_CORE_PROJECT: ***
2025-06-11T23:37:26.4513161Z   CLOUDSDK_PROJECT: ***
2025-06-11T23:37:26.4514364Z   GCLOUD_PROJECT: ***
2025-06-11T23:37:26.4515489Z   GCP_PROJECT: ***
2025-06-11T23:37:26.4516643Z   GOOGLE_CLOUD_PROJECT: ***
2025-06-11T23:37:26.4517922Z ##[endgroup]
2025-06-11T23:37:27.5888386Z [command]/usr/bin/tar xz --warning=no-unknown-keyword --overwrite -C
/home/runner/work/_temp/9026e7fa-2cc4-4130-8688-5696497192ee -f /home/runner/work/_temp/dfbec561-4926-403f-a90c-e11e937592b9
2025-06-11T23:37:44.1990700Z Successfully authenticated
2025-06-11T23:37:45.4067815Z Successfully set default project
2025-06-11T23:37:45.4249423Z ##[group]Run gcloud --quiet auth configure-docker
2025-06-11T23:37:45.4249949Z [36;1mgcloud --quiet auth configure-docker[0m
2025-06-11T23:37:45.4343650Z shell: /usr/bin/bash -e ***0***
2025-06-11T23:37:45.4343980Z env:
2025-06-11T23:37:45.4344238Z   PROJECT_ID: ***
2025-06-11T23:37:45.4344513Z   GKE_CLUSTER: time-machine
2025-06-11T23:37:45.4344791Z   GKE_ZONE: us-west1
2025-06-11T23:37:45.4345055Z   IMAGE_TAG: latest
2025-06-11T23:37:45.4345555Z   CLOUDSDK_AUTH_CREDENTIAL_FILE_OVERRIDE: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:45.4346286Z   GOOGLE_APPLICATION_CREDENTIALS: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:45.4346961Z   GOOGLE_GHA_CREDS_PATH: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:45.4347439Z   CLOUDSDK_CORE_PROJECT: ***
2025-06-11T23:37:45.4347976Z   CLOUDSDK_PROJECT: ***
2025-06-11T23:37:45.4348291Z   GCLOUD_PROJECT: ***
2025-06-11T23:37:45.4348600Z   GCP_PROJECT: ***
2025-06-11T23:37:45.4348873Z   GOOGLE_CLOUD_PROJECT: ***
2025-06-11T23:37:45.4349232Z   CLOUDSDK_METRICS_ENVIRONMENT: github-actions-setup-gcloud
2025-06-11T23:37:45.4349632Z   CLOUDSDK_METRICS_ENVIRONMENT_VERSION: 2.1.4
2025-06-11T23:37:45.4349946Z ##[endgroup]
2025-06-11T23:37:45.9628875Z Adding credentials for all GCR repositories.
2025-06-11T23:37:45.9630211Z WARNING: A long list of credential helpers may cause delays running 'docker build'. We recommend passing the registry name to
configure only the registry you are using.
2025-06-11T23:37:45.9793081Z Docker configuration file updated.
2025-06-11T23:37:46.0422061Z ##[group]Run docker build \
2025-06-11T23:37:46.0422635Z [36;1mdocker build \[0m

```
2025-06-11T23:37:46.0422997Z [36;1m  --tag "gcr.io/$PROJECT_ID/tm-auth:$IMAGE_TAG" \[0m
2025-06-11T23:37:46.0423347Z [36;1m  auth/[0m
2025-06-11T23:37:46.0480192Z shell: /usr/bin/bash -e ***0***
2025-06-11T23:37:46.0480545Z env:
2025-06-11T23:37:46.0480835Z   PROJECT_ID: ***
2025-06-11T23:37:46.0481108Z   GKE_CLUSTER: time-machine
2025-06-11T23:37:46.0481394Z   GKE_ZONE: us-west1
2025-06-11T23:37:46.0481644Z   IMAGE_TAG: latest
2025-06-11T23:37:46.0482115Z   CLOUDSDK_AUTH_CREDENTIAL_FILE_OVERRIDE: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:46.0482827Z   GOOGLE_APPLICATION_CREDENTIALS: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:46.0483460Z   GOOGLE_GHA_CREDS_PATH: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:37:46.0483940Z   CLOUDSDK_CORE_PROJECT: ***
2025-06-11T23:37:46.0484285Z   CLOUDSDK_PROJECT: ***
2025-06-11T23:37:46.0484564Z   GCLOUD_PROJECT: ***
2025-06-11T23:37:46.0484837Z   GCP_PROJECT: ***
2025-06-11T23:37:46.0485102Z   GOOGLE_CLOUD_PROJECT: ***
2025-06-11T23:37:46.0485446Z   CLOUDSDK_METRICS_ENVIRONMENT: github-actions-setup-gcloud
2025-06-11T23:37:46.0485856Z   CLOUDSDK_METRICS_ENVIRONMENT_VERSION: 2.1.4
2025-06-11T23:37:46.0486167Z ##[endgroup]
2025-06-11T23:37:46.5309558Z #0 building with "default" instance using docker driver
2025-06-11T23:37:46.5310742Z
2025-06-11T23:37:46.5311161Z #1 [internal] load build definition from Dockerfile
2025-06-11T23:37:46.5311809Z #1 transferring dockerfile: 290B done
2025-06-11T23:37:46.5312306Z #1 DONE 0.0s
2025-06-11T23:37:46.5312530Z
2025-06-11T23:37:46.5312805Z #2 [internal] load metadata for docker.io/library/node:24
2025-06-11T23:37:46.7565775Z #2 ...
