Application development in the Cloud

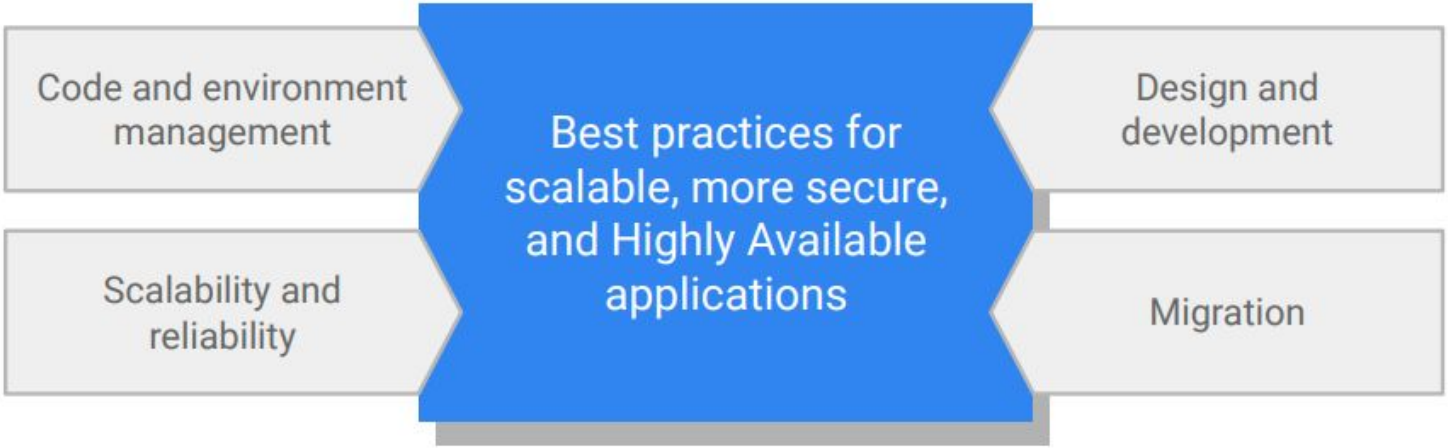
Build for the Cloud

Global reach

Scalability and
High Availability

Security

Implement best practice to build scalable, more secure, and highly available applications



Manage your application's code and environment

Code repository

Dependency management

Configuration settings

App Dev: Setting up a Development Environment - Python

50 minutes 1 Credit 

GSP183

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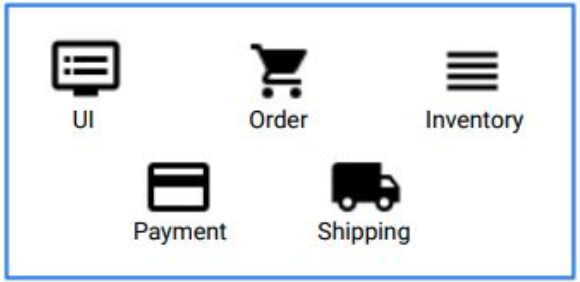
Consider implementing microservices



Monolithic application

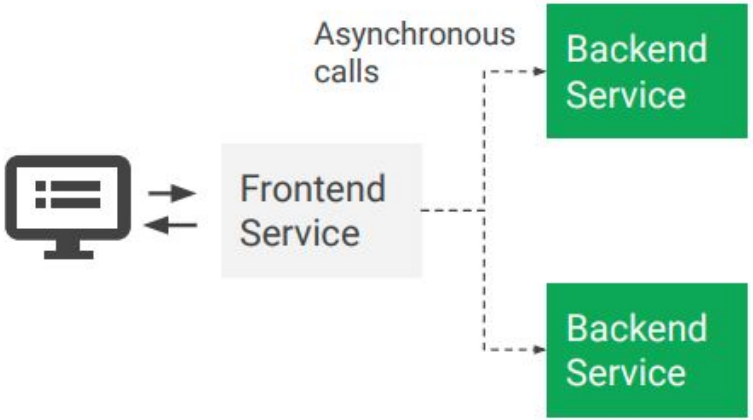
- Codebase becomes large
- Packages have tangled dependencies

