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11
I/O

Apps, Add-Ins and More with Apps Script

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May 11th 2011

Apps, Add-Ins and More with Apps Script

Hashtags: **#io2011 #GoogleApps**

Feedback: **http://goo.gl/igDEm**

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Introduction

- Add-Ins
  - Extensions to Apps that provide integrated ‘glue-logic’
- Apps
  - Full scale applications, including user-interface
- Apps Script
  - Google’s cloud scripting service
  - Extends and automates Google Apps

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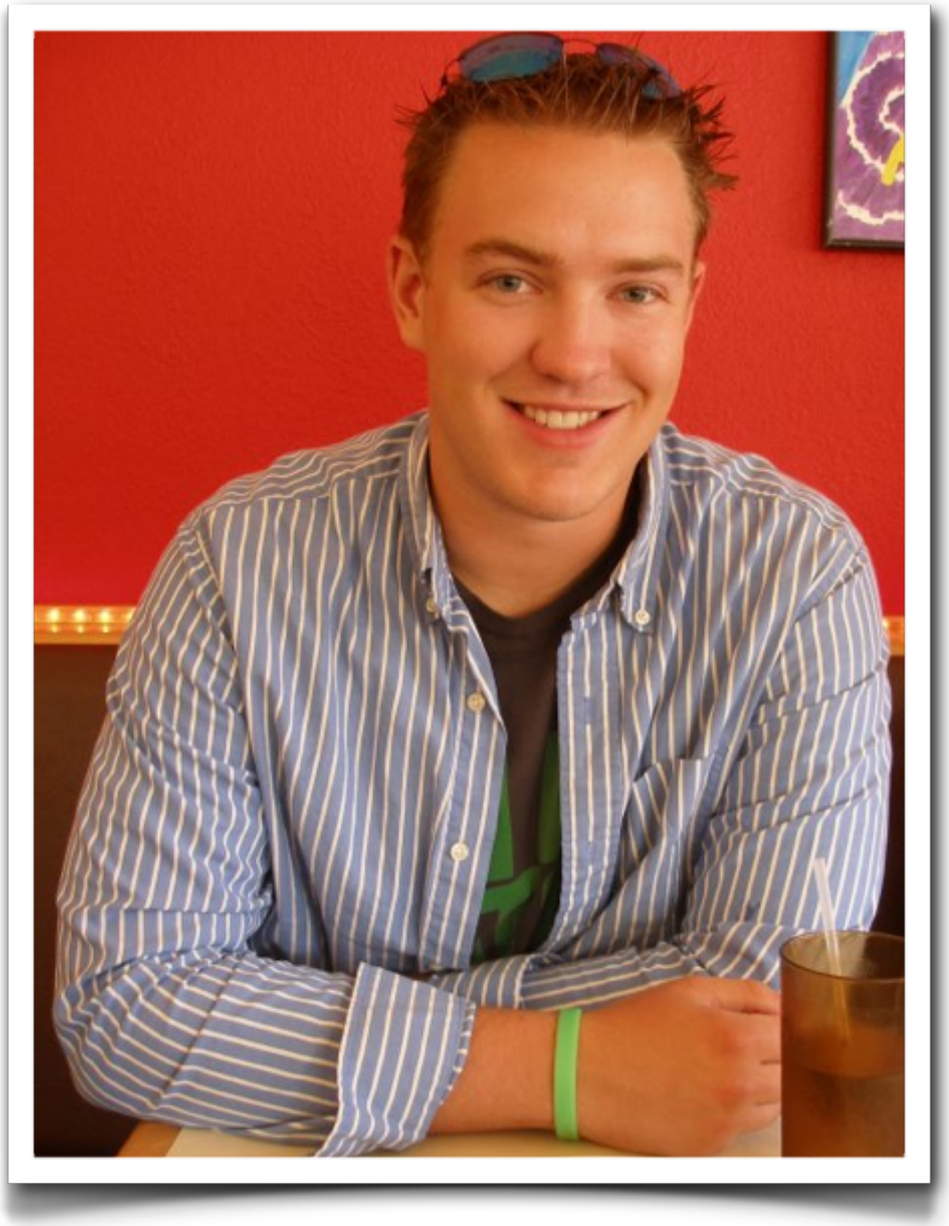
Bob...



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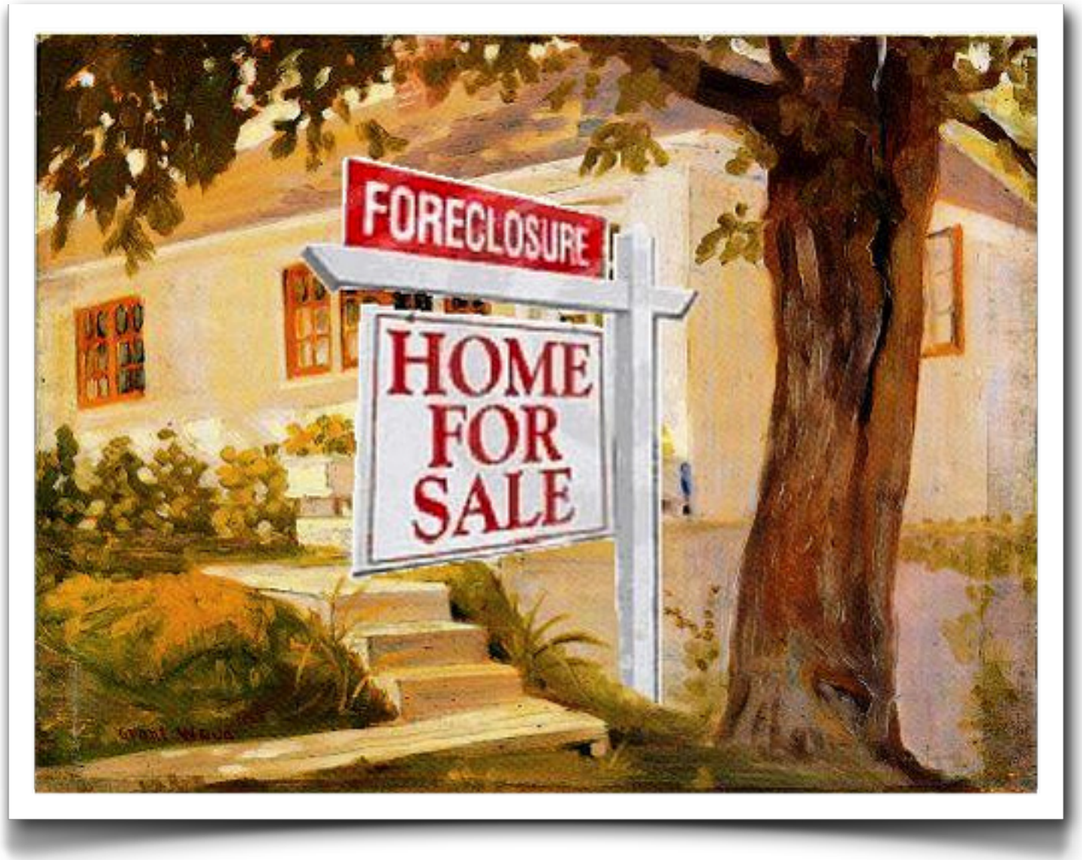
Mortgages...



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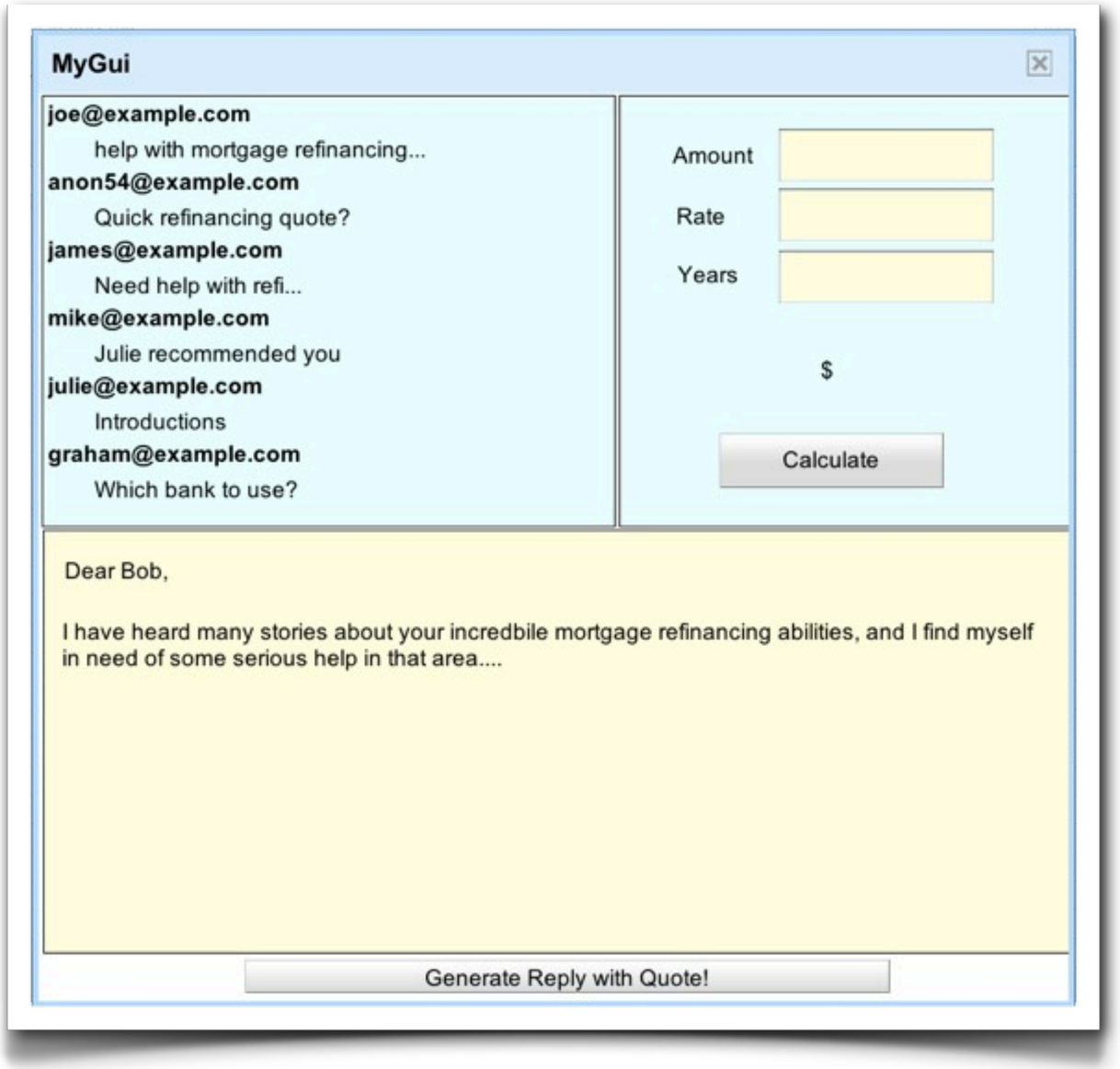
Agenda

