Python API Description Generator

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Overview

- API Descriptions

- Project Description

- Implementation

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- Summary

API Descriptions

• Provide an overview of different services offered in web apps

• Makes it easier for developers to write code that interfaces with existing web apps

- API has a name

- API has at least one base URL

- API has at least one resource

- Each resource has at least one operation

- Each operation has a HTTP method

- There are no references to undefined types

- There are no references to undefined input bindings

Project Description

- API description generator
  - Written for Google App Engine web apps
  - Python 2.7
  - Uses a combination of dynamic parsing (Python decorators) and static parsing

Implementation

- Python decorators
  - Methods or classes that allow modification of code in functions or classes
  - Identified with a '@'
  - Takes an instance of a method or class object and returns the (possibly) modified object
  - Our decorator identifies method and class information and parses the given docstring
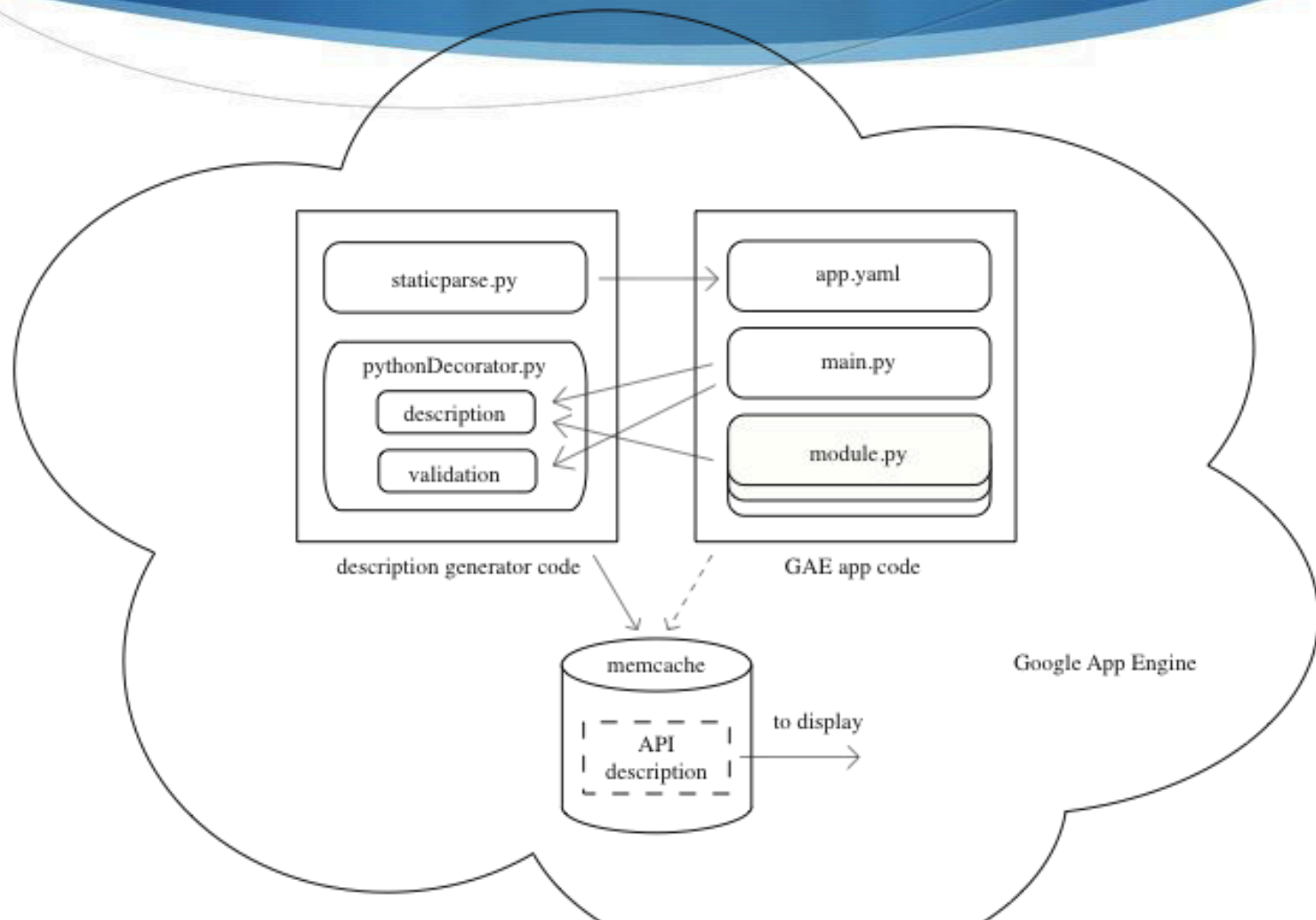
Implementation

- Static parsing
  - Takes advantage of the format of the app.yaml file
  - Parses for the name, description, version, etc. of the application
  - Done once the first time the decorator is called

Implementation

- Dynamic parsing
  - Docstrings obtained from the method or class object passed to the decorator
  - In a (method-less) class, parses for attributes
  - In an HTTP method, parses for arguments, input bindings, return types, and exceptions
  - Generates resources (classes of methods), operations (HTTP methods), and data types (method-less classes)

Service Architecture

Implementation

- API description stored in a dictionary in memcache
  - Expires in 1 hour
  - Because description is generated dynamically as each method is invoked, developer must click through all logical paths
  - Description retrieved by adding '/options' to base URL
    - If valid, converted to a JSON object and displayed as a web page
    - If invalid, displays error message(s)

Demo

Summary

- Challenges faced
  - Python—dynamically typed
  - Lack of standards for API descriptions

- Future work
  - Obtain more information about API
  - Extend to support non-GAE apps
  - Automate testing

References

- Google App Engine: https://developers.google.com/appengine/docs/python/overview

- webapp2 framework: http://webapp-improved.appspot.com

- Python 2.7: http://www.python.org/doc

- Source code: https://github.com/chatkeon/cs263

- Project documentation: https://apidescription.readthedocs.org/en/latest

Thank You