Intro to Google Cloud Endpoints

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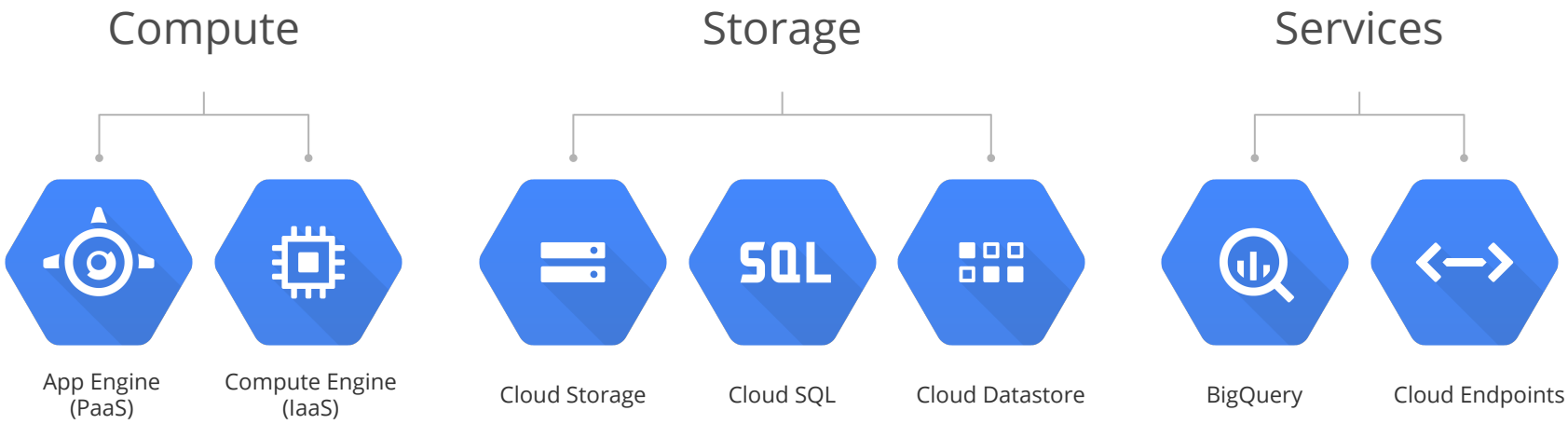
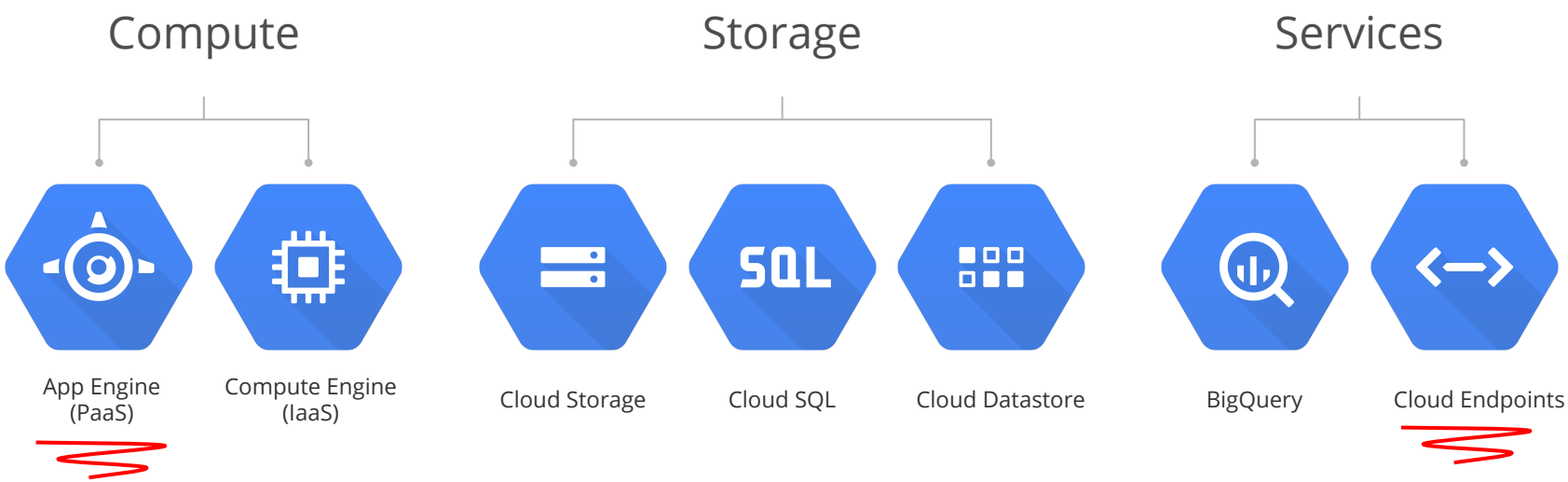
extrema