- *Bob's Mortgage Calculator*
  - Debugging
  - WYSIWYG GUIs
  - Deploying Apps and Add-Ins
  - Reading Gmail
  - Writing Documents
  - Blobs and Conversions
- Making Apps More Interactive

Mortgage Refinancing



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Calculating Payments

```
// M = P [ i(1 + i)^n ] / [ (1 + i)^n - 1]
function calcMonthlyPayment(principal, rate, term) {

  var n = term * 12;
  var i = (rate/100) / 12;
  var numerator = i * Math.pow((1+i),n);
  var denominator = Math.pow((1+i),n) - 1;

  return principal * numerator / denominator;
}

function test() {
  calcMonthlyPayment(100000, 4.0, 30);
}
```

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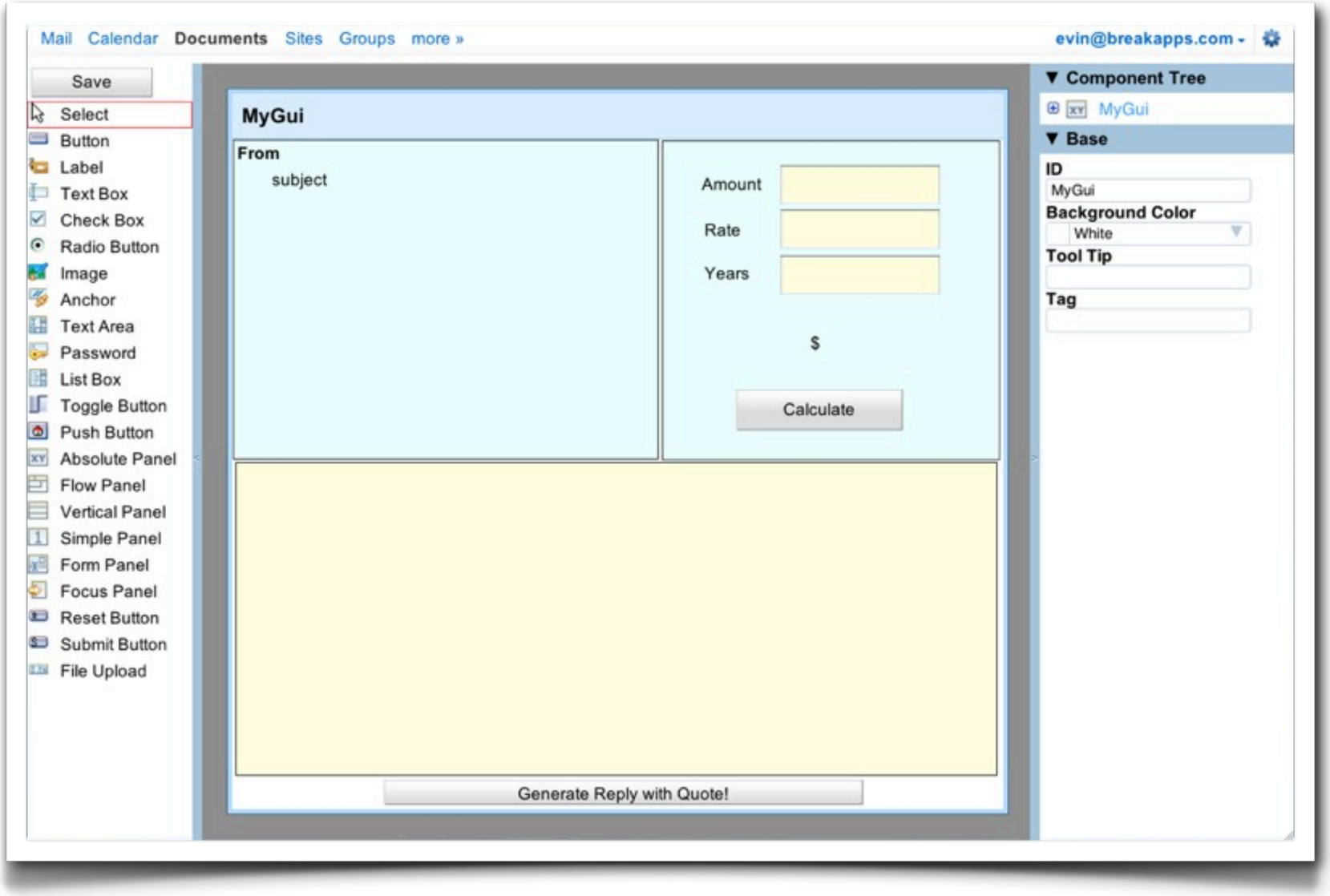
NEW!

Apps Script GUI Builder



What can the GUI Builder do for you?

- Build a user interface easily
- Decorate it later
- Script it as usual
- Deploy it fast

What can the GUI Builder do for you?

- Reduce development time
  - Iterate on the UI quickly as you write the script
- Reduce code size
  - Separate UI and styling from business logic
- Avoid common UiApp pitfalls
  - The Builder prevents common UiApp errors
  - If it works in the Builder, it will work in UiApp

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Building a GUI

- Building a UI is fast and intuitive
- *Application* design, not *website* design
- Real WYSIWYG, including browser quirks

Building a GUI - widgets and panels

- Draw or drag to create widgets
  - Use the same widgets as UiApp
  - And expect more widgets to be added
- Layout or group widgets with panels
  - Nested panels can create complex layout effects
  - Use flowing panels and % sizes for resolution independence
  - Try different resolutions without resizing your browser

Building a GUI - editing properties

- Each widget exposes only the properties it supports
  - Focus on exactly what you need
- Everything is checked as you type
  - If it works in the builder, it will work in your app
- Add event handlers directly from the Builder

Scripting GUI's - loading them in

- Load a Builder component with **loadComponent()**
  - 100% compatibility with UiApp
  - Components act as if you had typed in the code

- Show the app with this simple code

```
function doGet() {
  var app = UiApp.createApplication();
  app.add(app.loadComponent("MyGui"));
  return app;
}
```

Scripting GUI's - interaction with code

- Builder components can be edited in code

```
app.loadComponent("MyGui");
var widgetFromBuilder = app.getElementById("Button1");
widgetFromBuilder.setText("new text");
```

Scripting GUI's - interaction with code

- UiApp widgets can be added to Builder components

```
app.loadComponent("MyGui");
var panelFromBuilder = app.getElementById("Panel1");
panel.add(app.createButton("a new button"));
```


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Scripting GUI's - interaction with code

- You can even pull out parts of a component

```
app.loadComponent("MyGui");
var innerPanel = app.getElementById("Panel1");

// Only adding part of the component to the app
app.add(innerPanel);
```


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Scripting GUI's - interaction with code

- Or add the same component to the app twice

```
// The prefix is applied to all ids
app.add(app.loadComponent("MyGui"), {prefix: 1});
app.add(app.loadComponent("MyGui"), {prefix: 2});
```


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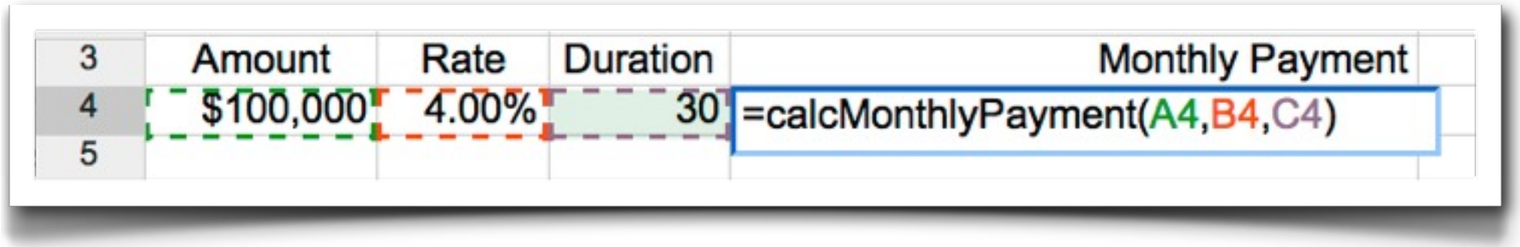
Deployment

- Spreadsheet Add-In
  - Custom function
  - Dialog with customized user interface
  - Integrated user menu
  - Executes as the user at the keyboard

- Published App
  - Fully capable web app
  - Executes as the publisher

Spreadsheet Add-In

- Custom Function
  - Every *visible* function is available as a Spreadsheet function



  - Hide functions by appending '_' to the end of the function name:

```
function calcMonthlyPayment_(principal, rate, term)
```

  - Simply return the value to show in the cell
  - *Tip*: returning arrays and double arrays is useful