Microservices

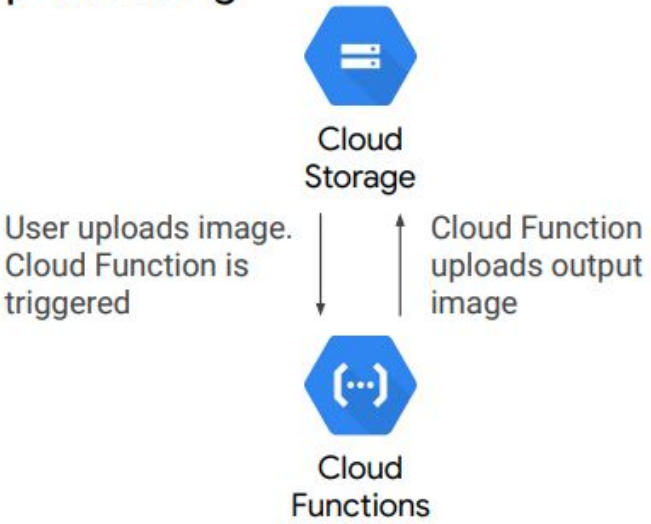
- Service boundaries match business boundaries
- Codebase is modular
- Each service can be independently updated, deployed, and scaled

Perform asynchronous operations

Keep UI responsive; perform backend operations asynchronously

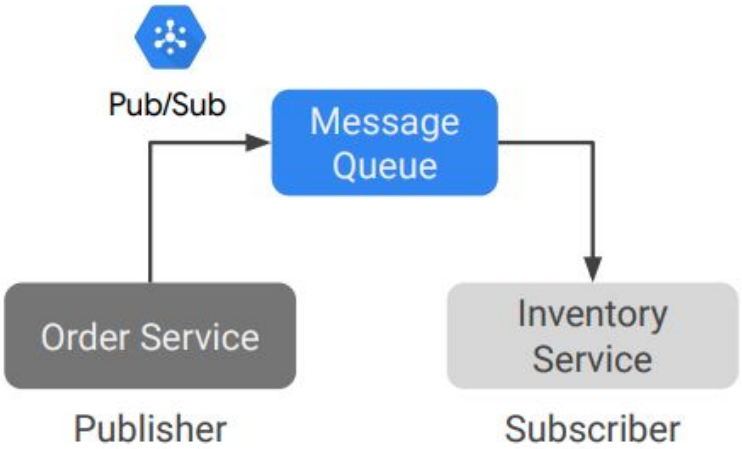


Use event-driven processing

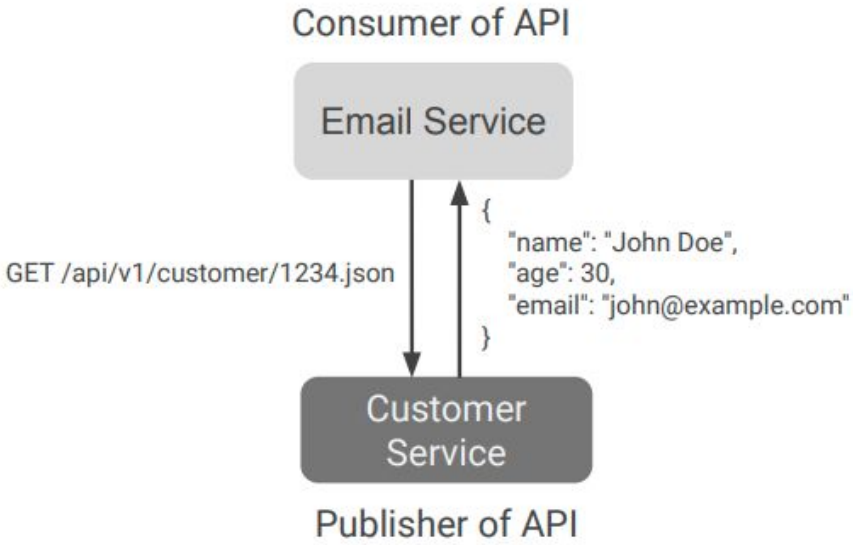


Design for loose coupling

Publishers and subscribers are loosely coupled



Consumers of HTTP APIs should bind loosely with publisher payloads



Implement stateless components for scalability

Worker pattern

Workers perform compute tasks without sharing state

Workers can scale up and down reliably

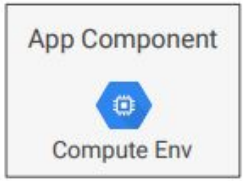
IoT data streams into a Pub/Sub topic. Cloud Function is triggered.