2025-06-11T23:37:46.7566033Z
2025-06-11T23:37:46.7566364Z #3 [auth] library/node:pull token for registry-1.docker.io
2025-06-11T23:37:46.7566847Z #3 DONE 0.0s
2025-06-11T23:37:46.9056417Z
2025-06-11T23:37:46.9057152Z #2 [internal] load metadata for docker.io/library/node:24
2025-06-11T23:37:47.3200729Z #2 DONE 0.9s
2025-06-11T23:37:47.4401040Z
2025-06-11T23:37:47.4401574Z #4 [internal] load .dockerignore
2025-06-11T23:37:47.4402155Z #4 transferring context: 91B done
2025-06-11T23:37:47.4402711Z #4 DONE 0.0s
2025-06-11T23:37:47.4402924Z
2025-06-11T23:37:47.4403097Z #5 [internal] load build context
2025-06-11T23:37:47.4403600Z #5 transferring context: 48.58kB done
2025-06-11T23:37:47.4404156Z #5 DONE 0.0s
2025-06-11T23:37:47.4404387Z
2025-06-11T23:37:47.4405004Z #6 [1/6] FROM docker.io/library/node:24@sha256:e4b2e35fefe1f37f10ecfb04130b38fc36948db703b5dbf63e475d13d4c889c9
2025-06-11T23:37:47.4406512Z #6 resolve docker.io/library/node:24@sha256:e4b2e35fefe1f37f10ecfb04130b38fc36948db703b5dbf63e475d13d4c889c9 done
2025-06-11T23:37:47.4408299Z #6 sha256:c19dd429a216875343dac95f7b76b4f8158d680251dfdbb8f6606415f6ec76e1 2.49kB / 2.49kB done
2025-06-11T23:37:47.4409652Z #6 sha256:0c01110621e0ec1eded421406c9f117f7ae5486c8f7b0a0d1a37cc7bc9317226 0B / 48.49MB 0.1s
2025-06-11T23:37:47.4410818Z #6 sha256:3b1eb73e993990490aa137c00e60ff4ca9d1715bafb8e888dbb0986275edb13f 0B / 24.02MB 0.1s
2025-06-11T23:37:47.4411958Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 0B / 64.40MB 0.1s
2025-06-11T23:37:47.4413110Z #6 sha256:e4b2e35fefe1f37f10ecfb04130b38fc36948db703b5dbf63e475d13d4c889c9 5.14kB / 5.14kB done
2025-06-11T23:37:47.4414297Z #6 sha256:755ea2a01757be91284247988150cb347565f3b7151b6cbbe727261bf811985b 6.42kB / 6.42kB done
2025-06-11T23:37:47.6401878Z #6 sha256:0c01110621e0ec1eded421406c9f117f7ae5486c8f7b0a0d1a37cc7bc9317226 36.70MB / 48.49MB 0.3s
2025-06-11T23:37:47.6404039Z #6 sha256:3b1eb73e993990490aa137c00e60ff4ca9d1715bafb8e888dbb0986275edb13f 18.87MB / 24.02MB 0.3s
2025-06-11T23:37:47.6405006Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 5.24MB / 64.40MB 0.3s
2025-06-11T23:37:47.7402362Z #6 sha256:0c01110621e0ec1eded421406c9f117f7ae5486c8f7b0a0d1a37cc7bc9317226 48.49MB / 48.49MB 0.4s done
2025-06-11T23:37:47.7404008Z #6 sha256:3b1eb73e993990490aa137c00e60ff4ca9d1715bafb8e888dbb0986275edb13f 24.02MB / 24.02MB 0.3s done
2025-06-11T23:37:47.7405238Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 13.63MB / 64.40MB 0.4s
2025-06-11T23:37:47.7406160Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 0B / 211.37MB 0.4s
2025-06-11T23:37:47.8405886Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 19.92MB / 64.40MB 0.5s
2025-06-11T23:37:47.8407084Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 11.53MB / 211.37MB 0.5s
2025-06-11T23:37:47.8408298Z #6 extracting sha256:0c01110621e0ec1eded421406c9f117f7ae5486c8f7b0a0d1a37cc7bc9317226
2025-06-11T23:37:47.8409344Z #6 sha256:7d640a28f66767021cc5b1a4b4300ebe1395609adf0e010a949cf42682594a89 0B / 3.32kB 0.5s
