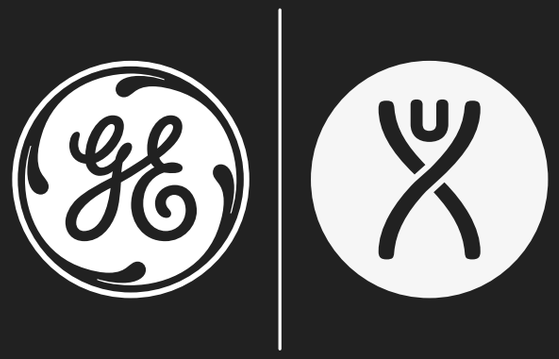


Design at Scale

Faster, Better UX via Design Systems

Dane Petersen
@thegreatsunra

Karel Barnoski
@karelbarnoski

Lean Day West Portland, OR | September 16, 2013

HOUSEKEEPING

Install a text editor

Sublime Text is great on PC and Mac

Download the zip file

http://tr.im/4dkrc

Introduce yourself to the people at your table and make sure at least one of you knows HTML/CSS

If everyone at your table knows HTML/CSS, please consider sharing your wisdom with another table!

Introductions

Dane Petersen

Lead Interaction Designer

GE Aviation

Karel Barnoski

Lead Interaction Designer

GE Energy

OUR PLAN FOR TODAY

Learn about design systems

Moving quickly from concept to creation

Sketch an app for your smart home

Use a design system to convert that sketch into code

TODAY'S SCHEDULE

1:00–1:10 Settle In & Introductions (10min)

1:10–1:20 Our Perspective (10min)

1:20–1:30 Sketching (10min)

1:30–2:30 Sketch Activity (60 min)

2:30–2:45 **Break** (15 min)

2:45–3:00 Design Systems (15 min)

3:00–3:15 Coding (15 min)

3:15–4:15 Coding Activity (60 min)

4:15–4:30 Wrap Up (15 min)

Bootstrap

Search Google or enter an address

Reader

Home Get started Scaffolding Base CSS Components JavaScript Customize

Bootstrap

Bootstrap

Sleek, intuitive, and powerful front-end framework for faster and easier web development.

Download Bootstrap

GitHub project Examples Extend Version 2.3.2

Star 55,241 Fork 18,756 Follow @twbootstrap 77.9K followers Tweet 0

Introducing Bootstrap.

Need reasons to love Bootstrap? Look no further.

Bootstrap

getbootstrap.com

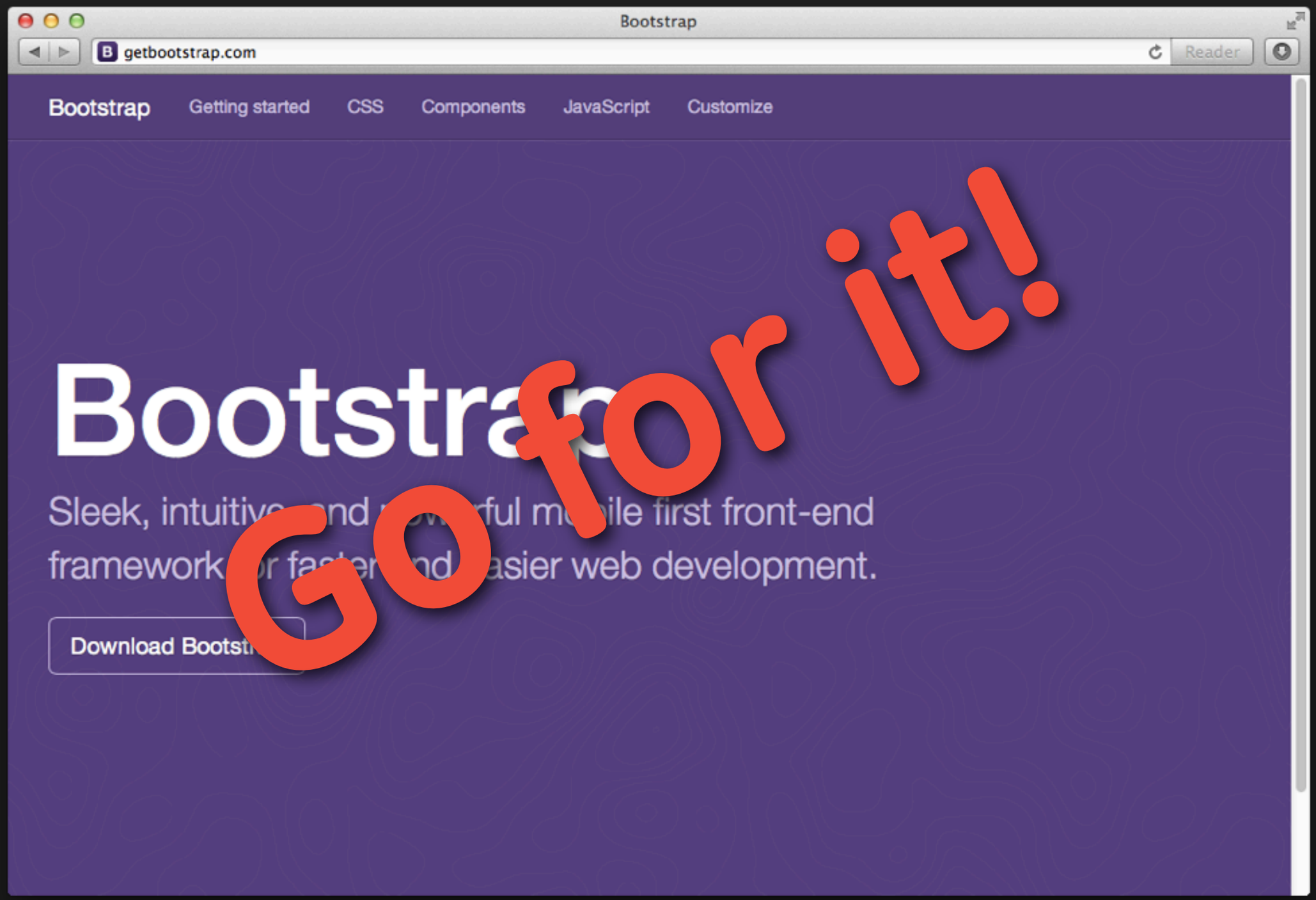
Reader

Bootstrap Getting started CSS Components JavaScript Customize

Bootstrap

Sleek, intuitive, and powerful mobile first front-end framework for faster and easier web development.