Google Cloud Platform



Google Cloud Platform



Cloud Platform solutions

You Manage Vendor Managed

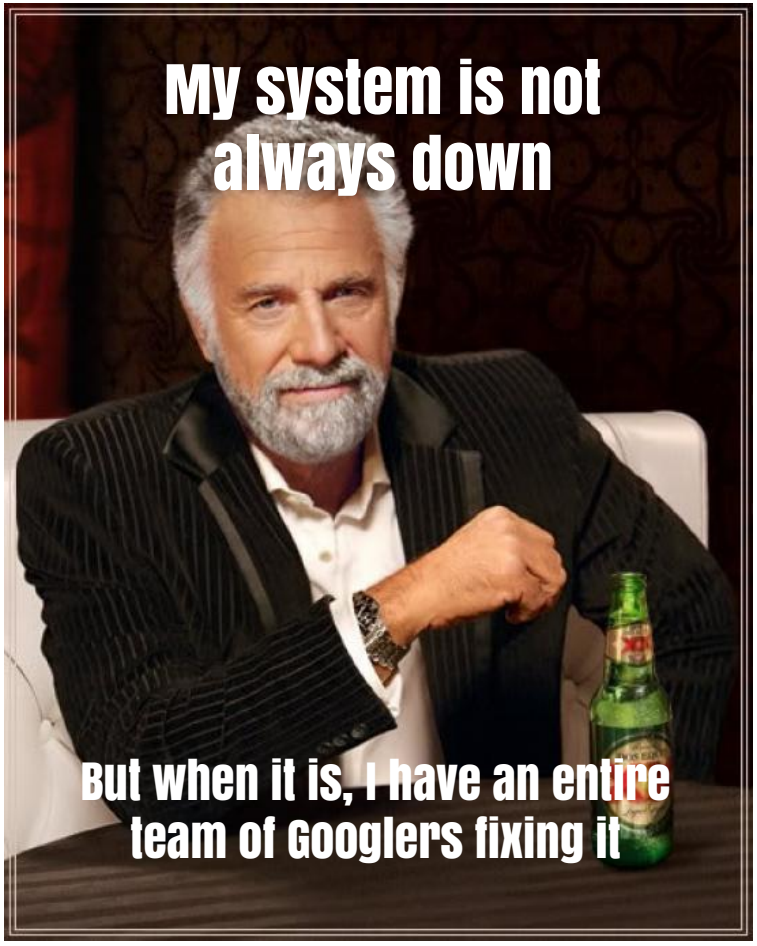
Packaged Software	IaaS Infrastructure-as-a-Service	PaaS Platform-as-a-Service	SaaS Software-as-a-Service
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

App Engine

If you don’t have a DevOps team to guarantee these:

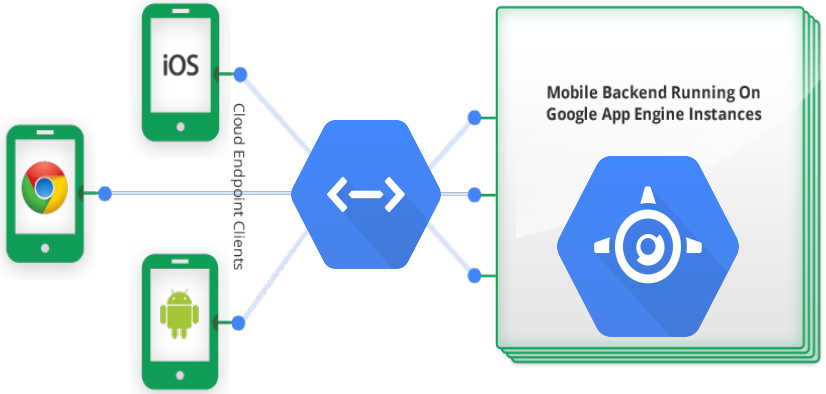
- Infinite scaling
- High availability.
- Transparent security upgrades.

and instead just want to focus on delivering new features, that’s what App Engine is for.

