

Geostore Technical Infrastructure

Components

Load Balancer

The Load Balancer is the initial point of contact of requests coming from the internet. Its primary responsibility is to route requests to an available server. If all current servers are busy processing requests, then it decides whether it is better to wait for a server to become available or to provision (turn on) another server to handle the additional requests. This is crucial for maintaining consistent optimal system performance whether in light or heavy load.

App Engine Frontend Servers

The App Engine Frontend Servers contain and run the application logic. These servers are responsible for handling all requests coming from the internet. The following operations are handled by the App Engine Frontend Servers, amongst others:

- User Registration, Login, and Authentication
- Determining whether a user has permissions to perform a requested operation or to access a specific resource
- Serving and rendering web pages
- Powering the Geostore API

Memcache

The Memcache component is a volatile high-speed storage cache. This is used for temporarily storing frequently used information in order to speed up data retrieval operations that would have otherwise taken a little longer if the data had to be retrieved from the database every time. The primary purpose of this component is for decreasing the time it takes to process requests that need information from the database.

Cloud Storage

Static content such as images, kmls, and other files are stored in the Cloud Storage component. This provides a secure, reliable, and high-availability file storage and retrieval service with storage redundancies, multiple datacenter replications, and distributed delivery infrastructure.

The following static content is stored and served by the Cloud Storage:

- Images
- KML & KMZ Files
- PDFs, Word Documents, Excel Sheets, and other Files

Cloud Datastore

Dynamic content such as users, projects, and other system data are stored in the Cloud Datastore. It provides a reliable and scalable database service that can maintain consistent performance even as the database scales to a huge size. The Cloud Datastore is designed for scalability, and is the perfect service for storing huge amounts of dynamic data that need to be accessed, retrieved, and queried frequently.

The following dynamic content is stored and served by the Cloud Datastore:

- User Data
- Projects Data
- Static Content Metadata (Eg. latitude & longitude coordinates of an image file, the project which a KML/KMZ file is linked with)

Task Queues

The Task Queue is where requests that take a longer time to process are placed. This could also include requests that don't necessarily need to be done while the user waits for a response to their requests. The following operations are placed in the Task Queues for background batch processing:

- Sending Emails for Notifications, Registration Verification, and other Emails
- Batch updates of data

App Engine Batch Servers

The App Engine Batch Servers are responsible for handling background batch processing of requests placed in the Task Queues. These Servers automatically scale up to handle a large amount of requests when there the Task Queues are filled up with many pending requests. It also automatically scales down when the Task Queues have few pending requests or when it is empty.

Conclusion

Overall, the Geostore Technical Infrastructure balances the multiple important goals of running the Geostore System. It provides a high-level of security, reliability, consistent performance at a large scale, and manageable costs. In this way, the Geostore System can successfully operate and empower its users to be able to further perform their duties and responsibilities in a more effective and efficient manner.