2025-06-11T23:37:48.0158696Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 33.55MB / 64.40MB 0.6s
2025-06-11T23:37:48.0159886Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 30.41MB / 211.37MB 0.6s
2025-06-11T23:37:48.0162299Z #6 sha256:7d640a28f66767021cc5b1a4b4300ebe1395609adf0e010a949cf42682594a89 3.32kB / 3.32kB 0.5s done
2025-06-11T23:37:48.0163411Z #6 sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 0B / 58.47MB 0.6s
2025-06-11T23:37:48.1180149Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 47.19MB / 64.40MB 0.7s
2025-06-11T23:37:48.1182136Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 48.23MB / 211.37MB 0.7s
2025-06-11T23:37:48.1212886Z #6 sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 11.53MB / 58.47MB 0.7s
2025-06-11T23:37:48.2205535Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 60.82MB / 64.40MB 0.8s
2025-06-11T23:37:48.2206431Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 71.30MB / 211.37MB 0.8s
```

```
2025-06-11T23:37:48.2207885Z #6 sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 24.12MB / 58.47MB 0.8s
2025-06-11T23:37:48.3401324Z #6 sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 64.40MB / 64.40MB 0.9s done
2025-06-11T23:37:48.3402713Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 102.76MB / 211.37MB 1.0s
2025-06-11T23:37:48.3403930Z #6 sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 54.53MB / 58.47MB 1.0s
2025-06-11T23:37:48.3405152Z #6 sha256:57b0becc010f6ac2c62850ba90f1afd81a1b64f8e00941cbf6408bab573e9309 1.25MB / 1.25MB 1.0s done
2025-06-11T23:37:48.3406309Z #6 sha256:19120b89d6208d242a6bb8585b3e896d24742633dd9404165e91133ac19afc16 0B / 449B 1.0s
2025-06-11T23:37:48.4521939Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 114.29MB / 211.37MB 1.1s
2025-06-11T23:37:48.4523020Z #6 sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 58.47MB / 58.47MB 1.1s done
2025-06-11T23:37:48.4524027Z #6 sha256:19120b89d6208d242a6bb8585b3e896d24742633dd9404165e91133ac19afc16 449B / 449B 1.1s done
2025-06-11T23:37:48.6609384Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 131.07MB / 211.37MB 1.3s
2025-06-11T23:37:48.8766401Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 154.37MB / 211.37MB 1.5s
2025-06-11T23:37:48.9881583Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 173.02MB / 211.37MB 1.6s
2025-06-11T23:37:49.1024932Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 189.79MB / 211.37MB 1.7s
2025-06-11T23:37:49.2399335Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 204.47MB / 211.37MB 1.9s
2025-06-11T23:37:49.5588281Z #6 sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 211.37MB / 211.37MB 2.2s done
2025-06-11T23:37:49.5589887Z #6 extracting sha256:0c01110621e0ec1eded421406c9f117f7ae5486c8f7b0a0d1a37cc7bc9317226 1.8s done
2025-06-11T23:37:49.7223984Z #6 extracting sha256:3b1eb73e993990490aa137c00e60ff4ca9d1715bafb8e888dbb0986275edb13f 0.1s