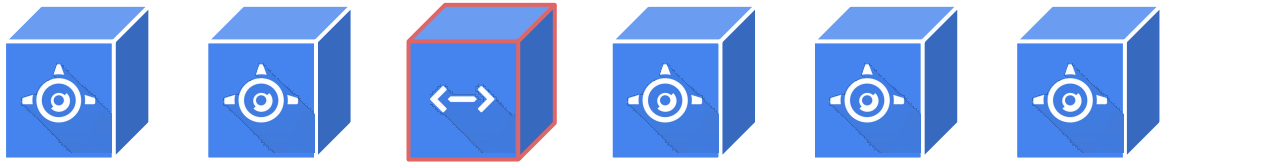

My system is not always down
But when it is, I have an entire team of Googlers fixing it

Cloud Endpoints runs on App Engine

- Generates REST API automatically
- JS, Android and iOS client libraries
- Server/Client communication is hidden
- Runs on same powerful infrastructure, scales infinitely



Your API


Memcache
UserService
Your API
MailService
ImageService
DatastoreService

Creating an Endpoint

- Create a class (e.g. MyAPI.java)
  - Also available on Python

- Annotate it with @Api and set metadata to be used for the generated client library

```
@Api(name = “MyAPI”,
    namespace = @ApiNamespace(ownerDomain=”foo.com”, ownerName=”bar”),
    version = “v1”)
public class MyAPI {
}
```

- You already have an empty Endpoint!

Adding methods to our Endpoint

- Create the method

- Annotate it with @ApiMethod. We can specify
  - Path: if we want our API to be called directly using URIs
  - Name: we can change URIs without affecting our client code
  - HTTP method: like any REST service

```
@ApiMethod(path="helloworld", name="helloworld", httpMethod=HttpMethod.GET)
public String hello() {
          return “Hello World!”;
     }
```

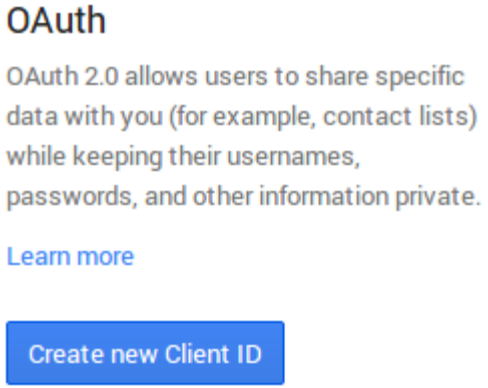
Adding Client ID

We have an Endpoint, but there is no client available to use it

We can configure different client IDs to call our API

We have to:

1. Create the ID on Google Developers Console
   `“Apis & Auth” -> “Credentials” menu`
2. Add the generated ID to our @Api configuration



Registering a Web Application (JS)

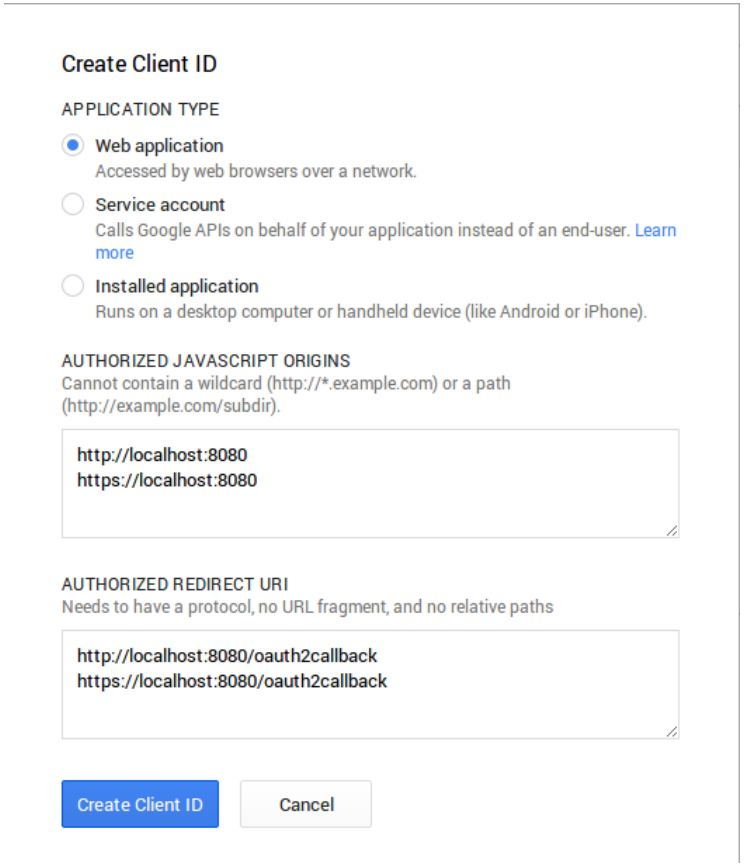
Set the app type to “Web Application”