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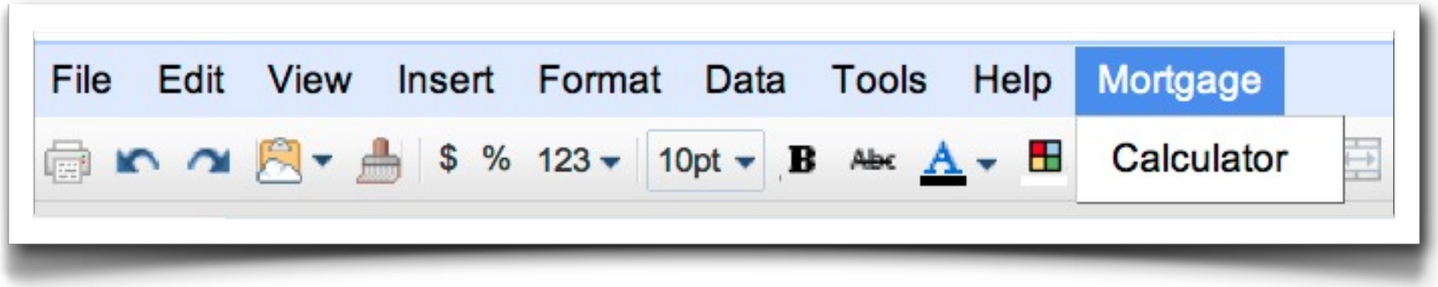
Spreadsheet Add-In

- Custom Dialog
  - Usually raised from a menu, for example:



  - Special function causes the menu to load along with the spreadsheet

```
function onOpen() {
  var subMenus = [{name:"Calculator", functionName:"showCalc"}];
  SpreadsheetApp.getActiveSpreadsheet()
    .addMenu("Mortgage", subMenus);
}
```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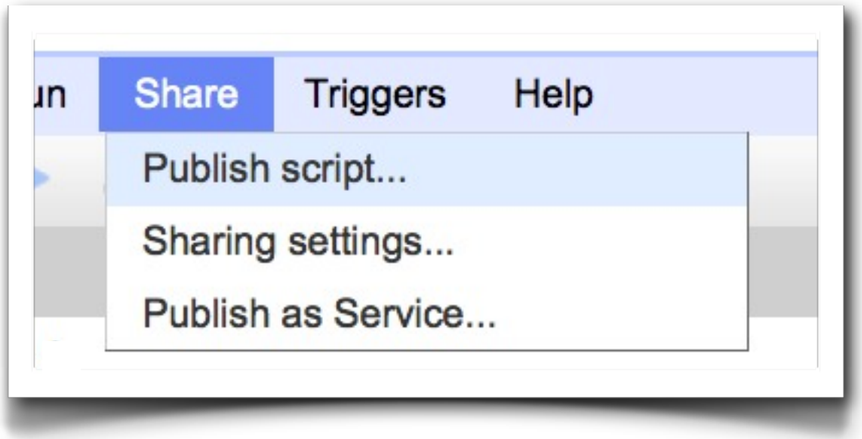
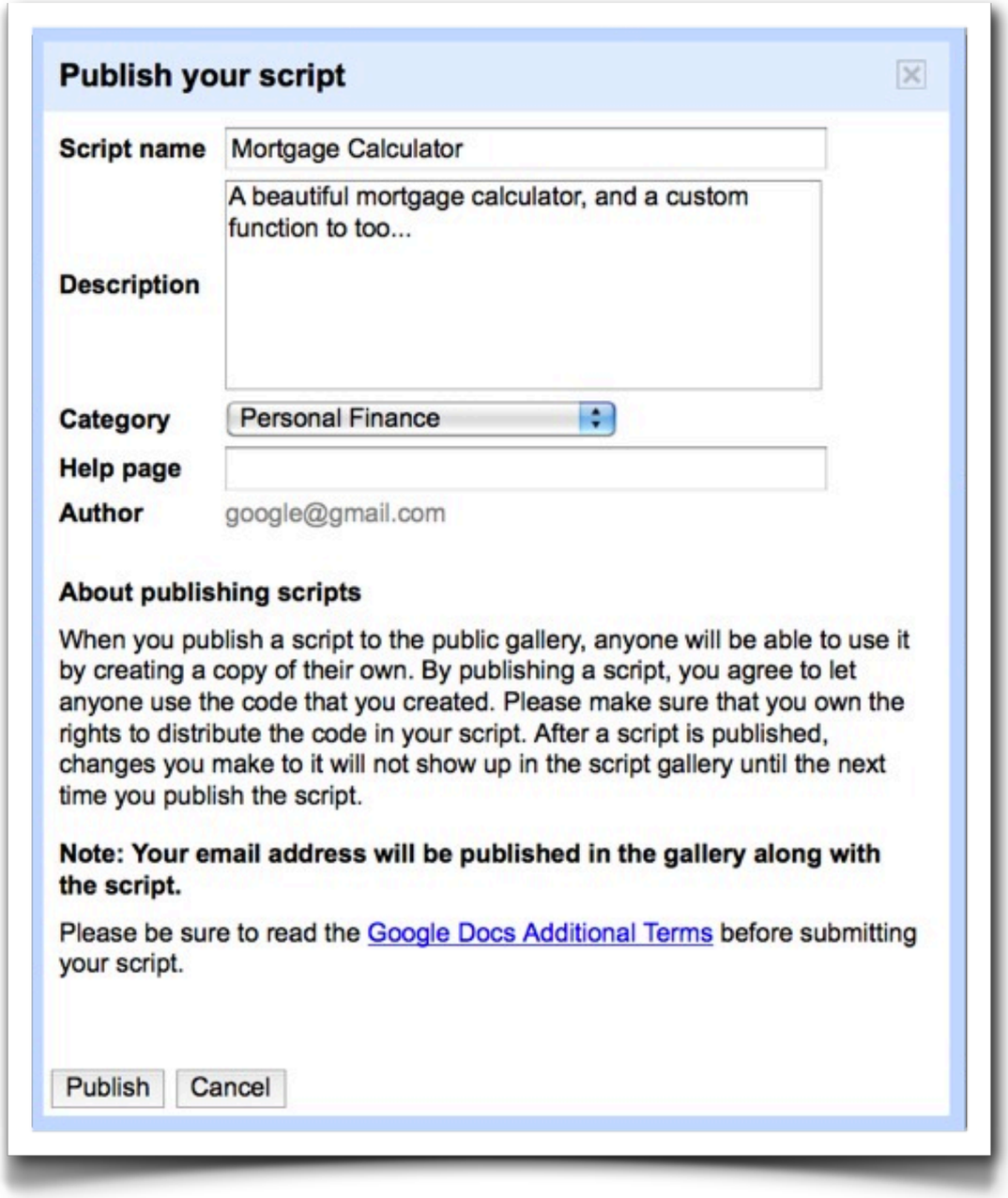
Distributing Add-Ins



- Publish to the Public Script Gallery
  - Public gallery, accessible from any Spreadsheet
  - Scripts can only be published from non-domain account
- Publish Spreadsheet to the Template Gallery
  - Domain specific gallery saves enterprise assets becoming public
  - Add-In Scripts very likely to rely on specific spreadsheet layout, etc


Publish your script
Script name
Mortgage Calculator
Description
A beautiful mortgage calculator, and a custom function to too...
Category
Personal Finance
Help page
Author
google@gmail.com
About publishing scripts
When you publish a script to the public gallery, anyone will be able to use it by creating a copy of their own. By publishing a script, you agree to let anyone use the code that you created. Please make sure that you own the rights to distribute the code in your script. After a script is published, changes you make to it will not show up in the script gallery until the next time you publish the script.
Note: Your email address will be published in the gallery along with the script.
Please be sure to read the Google Docs Additional Terms before submitting your script.
Publish
Cancel

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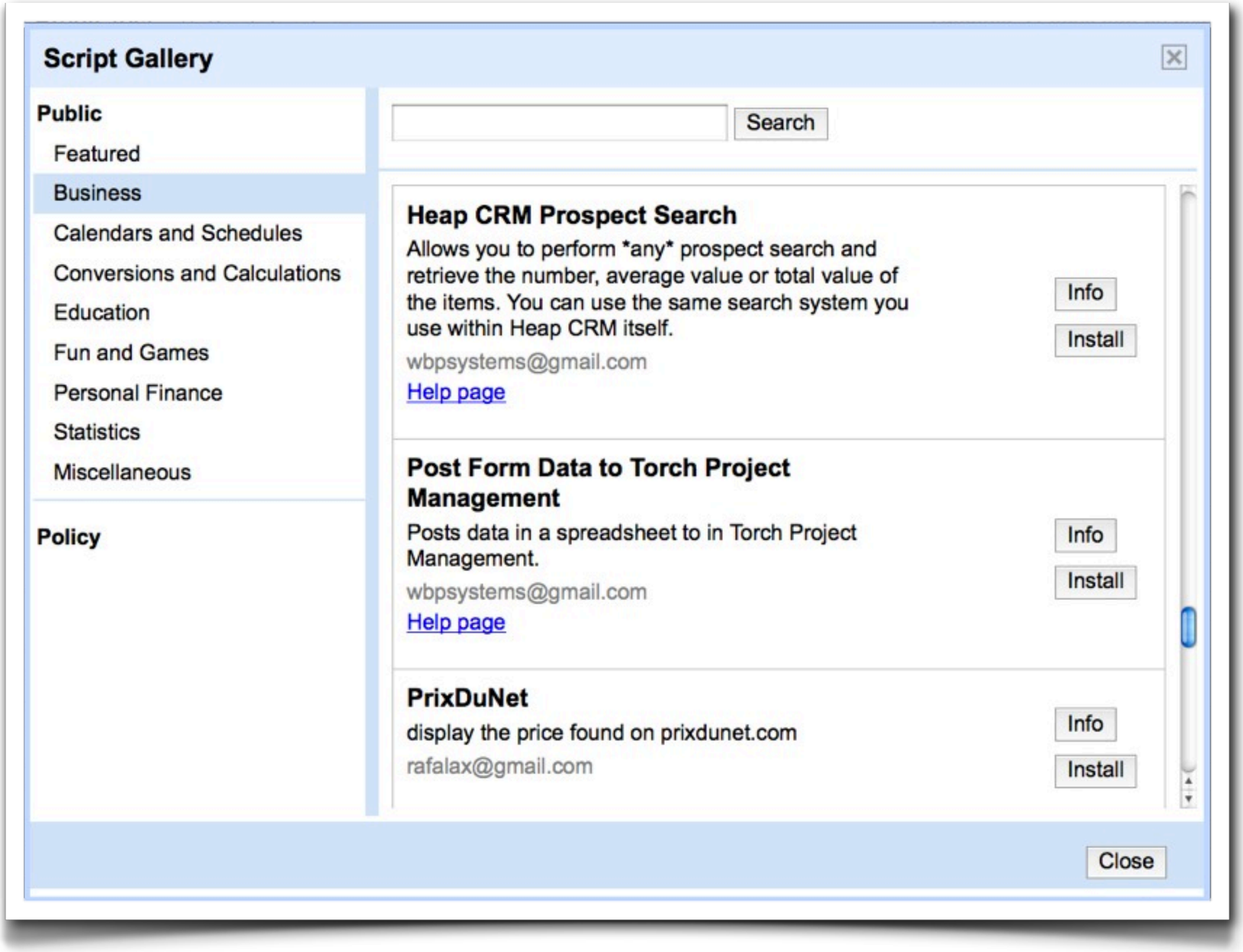
Script Gallery
Public
Featured
Business
Calendars and Schedules
Conversions and Calculations
Education
Fun and Games
Personal Finance
Statistics
Miscellaneous
Policy
Search
Heap CRM Prospect Search
Allows you to perform *any* prospect search and retrieve the number, average value or total value of the items. You can use the same search system you use within Heap CRM itself.
wbpsystems@gmail.com
Help page
Info
Install
Post Form Data to Torch Project Management
Posts data in a spreadsheet to in Torch Project Management.
wbpsystems@gmail.com
Help page
Info
Install
PrixDuNet
display the price found on prixdunet.com
rafalax@gmail.com
Info
Install
Close