Pub/Sub

Cloud Functions

Pub/Sub

IoT data streams into a Pub/Sub topic. App component subscribes to messages from topic.

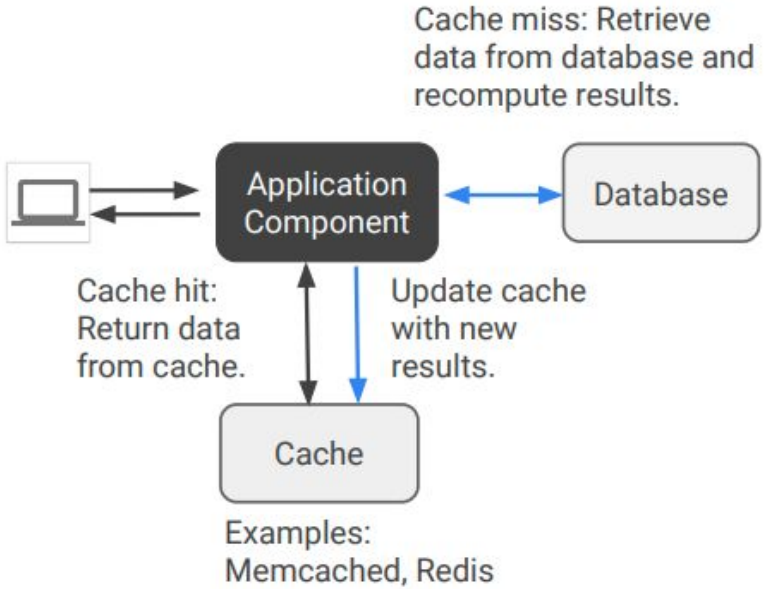


App component processes, transforms, and stores data.