“Authorized Javascript Origins” specify websites that can use the generated key

Usually, localhost and our domain

Be aware of HTTP and/or HTTPS

“Authorized redirect URI” sets valid URIs to redirect after doing OAuth login



Adding the Web Application ID

To add the previously created ID to our configuration, go to @Api config and set the clientIds attribute

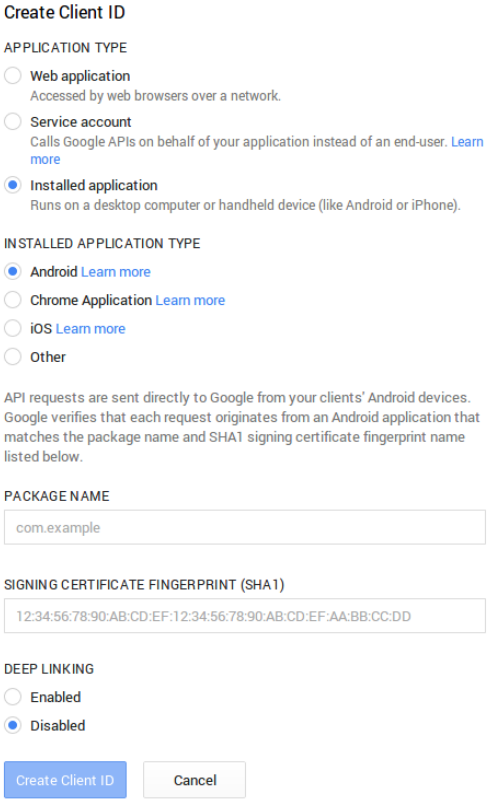
```
@Api(name = “MyAPI”,
    namespace = @ApiNamespace(ownerDomain=”foo.com”, ownerName=”bar”),
    version = “v1”,
    clientIds = { “960794397679-78s0s8v.apps.googleusercontent.com” })
public class MyAPI {
}
```

Now, we can call the API from JS (See later)

Registering an Android Application

Set the app type to “Installed Application” and type to “Android”

Now, we only have to specify our Android application base package and the fingerprint of the app certificate



Adding Android Application ID

To add the Android ID to our API, go to @Api config and add it to the “clientIds” attribute. Also, you need to set the “audiences” attribute to any Web Application ID

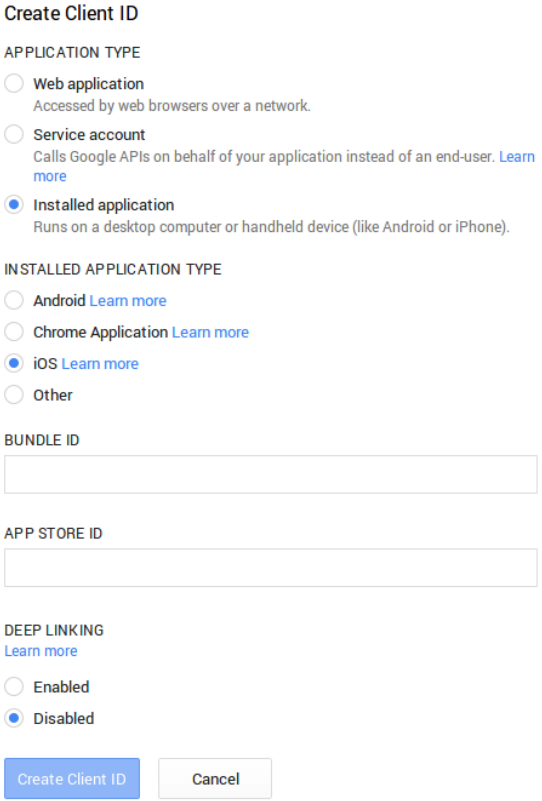
```
@Api(name = “MyAPI”,
    namespace = @ApiNamespace(ownerDomain=”foo.com”, ownerName=”bar”),
    version = “v1”,
    clientIds = { “960794397679-5qkdoj0.apps.googleusercontent.com” },
    audiences = { “960794397679-78s0s8v.apps.googleusercontent.com” })
public class MyAPI {
}
```

Registering and adding an iOS Application

Set the app type to “Installed Application” and application type to “iOS”

Now, we only have to specify our iOS application bundle ID and AppStore ID

To finalize, add it to @Api “clientIds” attr



Adding OAuth authentication

At the moment, we can create an API that can be invoked from JS, Android and iOS. Now we can add security.