Publishing Apps

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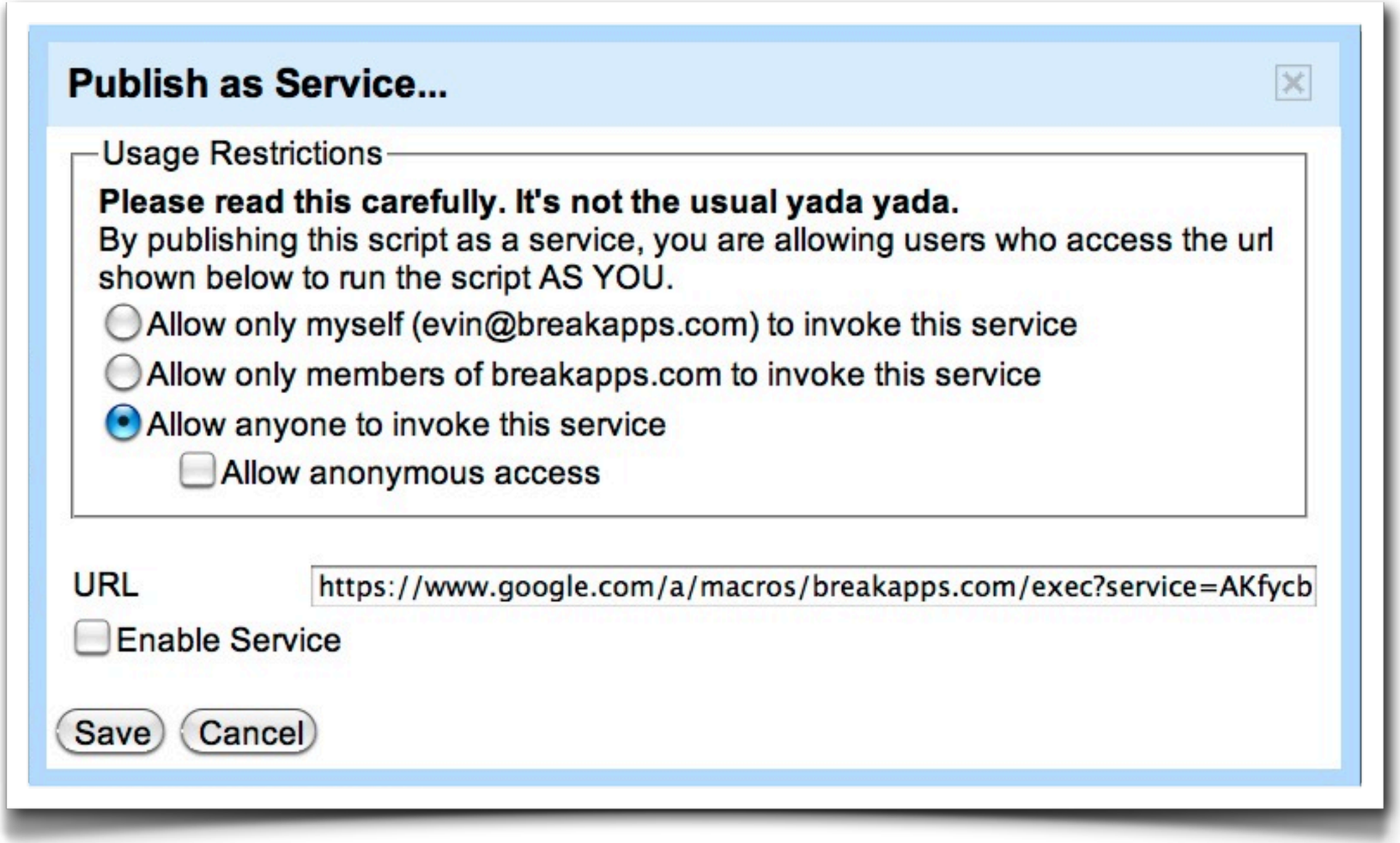
Publishing Apps



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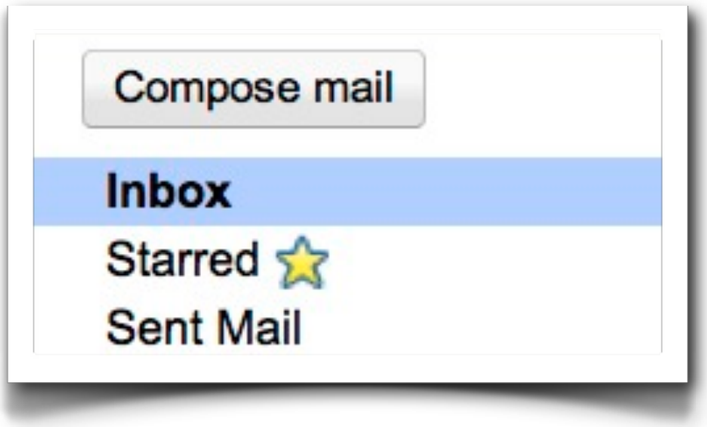
Gmail Service

If you use Gmail, you already know the API

- Compose
- Inbox
- Starred
- Sent Mail
- Labels
- Search



GmailApp

- There are just 3 objects:
  - GmailThread
  - GmailMessage
  - GmailLabel
- Threads are composed of messages
- Each thread can have multiple labels

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GmailApp

- Labels are simple:
  - GmailApp.createLabel (*labelName*)
  - GmailApp.deleteLabel (*label*)
  - GmailApp.getUserLabelByName (*labelName*)
  - GmailApp.getUserLabels ()

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GmailApp

- Threads are grouped by:
  - Inbox
  - PriorityInbox
  - Starred (contains a starred message)
  - Spam
  - Chat*
  - Trash*

*Chat and Trash don’t have ‘getUnreadCounts’

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GmailApp

- Threads are can be marked as:
  - Important or Unimportant
  - Read or Unread
- Threads are can be ‘moved’ to:
  - Inbox
  - Archive
  - Spam
  - Trash

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GmailApp

```
function getEmails() {

  var threads = GmailApp.search('in:inbox is:unread');
  var messages = [];

  for (var t in threads) {
    ...
  }

  return messages;
}
```