Datastore

Cache content

Cache application data

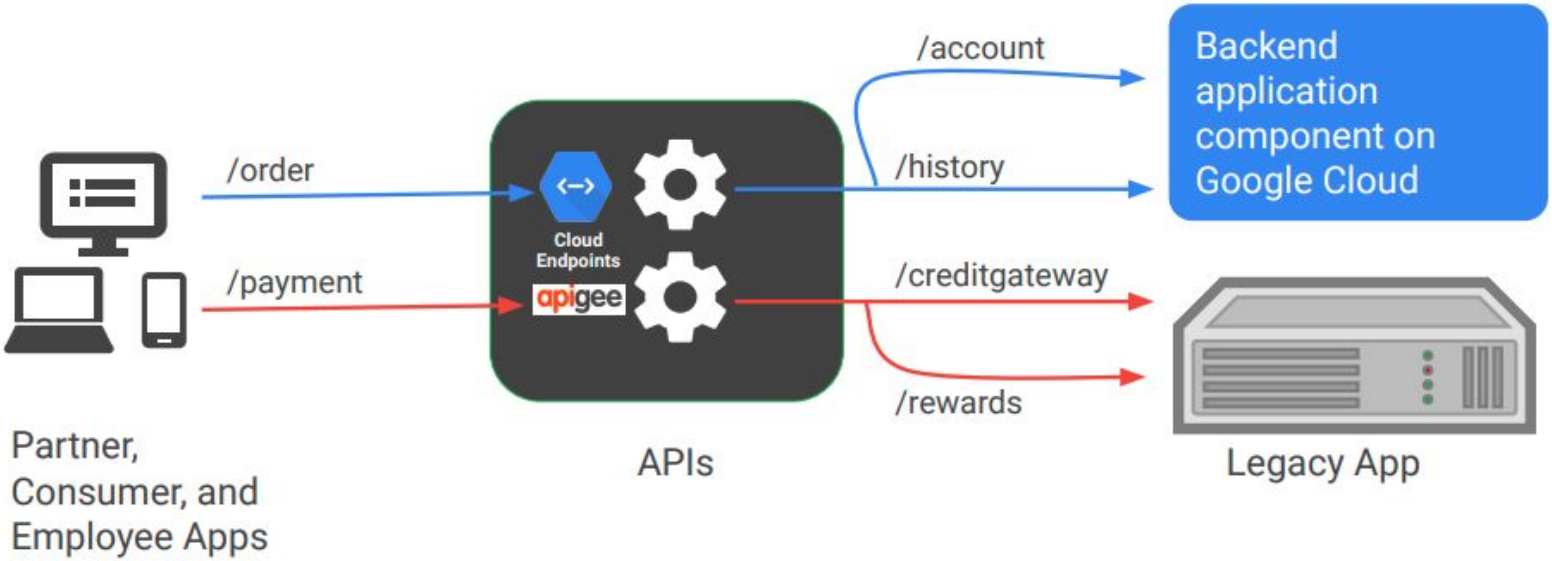


Cache frontend content

Cloud CDN

- Cache load-balanced frontend content that comes from Compute Engine VM instance groups
- Cache static content that is served from Cloud Storage

Implement API gateways to make backend functionality available to consumer applications



Use federated identity management

Sign in with Google

Sign in with Facebook

Sign in with Twitter

Sign in with GitHub

Sign in with email

Identity Platform

Authenticate users by using external identity providers.

App Dev: Adding User Authentication to your Application - Python

1 hour 5 Credits 

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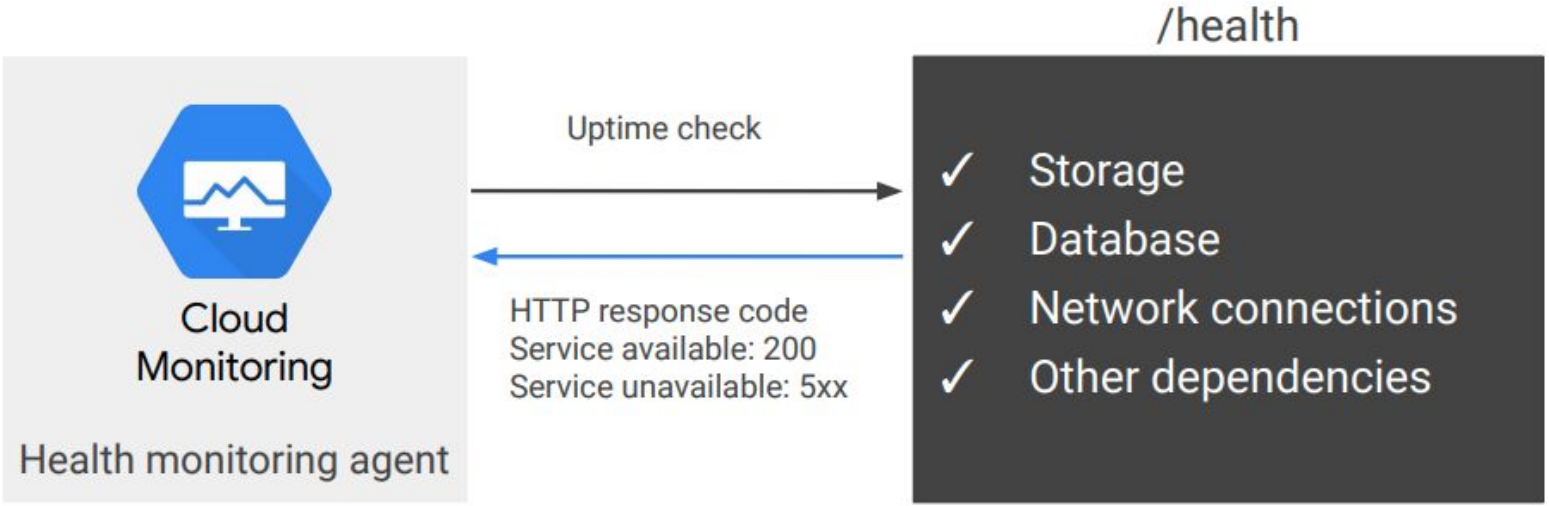
Implement health-check endpoints



Set up logging and monitor your application's performance

App Component
`print`

App Component
`console.log`

App Component

Google Cloud's operations suite

- Debugging
- Error reporting
- Tracing
- Logs-based metrics
- Monitoring

Handle transient and long-lasting errors gracefully

Transient errors:

Retry with exponential backoff.