To add OAuth2 authentication we must specify:

1. OAuth2 scopes with the user info we want to retrieve
2. Which methods require authentication control

Adding OAuth Scopes

Set the scopes attribute

```
@Api(name = “MyAPI”,
    namespace = @ApiNamespace(ownerDomain=”foo.com”, ownerName=”bar”),
    version = “v1”,
    scopes = { “https://www.googleapis.com/auth/userinfo.email” })
public class MyAPI {
}
```

For a list of available scopes, visit https://developers.google.com/+/api/oauth#login-scopes

Registering OAuth protected methods

Just add a com.google.appengine.api.users.User argument to your method and it will be injected

```
public String helloworld(User user) { … }
```

If there is no authenticated user this param will be null, so it must be checked

```
if (user == null) {
     throw new OAuthRequestException(“This method is protected!”);
}
```

Complete Endpoint example

```
@Api(name = “MyAPI”,
    namespace = @ApiNamespace(ownerDomain=”foo.com”, ownerName=”instructormatters”),
    version = “v1”,
    scopes = {Constants.EMAIL_SCOPE},
    clientIds = {Constants.WEB_CLIENT_ID, Constants.ANDROID_CLIENT_ID, Constants.
 IOS_CLIENT_ID},
    audiences = {Constants.ANDROID_AUDIENCE}
)
public class MyAPI {

    @ApiMethod(path="helloworld", name="helloworld")
    public String hello() {
              return “Hello World!”;
         }

}
```

Client side

1. JS
2. Apps
    a. Android
    b. iOS

Client side - JS

We will use the same library Google provides for their own APIs
https://apis.google.com/js/client.js?onload=init

```
<script type="text/javascript">
    // init gapi
    window.init = function() {
        …
    }
</script>
<script src="https://apis.google.com/js/client.js?onload=init" async defer>
</script>
```

Client side - JS - Main features

Using the Google library, we need to know some basic features:

Loading an API (endpoints, oauth, ...)

```
gapi.client.load(api, version, callback [, apiRoot]);
```

API root refers to the url to obtain the API

```
e.g.: apiRoot = '//' + location.host + '/ah/api'
```

Client side - JS - Loading myAPI

```
<script type="text/javascript">
    // init gapi
    window.init = function() {
        var apisToLoad;
        var callback = function() {
        if (--apisToLoad == 0) {
                ...
        }
        }
        apisToLoad = 2; // must match number of calls to gapi.client.load()
        gapi.client.load('oauth2', 'v2', callback);
        gapi.client.load('myAPI', 'v1', callback, '//' + location.host + '/ah/api');
    }
</script>
<script src="https://apis.google.com/js/client.js?onload=init" async defer>
</script>
```

Client side - JS - Adding OAuth

To add OAuth support to our JS client side, we need three steps:

1. Load the API

```
gapi.client.load('oauth2', 'v2', callback);
```

2. Call the method to handle the auth flow

```
gapi.auth.authorize({ clientId, scope, immediate }, callback);
```

3. Retrieve the user info (if any)

```
gapi.client.oauth2.userinfo.get().execute(callback)
```

Client side - JS - Adding OAuth

```
window.init = function() {
    var apisToLoad;
    var callback = function() {
    if (--apisToLoad == 0) {
            gapi.auth.authorize(
                { client_id: WEB_CLIENT_ID, scope: SCOPES, immediate: true },
                authorizeCallback
            );
        }
    }
    apisToLoad = 2; // must match number of calls to gapi.client.load()
    gapi.client.load('myAPI', 'v1', callback, '//' + location.host + '/ah/api');
    gapi.client.load('oauth2', 'v2', callback);
}
```

Client side - JS - Adding OAuth

```
authorizeCallback = function() {
    gapi.client.oauth2.userinfo.get().execute(function(user) {
        if (user && !user.error) {
            // user is logged
            …
        } else {
            // anonymous user
            …
        }
    });
}
```

Now, let’s see how to call our API

Client side - JS - Calling myApi

To call the different APIs we need to use the following pattern:

```
gapi.client.{{API}}.{{methodName}}([params]).execute(callback)
```