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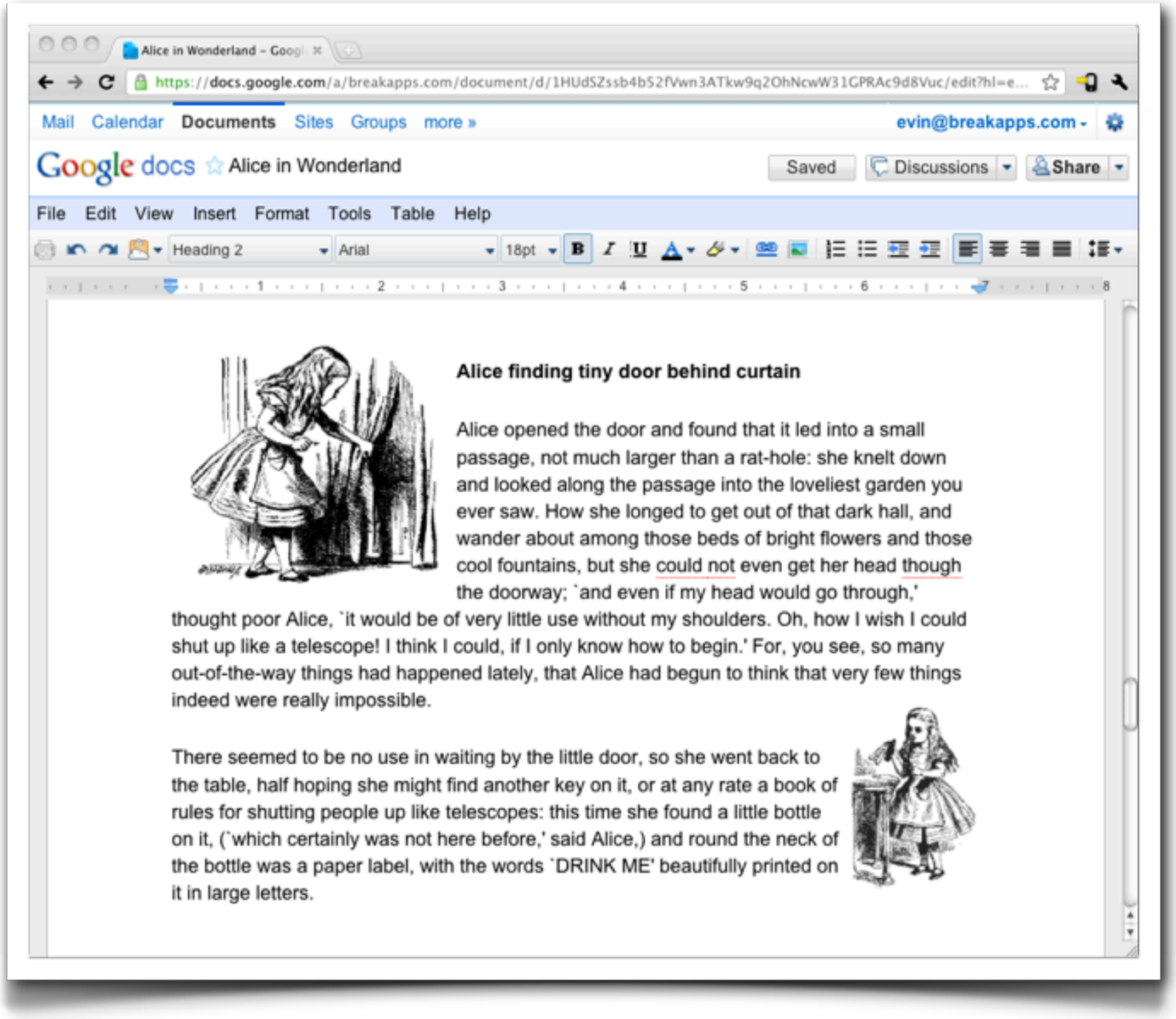
NEW!

Document Service



DocumentApp

- Create a new document:
  - DocumentApp.create (*name*)
- Open an existing document:
  - DocumentApp.openById (*id*)

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DocumentApp

Documents are composed of elements:

- DocumentBody
- Paragraphs
- Headers
- Footers
- ListItems
- Tables

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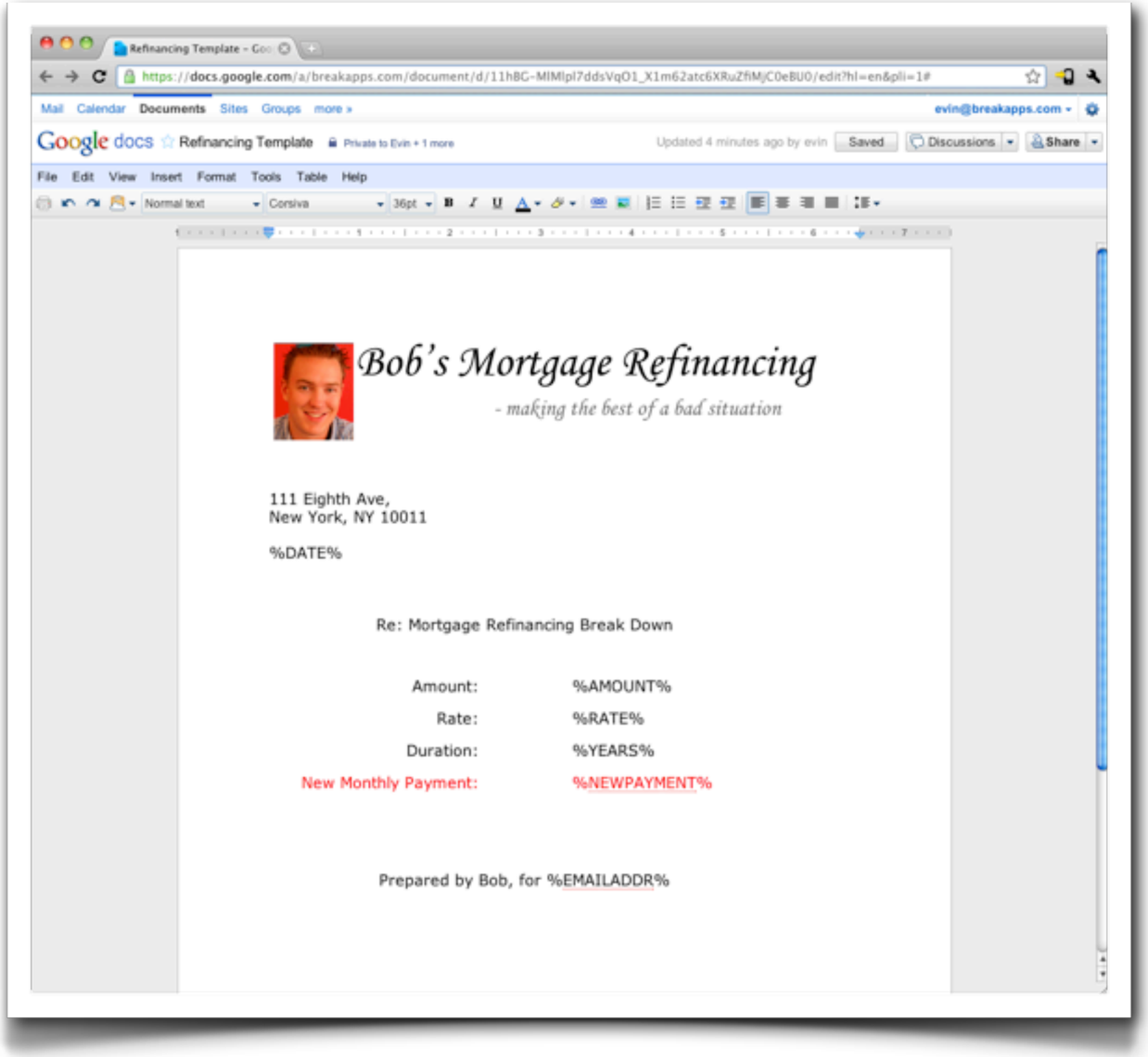
Document Template



Document Template

```
function createDocument(emailAddr, date, rate, amount, years, payment) {
  var docId = DocsList
              .getFileById("1VP4ZW3zypaqmfbRkzZvez0fLqXJUGHbkOBYRrhcRBwM")
              .makeCopy().getId();

  var doc = DocumentApp.openById(docId);

  var body = doc.getActiveSection();
  body.replaceText("%DATE%", date);
  body.replaceText("%RATE%",  "" + rate);
  body.replaceText("%AMOUNT%",  "" + amount);
  body.replaceText("%YEARS%",  "" + years);
  body.replaceText("%NEWPAYMENT%",  "" + payment);
  body.replaceText("%EMAILADDR%",  "" + emailAddr);
  return doc;
}
```

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Gobs and Gobs of Blobs

What is a Blob?

- \ˈbläb\ - ***noun***
- Something ill-defined or amorphous

- Binary large object

Image: http://www.flickr.com/photos/simon_elgood/ / CC BY 2.0

Blobs

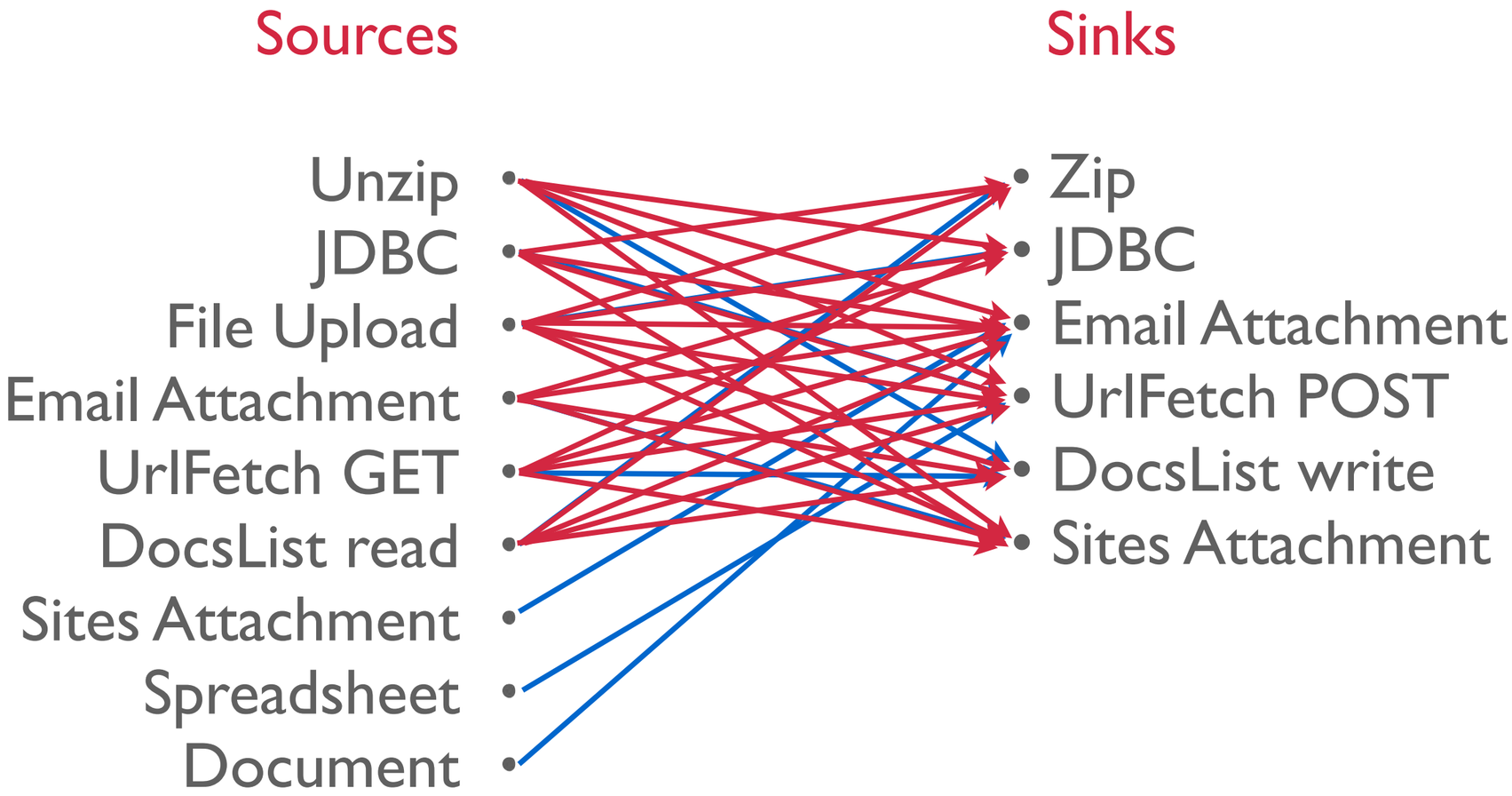
Sources

- Unzip
- JDBC
- File Upload
- Email Attachment
- UrlFetch GET
- DocsList read
- Sites Attachment
- Spreadsheet
- Document

