Google App Engine

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Google App Engine

- Your App, Their Engine
  - Upload and run your app on Google's infrastructure.
  - App Engine does not offer you a virtual machine, but a scalable container in which your application runs

- Let them manage your app. Why?

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Lots to worry about

- *Server management*
- *Scaling*
- *Load Balancing*
- *Database Administration*

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Abstractions & Features

<!-- Focus on your idea, your code --->

Easy to use

Quick Deployment

No Commitment

Automated Scale up – Scale down

Good Quotas for average usage.

Languages and Frameworks

Frameworks Supported

- Django
- Webapp2
- Flask

Storage Options

- NoSQL Datastore
- Cloud SQL

Languages Supported

- Java
- Python
- Go
- PHP

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IS
SILENT.
TONE

On towards hello world...

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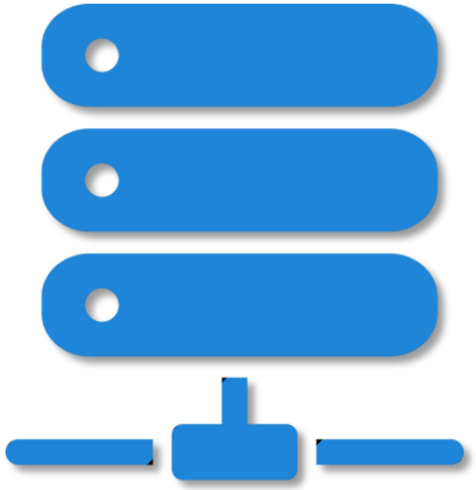
Some Basics

Server

Merely a software/hardware which accepts requests from someone and replies accordingly.

Our App



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Client

With reference to a server, someone who sends a request to the server is a client.

Our Browser

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Interaction

Protocol to send data between server and client.

HTTP

- Browser to App – Request
- App to Browser - Response

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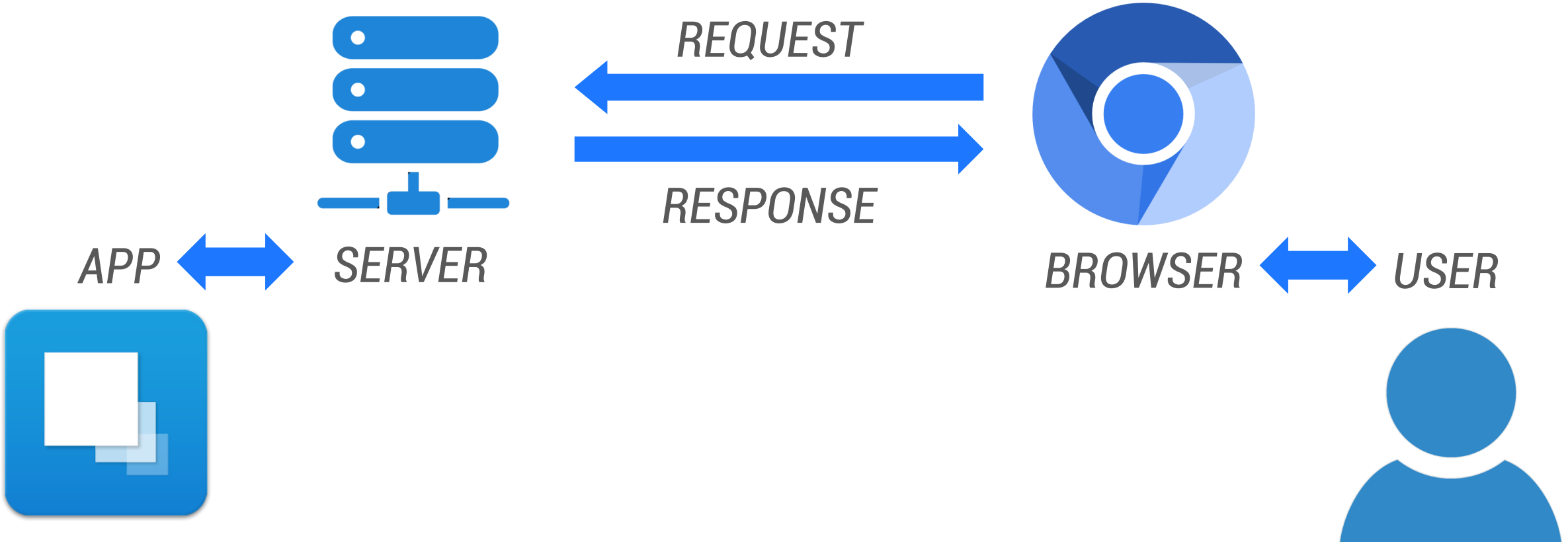
HTTP