Service availability errors:

Implement a circuit breaker.

Perform high availability testing and develop disaster recovery plans

In addition to functional and performance testing, perform high-availability testing and develop disaster recovery plans.

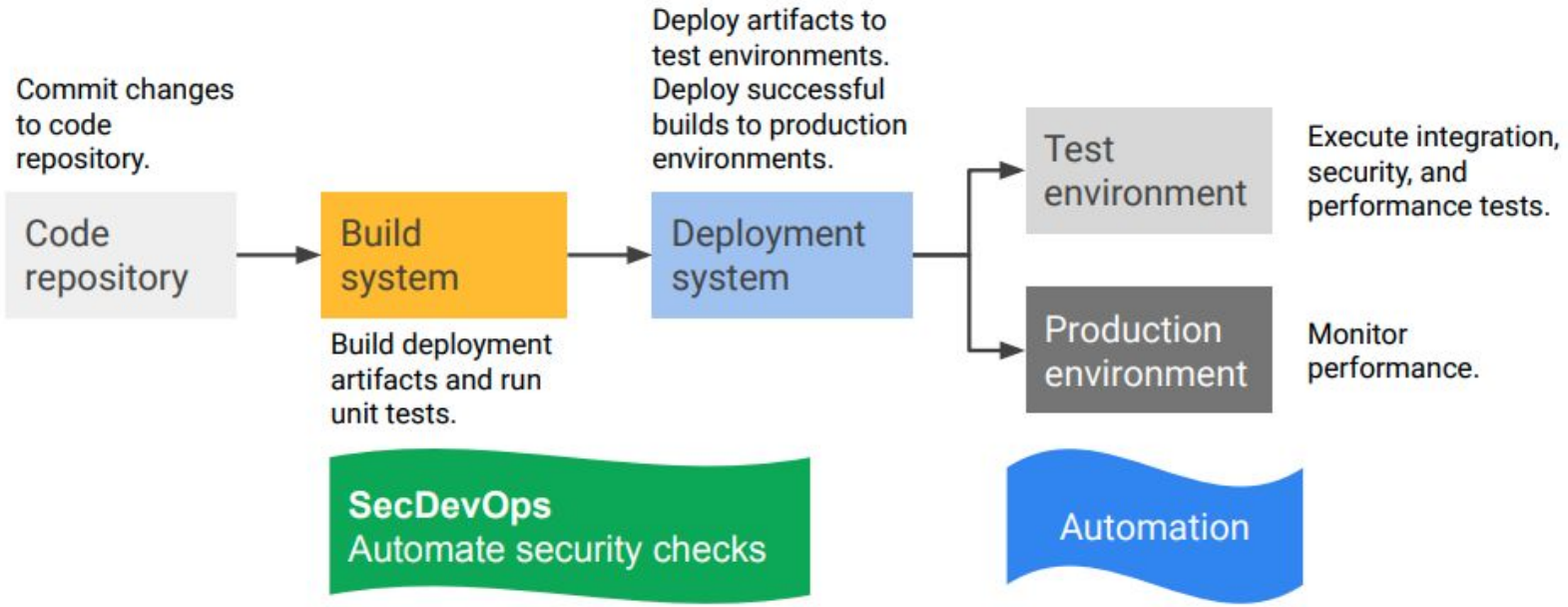
- Identify failure scenarios.
- Create disaster recovery plans (people, processes, tools).
- Perform tabletop tests.

- Perform canary testing and blue/green deployments.
- Validate your disaster recovery plan.