Sinks

- Zip
- JDBC
- Email Attachment
- UrlFetch POST
- DocsList write
- Sites Attachment

Blobs



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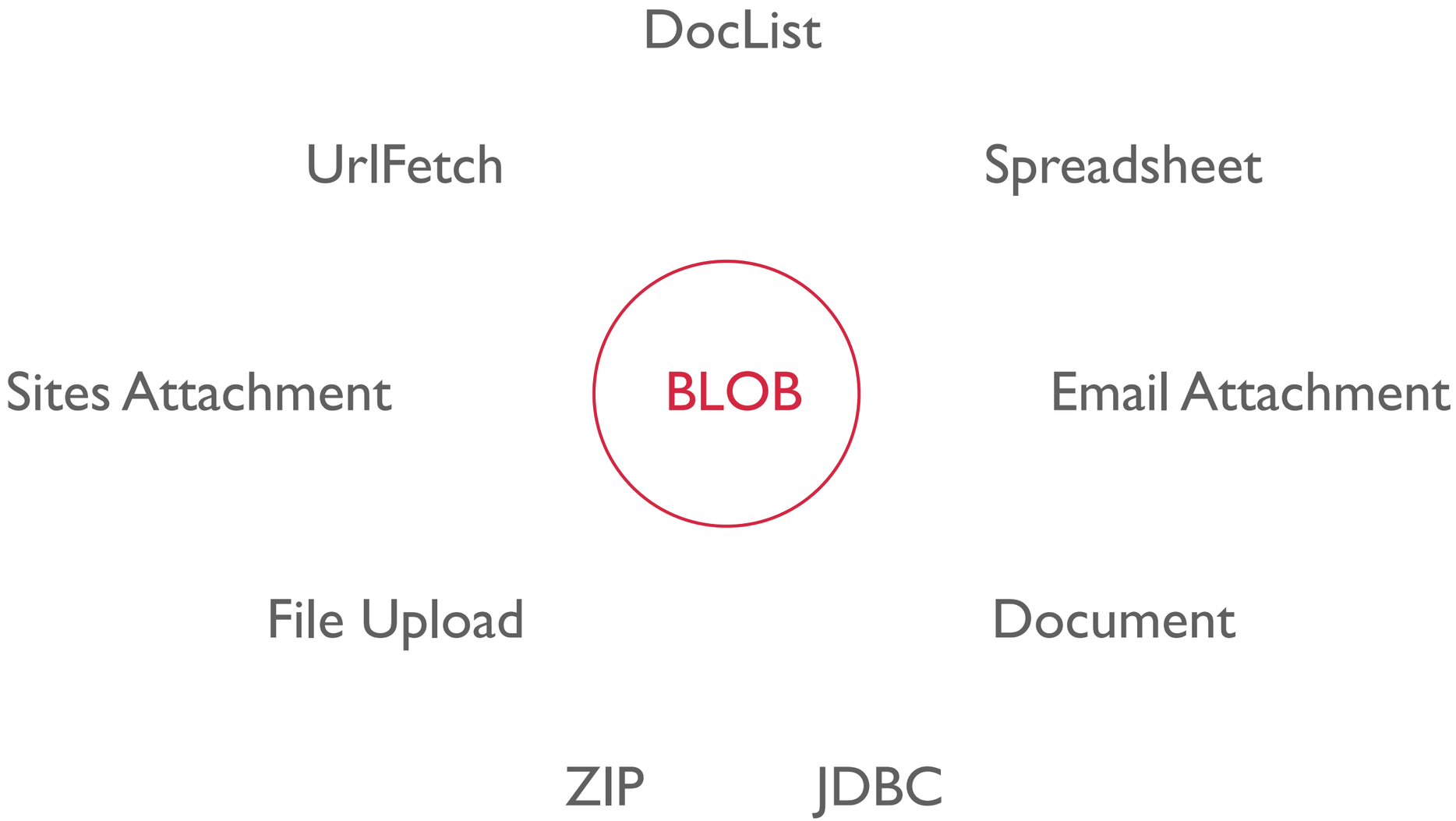
Blobs



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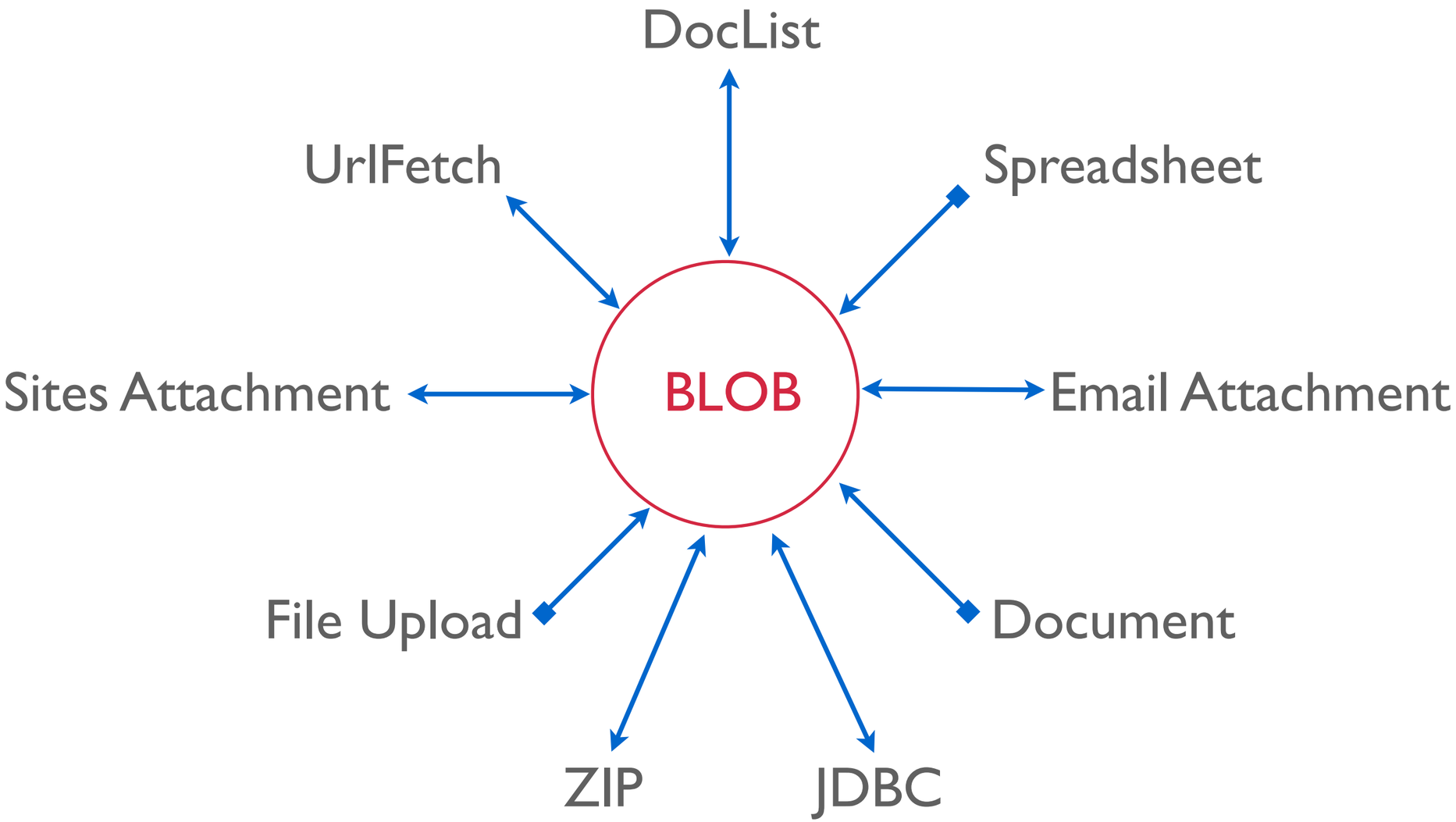
Blobs



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Blobs

- Blobs are simple:
  - getName/setName
  - getContentType/setContentType
  - getBytes/setBytes
  - getDataAsString/setDataAsString
- Create a Blob:
  - Utilities.createBlob

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Using Blobs

```
SitesApp.getPageByUrl(path).getAttachments()
```


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Using Blobs

```
SitesApp.getPageByUrl(path).getAttachments().concat(
  [UrlFetchApp.fetch(url)]
  );
```


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Using Blobs

```
SitesApp.getPageByUrl(path).getAttachments().concat(
  [UrlFetchApp.fetch(url)],
  DocsList.find("image.png")
  );
```


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Using Blobs

```
                                        Utilities.zip(
SitesApp.getPageByUrl(path).getAttachments().concat(
  [UrlFetchApp.fetch(url)],
  DocsList.find("image.png")
), "files.zip")
```


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Using Blobs

```
MailApp.sendEmail("bob@example.com",
                  "my email with attachment",
                  "here are the files",
                  {attachments: Utilities.zip(
SitesApp.getPageByUrl(path).getAttachments().concat(
  [UrlFetchApp.fetch(url)],
  DocsList.find("image.png")
), "files.zip")});
```


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Conversions

- Why am I talking about Blobs?
- Spreadsheets and Documents are Blobs
  - Google Docs convert automatically to PDF
  - Many other types got to PDF also
  - Image to Image for PNG, JPEG, BMP and GIF
  - With a lot more to come...