Transfer of resources

- Request / Response
- Demarcation of content type
- Cookies
- Content

Complete Picture



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Lets get you all set up. [Go]

<PS: shortest valid english sentence
PS: Also a programming language>

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User to Browser

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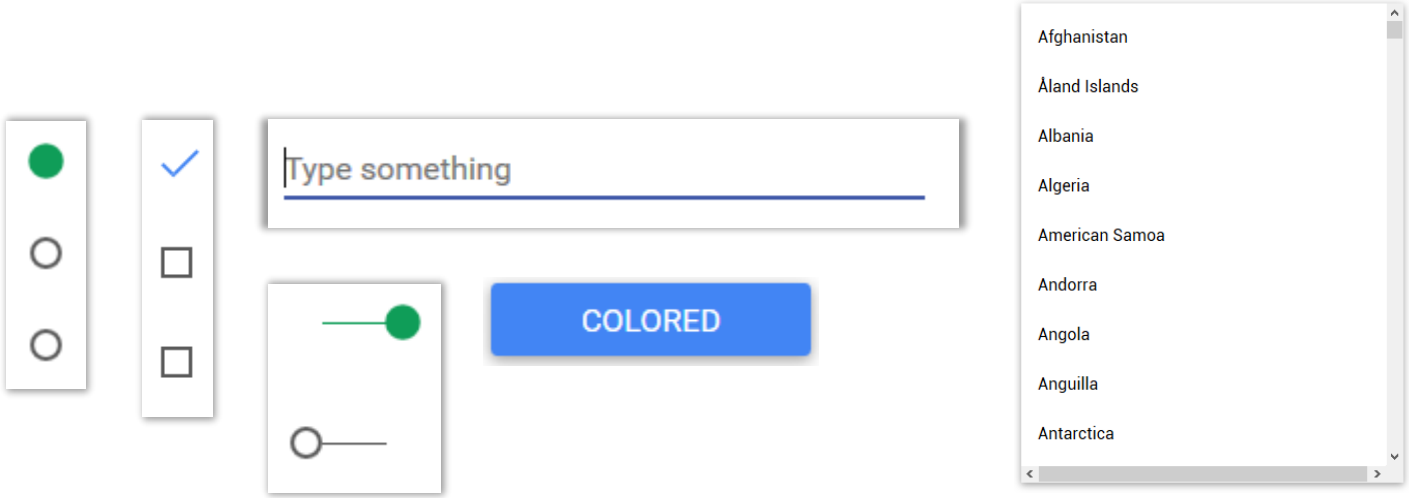
<Input>

- Input field for data entering.
  - Type
  - Name
  - Value
- Multiple Types

```
<input type="text" name="q" value="search">
```



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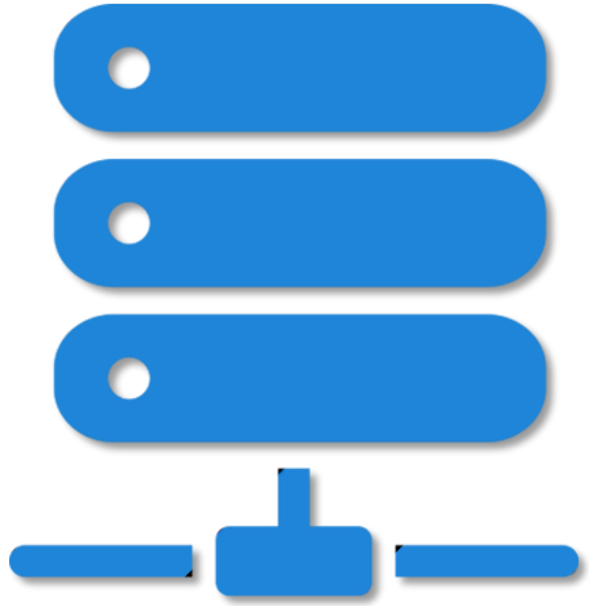
Browser to Server



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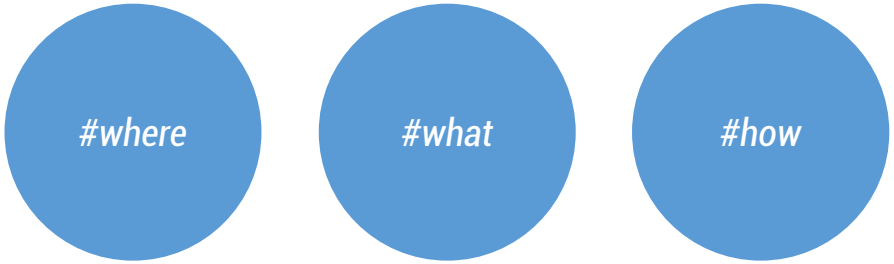
<Form>

Most basic way to send data to app

```
<form>
<input type="text" name="q" value="search">
<input type="text" name="q" value="search">
<input type="text" name="q" value="search">
</form>
```



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- *The ACTION attribute*

- *What URL you want the form to be submitted at?*
  - *Can be anything, provided the app behind the URL accepts a form input*

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#what

- *Associates value entered to variables*
- *Importance of Name parameter*

```
<input type="text" name="q" value="search">
```

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#how

-GET-

On the URL

“Ask for something”

Out in the open

<default>

-POST-

In the Content

“Update/Change something”

Hidden

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Now that the necessities are out of the way, let us move on to....