2025-06-11T23:37:50.4713442Z #6 extracting sha256:3b1eb73e993990490aa137c00e60ff4ca9d1715bafb8e888dbb0986275edb13f 0.7s done
2025-06-11T23:37:52.3590486Z #6 extracting sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a
2025-06-11T23:37:54.5184605Z #6 extracting sha256:b1b8a0660a31403a35d70b276c3c86b1200b8683e83cd77a92ec98744017684a 2.0s done
2025-06-11T23:37:54.6723450Z #6 extracting sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d
2025-06-11T23:37:59.8082794Z #6 extracting sha256:48b8862a18fa961ebfbac8484877dd4894e96ee88177d8c4f1f54d9727262b7d 5.0s done
2025-06-11T23:38:00.9461976Z #6 extracting sha256:7d640a28f66767021cc5b1a4b4300ebe1395609adf0e010a949cf42682594a89
2025-06-11T23:38:01.0737226Z #6 extracting sha256:7d640a28f66767021cc5b1a4b4300ebe1395609adf0e010a949cf42682594a89 done
2025-06-11T23:38:01.0740757Z #6 extracting sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 0.1s
2025-06-11T23:38:02.9899800Z #6 extracting sha256:07fea7834ac30bf873caef4d0ed795b73793c7ce9c88b2f9bd9ee9b515c18012 1.9s done
2025-06-11T23:38:03.1694889Z #6 extracting sha256:57b0becc010f6ac2c62850ba90f1afd81a1b64f8e00941cbf6408bab573e9309
2025-06-11T23:38:03.3999603Z #6 extracting sha256:57b0becc010f6ac2c62850ba90f1afd81a1b64f8e00941cbf6408bab573e9309 0.0s done
2025-06-11T23:38:03.4000498Z #6 extracting sha256:19120b89d6208d242a6bb8585b3e896d24742633dd9404165e91133ac19afc16 done
2025-06-11T23:38:03.4001122Z #6 DONE 15.9s
2025-06-11T23:38:03.4001355Z
2025-06-11T23:38:03.4002058Z #7 [2/6] RUN mkdir -p /home/node/app/node_modules && chown -R node:node /home/node/app
2025-06-11T23:38:03.4002778Z #7 DONE 0.1s
2025-06-11T23:38:03.5897221Z
2025-06-11T23:38:03.5897868Z #8 [3/6] WORKDIR /home/node/app
2025-06-11T23:38:03.5898449Z #8 DONE 0.0s
2025-06-11T23:38:03.5898694Z
2025-06-11T23:38:03.5899014Z #9 [4/6] COPY --chown=node:node package*.json ./
2025-06-11T23:38:03.5899595Z #9 DONE 0.0s
2025-06-11T23:38:03.5899863Z
2025-06-11T23:38:03.5900040Z #10 [5/6] RUN npm install
2025-06-11T23:38:04.8204076Z #10 1.381
2025-06-11T23:38:04.8204621Z #10 1.381 added 101 packages, and audited 102 packages in 1s
2025-06-11T23:38:04.9519734Z #10 1.381
2025-06-11T23:38:04.9520212Z #10 1.381 15 packages are looking for funding
2025-06-11T23:38:04.9520690Z #10 1.381   run `npm fund` for details
2025-06-11T23:38:04.9521000Z #10 1.382
2025-06-11T23:38:04.9521233Z #10 1.382 found 0 vulnerabilities
2025-06-11T23:38:04.9521615Z #10 1.383 npm notice
2025-06-11T23:38:04.9521993Z #10 1.383 npm notice New minor version of npm available! 11.3.0 -> 11.4.1
2025-06-11T23:38:04.9522618Z #10 1.383 npm notice Changelog: https://github.com/npm/cli/releases/tag/v11.4.1
2025-06-11T23:38:04.9523170Z #10 1.383 npm notice To update run: npm install -g npm@11.4.1
2025-06-11T23:38:04.9523619Z #10 1.383 npm notice
2025-06-11T23:38:04.9524011Z #10 DONE 1.5s
2025-06-11T23:38:05.1281800Z
2025-06-11T23:38:05.1282807Z #11 [6/6] COPY --chown=node:node . .