Conversions

- Blobs are simple:
  - getName/setName
  - getContentType/setContentType
  - getBytes/setBytes
  - getDataAsString/setDataAsString
  - getAs (contentType)

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Conversions

```
var pngBlob = DocsList.find("photo.jpg")[0].getAs("image/png");
```


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Conversions

```
var pdfs = SitesApp.getPageByUrl(url).getAttachments()
  .map(function(i) { return i.getAs("application/pdf") });
```


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Conversions

```
var blobs = SitesApp.getPageByUrl(path).getAttachments();
var pdfs = [];
for (var i in blobs)
  pdfs.push(blobs[i].getAs("application/pdf"));
```


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Conversions

```
var docBlob = createDocument(emailAddr, rate, amount, years);

message.reply("Here's the quote you requested",
    {attachments: docBlob.getAs("application/pdf")});

message.markRead();
```


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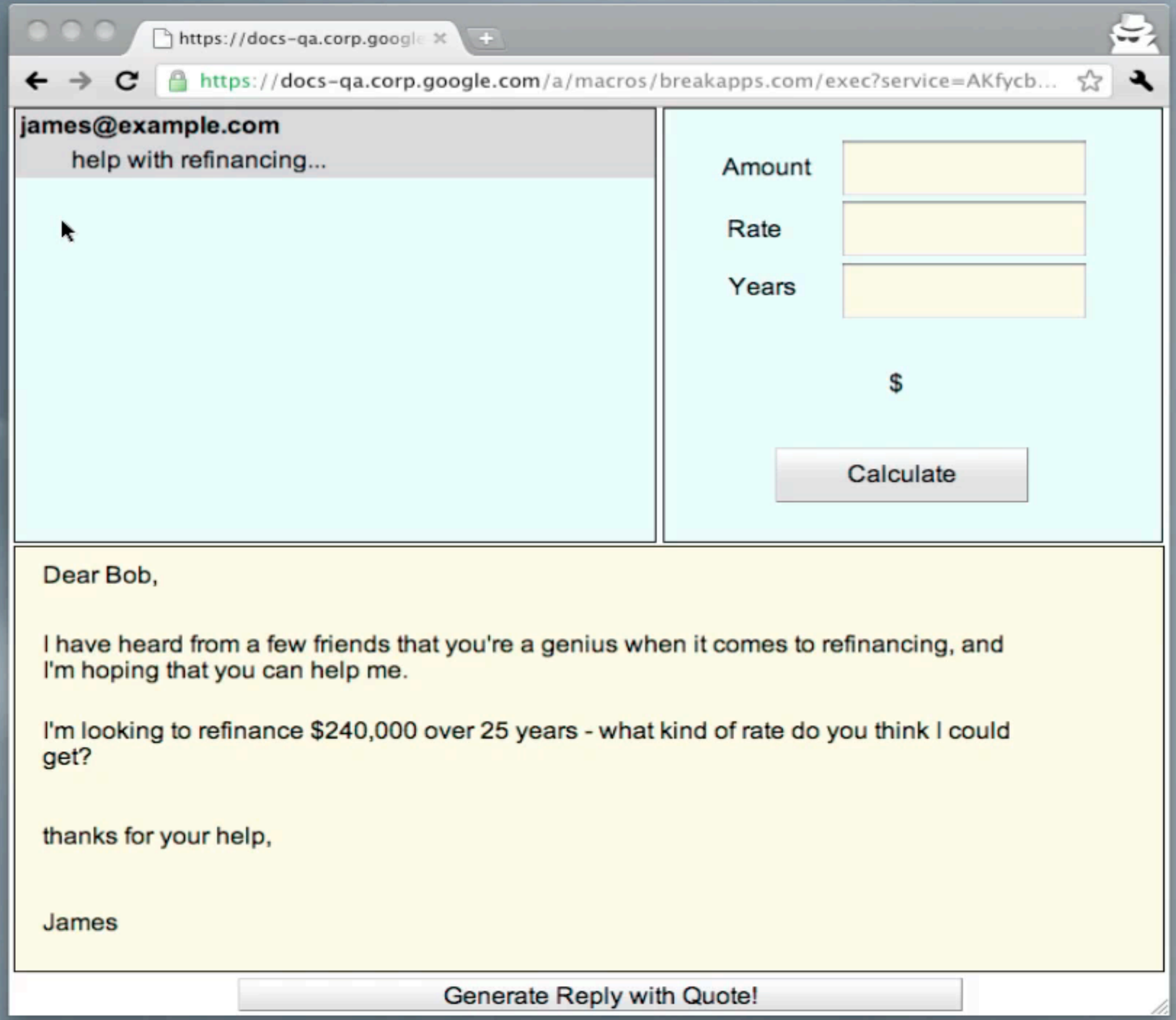
https://docs-qa.corp.google
https://docs-qa.corp.google.com/a/macros/breakapps.com/exec?service=AKfycb...
james@example.com
help with refinancing...
Amount
Rate
Years
$
Calculate
Dear Bob,
I have heard from a few friends that you're a genius when it comes to refinancing, and I'm hoping that you can help me.
I'm looking to refinance $240,000 over 25 years - what kind of rate do you think I could get?
thanks for your help,
James
Generate Reply with Quote!

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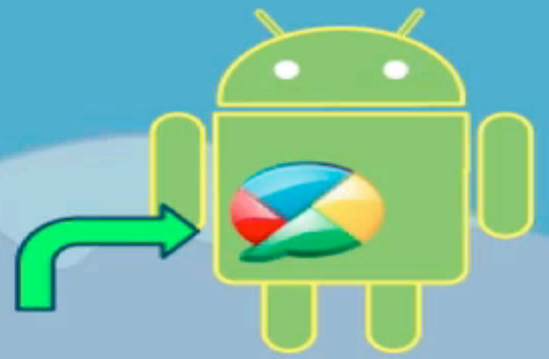
- *Making Apps More Interactive*

James Ferreira

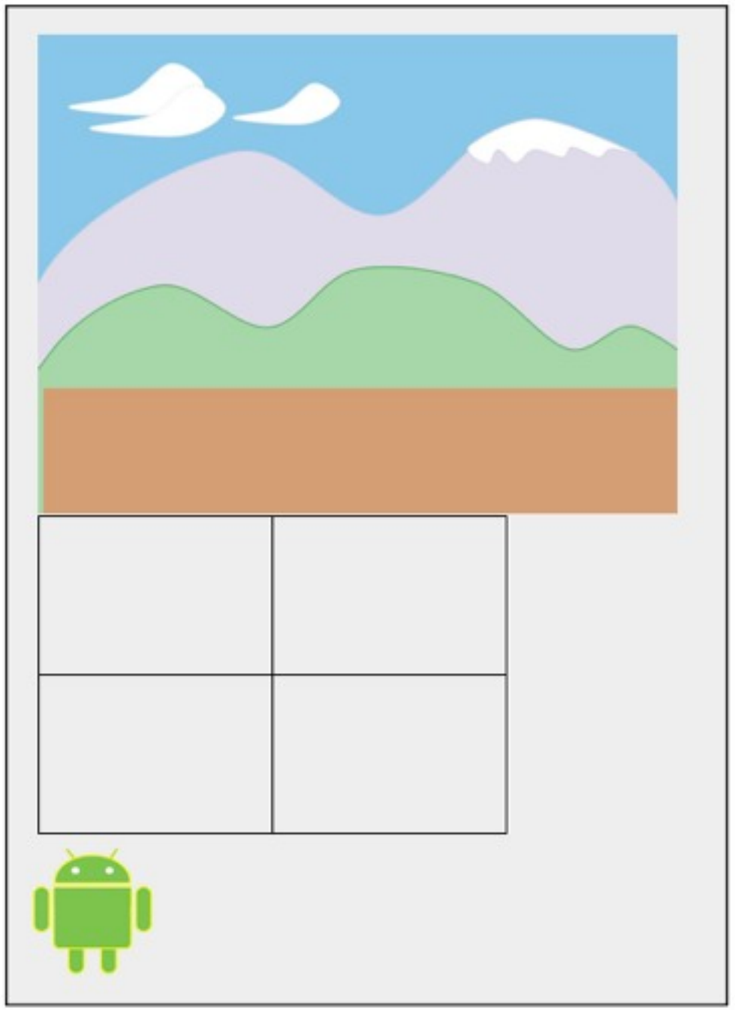
Author, Developer, Apps Script Expert
Simple Apps Solutions