Examples:

```
gapi.client.myAPI.helloworld().execute(function(resp) { … });

gapi.client.oauth2.userinfo.get().execute(function(resp) { … });

gapi.client.anotherAPI.entries.delete({ id: 2 }).execute(function(resp) { … });
```

Client side - JS - Calling myAPI

```
authorizeCallback = function() {
    gapi.client.oauth2.userinfo.get().execute(function(user) {
        if (user && !user.error) {
            // user is logged
            gapi.client.myAPI.securedMethod().execute(function(resp) { … });
            …
        } else {
            // anonymous user
            gapi.client.myAPI.unsecuredMethod().execute(function(resp) { … });
            …
        }
    });
}
```

Client side - Android

To use our API from an installed application (Android|iOS), we will need to generate a library. There are two ways of doing this:

- Using a Gradle task

```
gradle appengineEndpointsInstallClientLibs
```

- Using dependencies

```
compile project(path: ':my-server-project', configuration: 'android-endpoints')
```

Client side - Android - Instantiating our API

To create a new instance of our service, we have a Builder that needs:

- HttpTransport

  `AndroidHttp.newCompatibleTransport()`
- JsonFactory

  `new AndroidJsonFactory()`
- GoogleAccountCredential

  `GoogleAccountCredential.usingAudience(MyActivity.this, AUDIENCE)`

  `* AUDIENCE = "server:client_id:" + WEB_CLIENT_ID;  (Not Android ID!!)`

Client side - Android - Instantiating our API

Optionally, we can specify “rootUrl” property to the builder.

Useful to connect to our local server deployment instead of production.

```
// debug needs server address
if (BuildConfig.DEBUG) {
     builder.setRootUrl(getServerUrl() + "/_ah/api/");
}
```

Client side - Android - Calling our API

Once we have an instance of our API client, we just have to use it like with JS:

```
myAPIService.{{methodName}}.execute()
```

Examples:

```
String message = myAPIService.helloworld().execute(); // helloworld method name
Entry entry = myAPIService.entries().get().execute(); // entries.get method name
myAPIService.entries().create(entry).execute(); //entries.create method name
```

Client side - Android - Requirements

Requests to the API must be invoked on an async task

```
class HelloworldTask extends AsyncTask<Integer, Void, String> {
     @Override
     protected String doInBackground(Integer... integers) {
          …
          myAPIService.helloworld().execute();
          …
     }
     @Override
     protected void onPostExecute(String message) {
          …
     }
}
```

Client side - Android - OAuth authentication

The following Android permissions are required:

```
<uses-permission android:name="android.permission.GET_ACCOUNTS"/>

<uses-permission android:name="android.permission.USE_CREDENTIALS"/>
```

To log in, we will need the help of the AccountManager:

```
AccountManager am = AccountManager.get(MyActivity.this);
Account[] accounts = am.getAccountsByType(GoogleAuthUtil.GOOGLE_ACCOUNT_TYPE);
```

Client side - Android - OAuth authentication

To show the user the accounts picker:

```
Intent accountSelector = AccountPicker.newChooseAccountIntent(null, null,
                    new String[]{GoogleAuthUtil.GOOGLE_ACCOUNT_TYPE}, false,
                    “Select an account”, null, null, null);
startActivityForResult(accountSelector, 2222); // 2222 = Result of account select
```

When the user selects an account, the callback method will be invoked

Client side - Android - OAuth authentication

To receive the selected account:

```
@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
     super.onActivityResult(requestCode, resultCode, data);
     // if selected a Google account
     if (requestCode == 2222 && resultCode == RESULT_OK) {
          // Set the selected account.
          String accountName = data.getStringExtra(AccountManager.KEY_ACCOUNT_NAME);
          // Fire off the authorization check for this account and OAuth2 scopes.
          new AuthorizationCheckTask().execute(accountName);
     }
}
```

Why go with endpoints?