Our App - *Thoughtpad*

An app to scribble and retrieve.

i. Form
ii. Form Submission
iii. Form Data Validation
iv. Data storage (insert)
v. Data retrieval (query)
vi. Data association with user (login/logout)

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Get vs Post Method

Preventing being Trolled

- Let the text field input be –

```
</p> <input type = “submit”> Haha trolled your page.
I’ll break into your app <em> soon! </em>
```

- Why?

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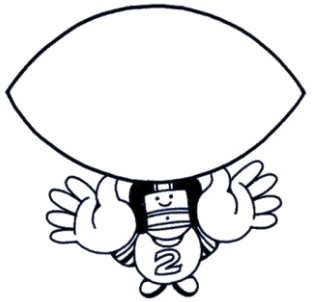
HTML Escaping

Similar to adding “ in printf(“ ");

Browser doesn't know what is text and what is HTML.

Only demarcation is the *Content-Type* header.

CGI Library to the rescue



Playing Catch with Data

- The form takes data on the **/edit/** page.
- Data thrown as a post to **/** page
- Need a post handler on **/** to catch the data.

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Templates

- Easy to deploy HTML
- Creates a distinction between Frontend - Backend
- Makes the code cleaner, more abstract.
- Editing HTML Easier
- Auto escaping
- Advanced functions like Loops present.
  - out of scope for today

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Storing Data

- Our app now needs to move beyond one post being passed around in HTTP Request.
- Need to preserve data
- Database management System

  - GAE does not allow Global Variables.

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Querying Data

Select FROM

WHERE

- And
- Or

ORDER BY

....

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Appending Data

- Insert
- Delete
- Update

Advanced DB Management

- Scaling
- Duplicating
- ...
- All while Preserving ACID

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Google App Engine Datastore

- NoSQL
- On the cloud
- Dynamic Row Add/Drop
- Automatic Indexing
- No constraint on storage
- Constraint on querying
- Queried by *GQL*

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GQL

- Simplified SQL exclusive to GAE Datastore
- Used only to Query the datastore.
- No Joins

Creating GAE Table(s)

- Like declaring a class

```
class Thoughts(ndb.model):
    name = ndb.StringProperty()
    thought = ndb.StringProperty(required = True)
    created = db.DateTimeProperty(auto_now_add = True)
```

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Populating the DB

- Insert

```
entry = Thoughts(name = name, thought = text)
entry.put()
```

Querying the DB

- Using GQL
  - Query Language only for GAE Datastore

```
posts = ndb.gql("SELECT * FROM Thoughts ORDER BY created DESC")
```

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Database Keys

- Auto assigned
- Can be made URLSafe, not secure however.
- Can Retrieve entity from

Cookies

- HTTP is a stateless protocol.
- Server can't track a client over multiple requests. Good for anonymity. But for normal harmless usage?
- Cookies help track a client over multiple HTTP requests

Logging on to Google

- Can open same Gmail across tabs. Or across HTTP Requests
- Cookie stored on Browser. Tracked via Server
  - Can be deleted by the user.
  - Can be disabled by the user.

Cookie

- Small messaged passed around in HTTP Headers.

Google.com Cookie:

```
PREF=ID=9dc1d7062ae5fd16:FF=0:TM=1336504404:LM=
1336504404:S=KVV_FUsYL5CImBd4; expires=Thu, 08-
May-2014 19:13:24 GMT; path=/;
domain=.google.com
```

Basic Cookie Implementation

```
Self.response.headers.add_header('Set-Cookie', 'visits=10')
```

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Under the hood

```
document.cookie
document.cookie "visits=10000"
```

Voila!

Need to protect

- #ing.
    - Okay no.
- Hashing
    - ROT13
    - MD5
    - HMAC
    - SHA256

The Google User

- You, Me, anyone with a Gmail ID.
- Alternate to sign in.
- Secure
- Extremely easy to handle.
- Properties
  - Nickname
  - Email address
  - UserID
  - ...

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Recognizing User in Thoughtpad

1. Pass around current google user in cookie.
2. Use cookie to put google user in database
3. While querying, retrieve posts of the current google user

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