LIVESTRONG
1274
BONTRAGER

Use the arrows to help Andy explore some scripts



Building a Canvas



- UiApp is the container

```
var app = UiApp.createApplication();
```

- We add widgets to the app

```
app.add(app.createImage(url));

app.add(app.createGrid(2,2));

app.add(app.createImage(url));

etc...
```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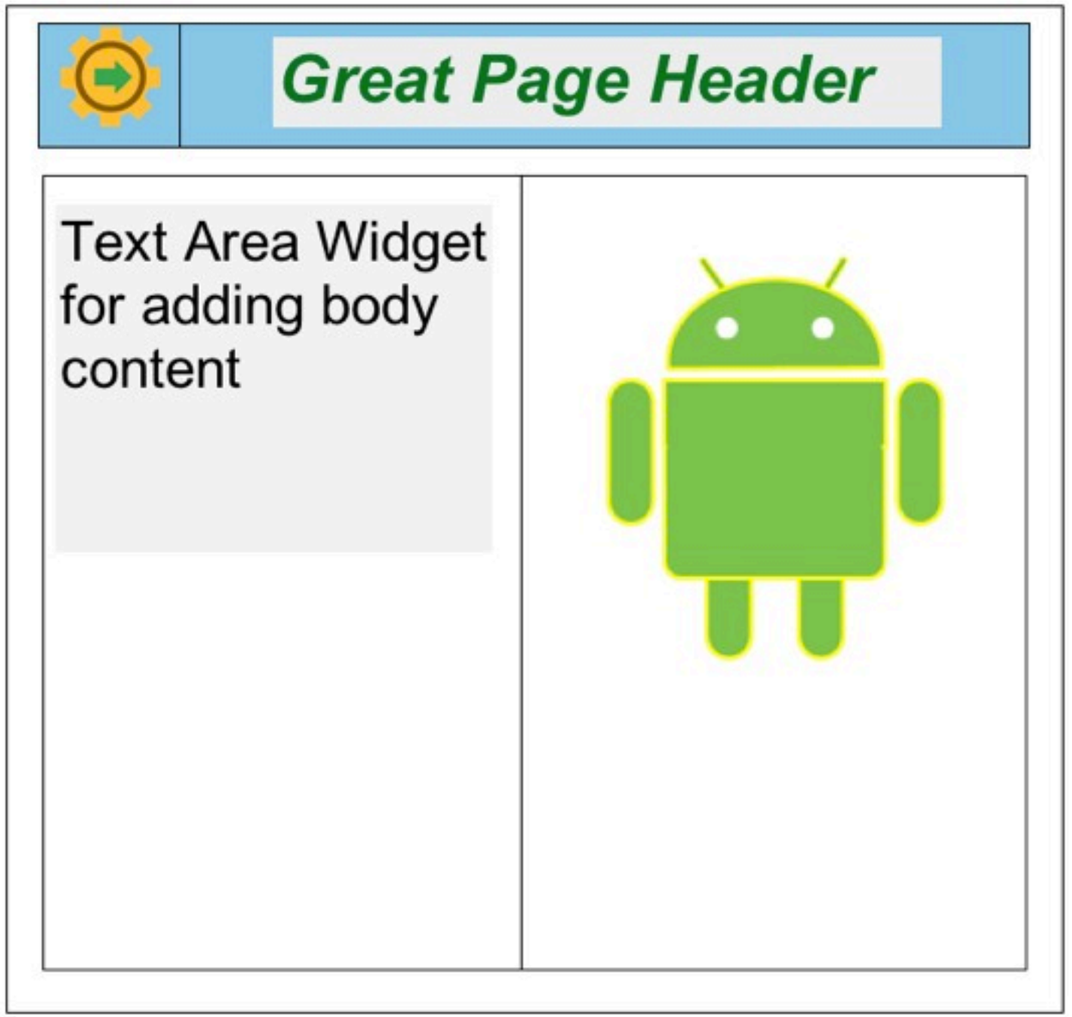
Widgets within Widgets



- Endless possible effects just by putting widgets in widgets
- E.g. widgets in a Grid:

```
app.add(grid1);
app.add(grid2);

grid1.setWidget(0,0,gearImage);
grid2.setWidget(0,0,textArea);
grid1.setWidget(0,1,textBox);
grid2.setWidget(0,1,AndyImage);
```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Placing Widgets with CSS

- Avoid lots of:

```
gearImg.
  setStyleAttribute
  ("position", "fixed");

gearImg.
  setStyleAttribute
  ("top", "550");

gearImg.
  setStyleAttribute
  ("left", "750");
```

- Instead try:

```
function applyCSS_(element, style){
  for (var key in style){
    element.
      setStyleAttribute
      (key, style[key]);
}  }

var _gearAt = {
      "position":"fixed",
      "top":"550px",
      "left":"750px"};

applyCSS_(gearImg, _gearAt);
```


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Making Andy Move

```
// Initial position
ScriptProperties.setProperty('x', 50);
ScriptProperties.setProperty('y', 450);

var _andyAt = {
    "position":"fixed",
    "top":ScriptProperties.getProperty('y')+"px",
    "left":ScriptProperties.getProperty('x')+"px" };

var andy = app.createImage('https://Andy.png').setId('andy');
app.add(andy);
applyCSS_(andy, _andyAt);
```


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Making Andy Move

```
var up = app.createImage('https://Up.png')
    .setSize('40px', '40px').setId('up')
    .addClickHandler(app.createServerClickHandler('move'));

var dn = app.createImage('https://Down.png')
    .setSize('40px', '40px').setId('dn')
    .addClickHandler(app.createServerClickHandler('move'));
```


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Making Andy Move

```
function move(e){
  var app = UiApp.getActiveApplication();
  var x = parseInt(ScriptProperties.getProperty('x'));
  var y = parseInt(ScriptProperties.getProperty('y'));

  if (e.parameter.source == 'up'){
    if (y == 0){return app;} //stop andy side
    y = y-50;
    ScriptProperties.setProperty('y', y);
  }
  else if (e.parameter.source == 'dn'){
    if (y == 500){return app;} //stop andy side
    y = y+50;
    ScriptProperties.setProperty('y', y);
  } //[...] left, right

  var _andyAt = {
    "top":ScriptProperties.getProperty('y')+"px",
    "left":ScriptProperties.getProperty('x')+"px" };

  applyCSS_(app.getElementById('andy'), _andyAt);

  return app;
}
```


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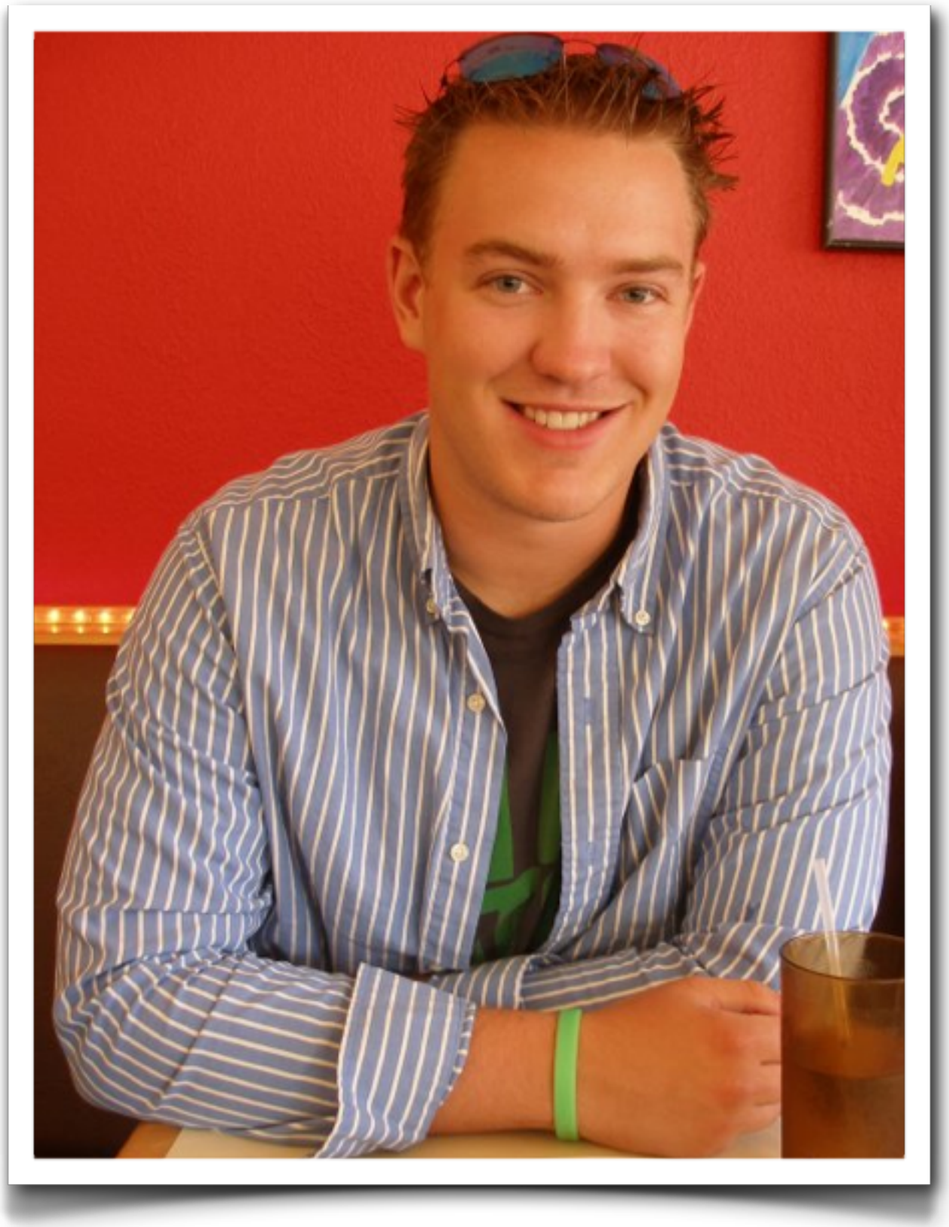
Recap



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Recap

- GUI Builder
  - Mortgage App, and Mortgage Calculator Add-In
  - Deploying as a Service, and to the Gallery
- Gmail Service
  - Just as simple as using Gmail itself!
- Document Service
  - Finally an API for scripting Google Documents

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Recap

- Blobs
  - Don’t over think it, *it’ll just work!*
- Conversions
  - Some simple cases covered today, stay tuned for more
- Andy App
  - There’s more to Script that boring data entry!

Questions

Hashtags: **#io2011 #GoogleApps**

Feedback: **http://goo.gl/igDEm**

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