Pros:

- SSL is required
- Generate client library
- Android, iOS, JS
- Transparent OAuth2
- Hosted on App Engine: escalability, performance, managed
- Use as any other Google API

Cons:

- only *.appspot.com domains
- only JSON responses (you can use standard App Engine for the rest)
- only Java and Python
- Standard App Engine limits apply (like the 60s request timeout)

Misconceptions about deploying on App Engine

Storage options on App Engine

Google Cloud Datastore

Managed noSQL storage
Unlimited scale
Limited query capabilities
Entities < 1MB

Google Cloud Storage

Store big files in the cloud
Reliable storage
Encrypted at rest
Resumable uploads / downloads using HTTP

More storage options on App Engine

Google Cloud SQL

Managed plain ol' MySQL

Max database size is 500GB

BigQuery

Blazing fast analytics and reporting

Scales indefinitely (though you may want to break data in chunks for cost)

Can be used via API, command line or web interface

Cloud Storage

Cloud Datastore

Even more storage options on App Engine

Google Compute Engine

- Deploy your own storage solution using persistent disks: PostgreSQL, Redis, MongoDB, etc.
- Some of these are available using a preconfigured stack that can be deployed with a single click.
- Choose the type of storage: Standard Persistent Disks, SSD Persistent Disks, Local SSD Disks (upcoming).
- Choose size: bigger is faster.


Cloud Storage


Cloud Datastore

Cloud SQL


BigQuery

Yet Even more storage options on App Engine

Google Drive API

- Store your data in rows using Google Spreadsheets
- Store files in Google Drive

For Android

- Cloud Save: Save and load a small amount of data for each user (4 x 256KB)
- Saved Games: Like Cloud Save for games (since Jul 2014). Includes a default UI, and counts against the Drive quota of the user.