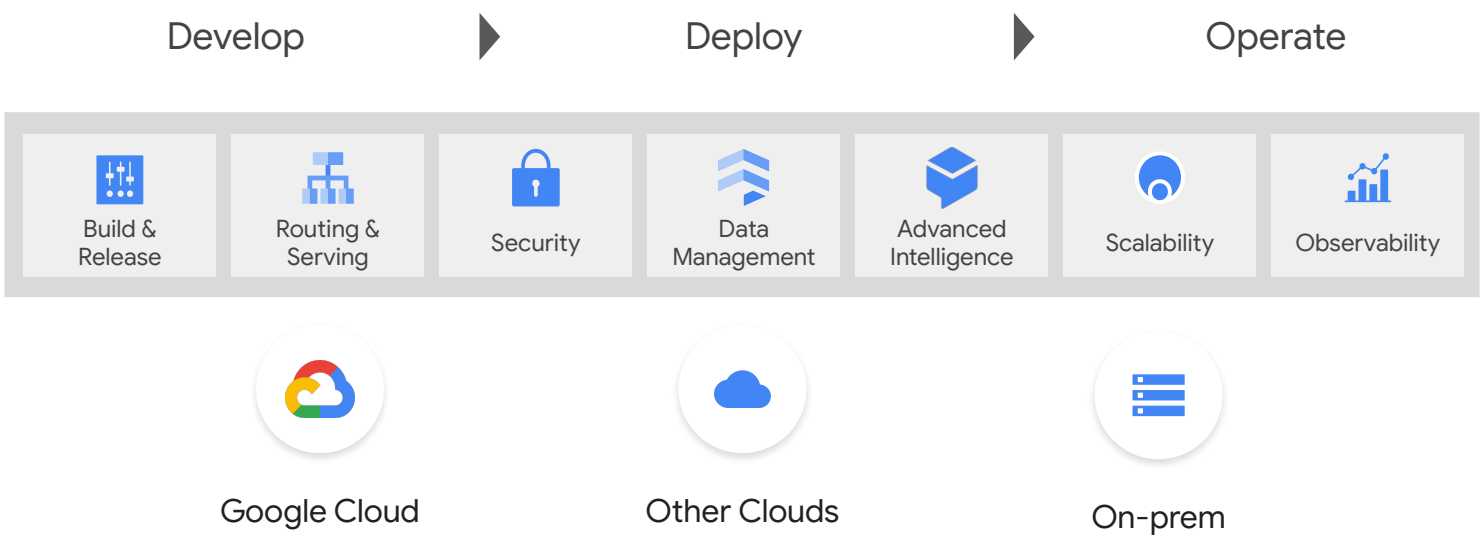
Example failure scenarios:

- Connectivity failure
- On-premises data center or other cloud-provider failure
- Google Cloud zonal or regional failure
- Deployment rollback
- Data corruption caused by network or application issues

Implement continuous integration and continuous delivery pipelines

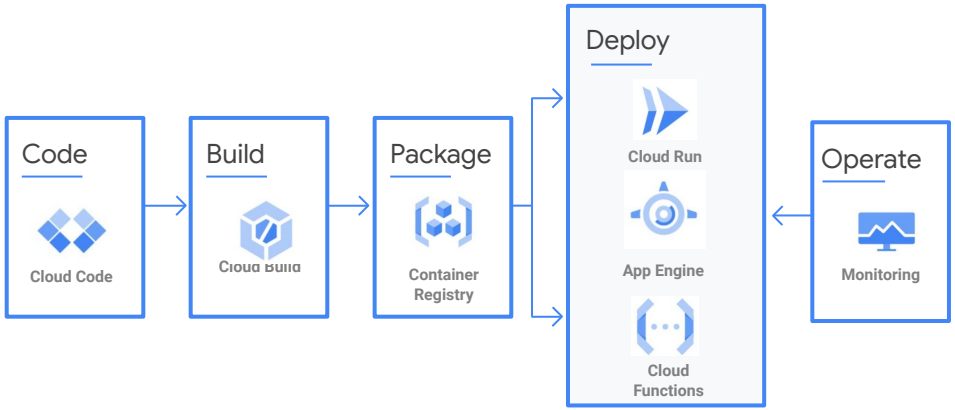


Google Cloud enables faster and more secure development, deployment and operations with serverless



Build scalable APIs in an environment built for developers to succeed

A fully managed environment to code, build and deploy applications with built-in security, autoscaling and ops management for faster deployments



- Run your code and deploy in seconds
- Streamline CI/CD
- Zero-config deployments
- No server management
- Automatically scaling to support traffic spikes without provisioning, patching, or monitoring

App Dev: Deploying the Application into Kubernetes Engine - Python

50 minutes 1 Credit

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App Dev: Developing a Backend Service - Python

1 hour 20 minutes 7 Credits 

GSP187

Google Cloud Self-Paced Labs

App Dev: Storing Application Data in Cloud Datastore - Python

50 minutes 5 Credits

GSP184

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