2025-06-11T23:38:05.1283638Z #11 DONE 0.0s
2025-06-11T23:38:05.1285056Z
2025-06-11T23:38:05.1285266Z #12 exporting to image
2025-06-11T23:38:05.1285720Z #12 exporting layers
2025-06-11T23:38:07.3867182Z #12 exporting layers 2.4s done
2025-06-11T23:38:07.4071915Z #12 writing image sha256:84a6cb1844507adfe0a7c73a46c7734a78d11857b945ccc7cbd68545f370bcc6 done
2025-06-11T23:38:07.4073344Z #12 naming to gcr.io/***/tm-auth:latest done
2025-06-11T23:38:07.4073950Z #12 DONE 2.4s
2025-06-11T23:38:07.4149069Z ##[group]Run docker push "gcr.io/$PROJECT_ID/tm-auth:$IMAGE_TAG"
2025-06-11T23:38:07.4149585Z [36;1mdocker push "gcr.io/$PROJECT_ID/tm-auth:$IMAGE_TAG"[0m
2025-06-11T23:38:07.4206095Z shell: /usr/bin/bash -e ***0***
2025-06-11T23:38:07.4206398Z env:
2025-06-11T23:38:07.4206647Z   PROJECT_ID: ***
2025-06-11T23:38:07.4206910Z   GKE_CLUSTER: time-machine
```

2025-06-11T23:38:07.4207187Z GKE_ZONE: us-west1
2025-06-11T23:38:07.4207429Z IMAGE_TAG: latest
2025-06-11T23:38:07.4208061Z CLOUDSDK_AUTH_CREDENTIAL_FILE_OVERRIDE: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:38:07.4208981Z GOOGLE_APPLICATION_CREDENTIALS: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:38:07.4209606Z GOOGLE_GHA_CREDS_PATH: /home/runner/work/team34/team34/gha-creds-c9a6dd87094bf148.json
2025-06-11T23:38:07.4210090Z CLOUDSDK_CORE_PROJECT: ***
2025-06-11T23:38:07.4210392Z CLOUDSDK_PROJECT: ***
2025-06-11T23:38:07.4210712Z GCLOUD_PROJECT: ***
2025-06-11T23:38:07.4210994Z GCP_PROJECT: ***
2025-06-11T23:38:07.4211259Z GOOGLE_CLOUD_PROJECT: ***
2025-06-11T23:38:07.4211607Z CLOUDSDK_METRICS_ENVIRONMENT: github-actions-setup-gcloud
2025-06-11T23:38:07.4212011Z CLOUDSDK_METRICS_ENVIRONMENT_VERSION: 2.1.4
2025-06-11T23:38:07.4212321Z ##[endgroup]
2025-06-11T23:38:07.9919695Z The push refers to repository [gcr.io/***/tm-auth]
2025-06-11T23:38:08.0433390Z 59c0798dc539: Preparing
2025-06-11T23:38:08.0434135Z b6db63dbb6bb: Preparing
2025-06-11T23:38:08.0434574Z b82408db1b09: Preparing
2025-06-11T23:38:08.0435213Z 5f70bf18a086: Preparing
2025-06-11T23:38:08.0435648Z 423fddde28a9: Preparing
2025-06-11T23:38:08.0436067Z 28693380f679: Preparing
2025-06-11T23:38:08.0436475Z 505ad75279cb: Preparing
2025-06-11T23:38:08.0436874Z 746469a814c0: Preparing
2025-06-11T23:38:08.0437274Z 1d1c062ba60a: Preparing
2025-06-11T23:38:08.0437905Z f9093a7aaa16: Preparing
2025-06-11T23:38:08.0438327Z 1c49688bd8eb: Preparing
2025-06-11T23:38:08.0438792Z f5b8fb1def00: Preparing
2025-06-11T23:38:08.0439225Z 8f003894a7ef: Preparing
2025-06-11T23:38:08.0439656Z 746469a814c0: Waiting
2025-06-11T23:38:08.0440086Z 1d1c062ba60a: Waiting
2025-06-11T23:38:08.0440475Z f9093a7aaa16: Waiting
2025-06-11T23:38:08.0440885Z 1c49688bd8eb: Waiting
2025-06-11T23:38:08.0441233Z f5b8fb1def00: Waiting
2025-06-11T23:38:08.0441492Z 8f003894a7ef: Waiting
2025-06-11T23:38:08.0441723Z 28693380f679: Waiting
2025-06-11T23:38:08.0441956Z 505ad75279cb: Waiting
2025-06-11T23:38:09.2884090Z b82408db1b09: Pushed
2025-06-11T23:38:09.3053776Z 59c0798dc539: Pushed
2025-06-11T23:38:09.3054272Z 5f70bf18a086: Pushed
2025-06-11T23:38:09.3208647Z 423fddde28a9: Pushed
2025-06-11T23:38:09.4932475Z 28693380f679: Layer already exists
2025-06-11T23:38:09.5200767Z 505ad75279cb: Layer already exists
2025-06-11T23:38:09.5246848Z 746469a814c0: Layer already exists
2025-06-11T23:38:09.5475002Z 1d1c062ba60a: Layer already exists
2025-06-11T23:38:09.7168722Z f9093a7aaa16: Layer already exists
2025-06-11T23:38:09.7435041Z 1c49688bd8eb: Layer already exists
2025-06-11T23:38:09.7451388Z f5b8fb1def00: Layer already exists
2025-06-11T23:38:09.7515967Z 8f003894a7ef: Layer already exists
2025-06-11T23:38:10.0316595Z b6db63dbb6bb: Pushed
2025-06-11T23:38:11.9842293Z latest: digest: sha256:ae0fa7218d0d582842147834e3103a3ac81291ab9ec370d4b3b0ea9d06737e39 size: 3046