Storage options on App Engine

Cloud Storage

Cloud Datastore

Cloud SQL

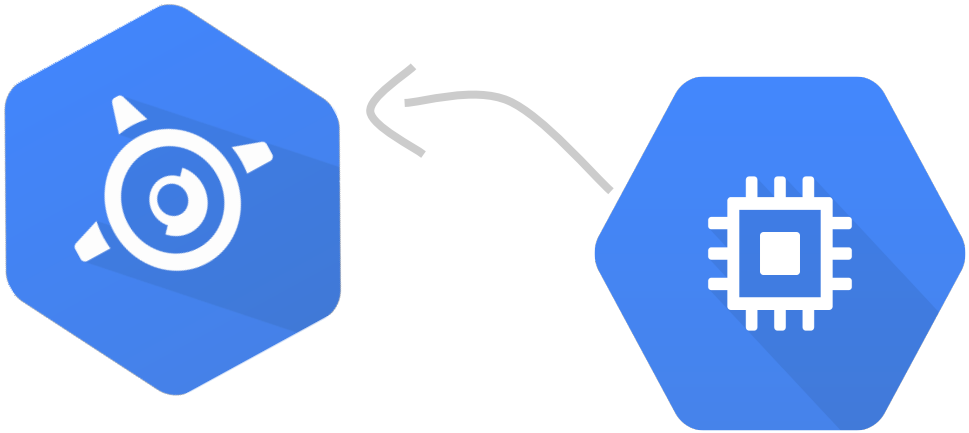
BigQuery

Compute Engine

Drive

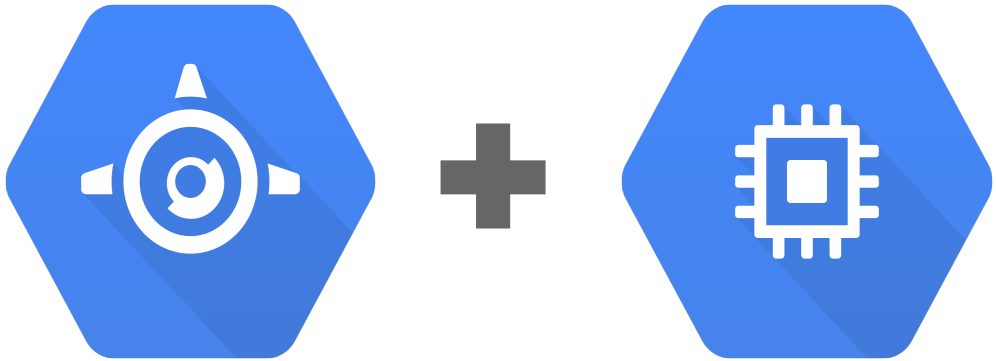
Android

Storage options on ~~App Engine~~ Compute Engine



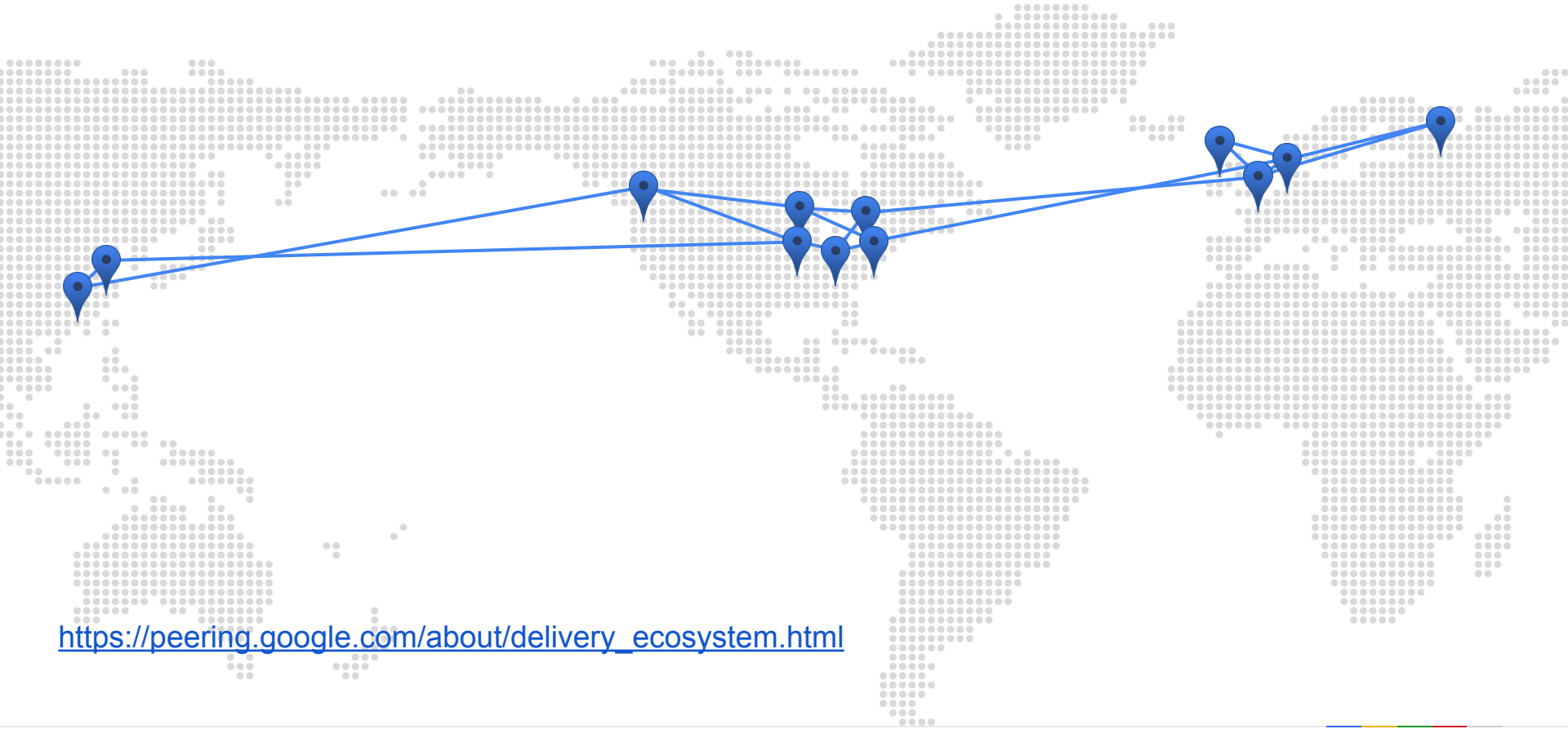
Cloud Storage Cloud Datastore Cloud SQL BigQuery Compute Engine Drive Android

Also works for hybrid applications



Cloud Storage | Cloud Datastore | Cloud SQL | BigQuery | Compute Engine | Drive | Android

Global network and Edge Cache



https://peering.google.com/about/delivery_ecosystem.html

HTTP 2.0 (based on SPDY)

- Up to 50% reduction in Page Load Time by reducing network latency
- Requires SSL (in practice) and is backwards-compatible
- Supported in all browsers (even Explorer)
- Learn if you are already supporting it: http://spdycheck.org/

Enabled out-of-the-box on App Engine

You don't have to do anything

Supported in other environments

Included with the latest Nginx

Adding **`mod_spdy`** with Apache

Q? A!

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extrema

CP300 IS HERE!

extrema

- The **Official Google Cloud Platform Course** is here in Europe!
- 5 days of the best training:
  - **App Engine, Compute Engine, Cloud Storage, Cloud SQL and BigQuery**
- Upcoming:
  - **Madrid**: January 2015
  - **Barcelona**: December 2014
  - Other cities coming soon!
- Register here.

GDG Spain

http://blog.extrema-sistemas.com/gdg-30/