Download Bootstrap


Bootstrap
getbootstrap.com
Reader
Bootstrap
Getting started
CSS
Components
JavaScript
Customize
Bootstrap
Sleek, intuitive, and powerful mobile first front-end framework for faster and easier web development.
Download Bootstrap
Go for it!

Questions?

Our Perspective

We are GE

GE is huge

121 years old
300,000 employees
14,000 developers
$147 billion revenue
$13 billion income

GE is huge
yec
00
00
$147 billion revenue

HELICAL 26W
120VAC 60Hz 390mA
FLE26HT3/2/SW

1:28 PM
ADVANTIUM
120
Profile

Profile

2005
2005
2005

machines

machines

analytics

machines

people

analytics

machines

people

analytics

The Industrial Internet

OUR MISSION

Help people create elegant, powerful and extensible experiences for the Industrial Internet

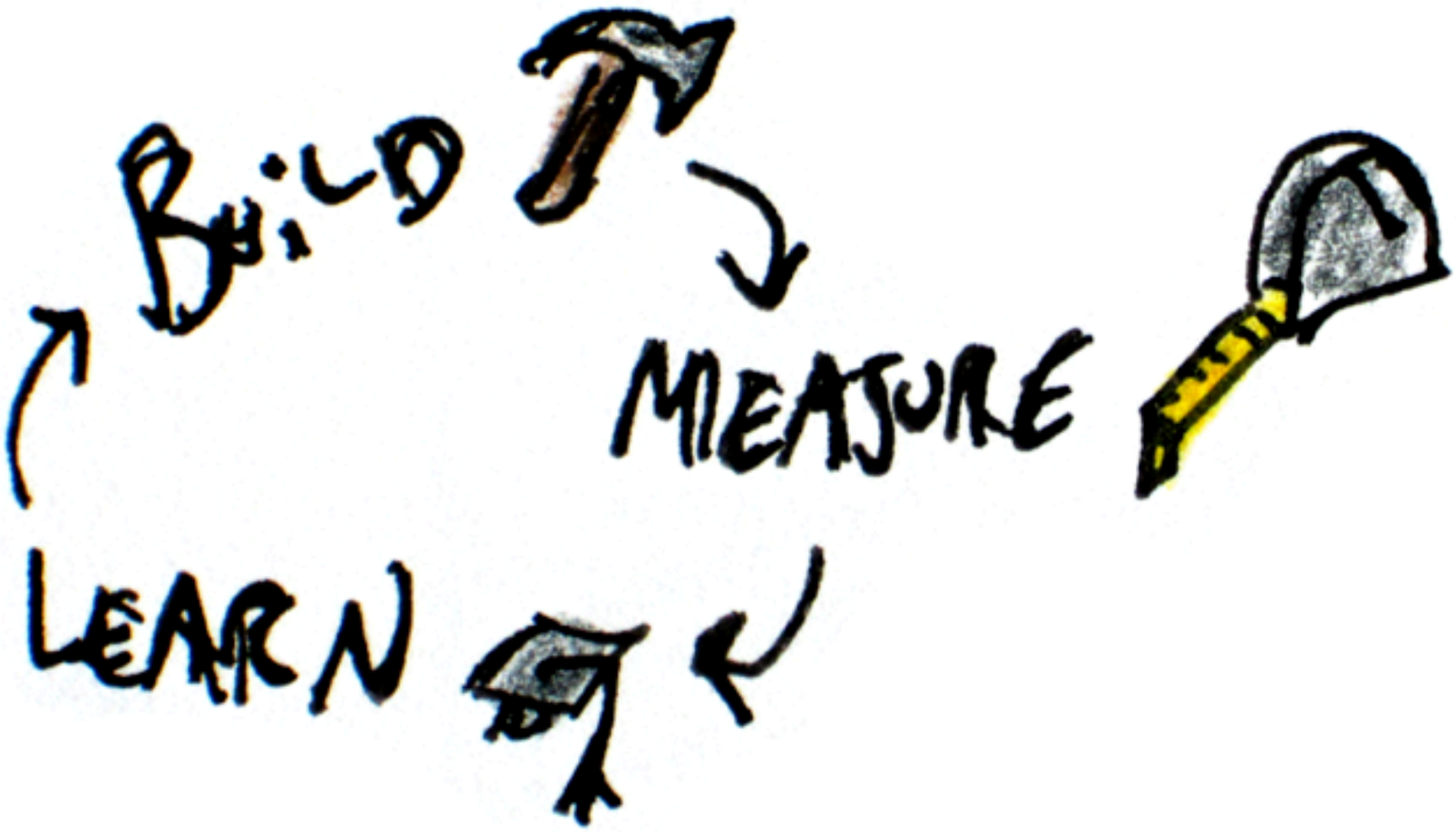
Lean UX + Design Systems + Agile

LEAN UX CASE STUDY

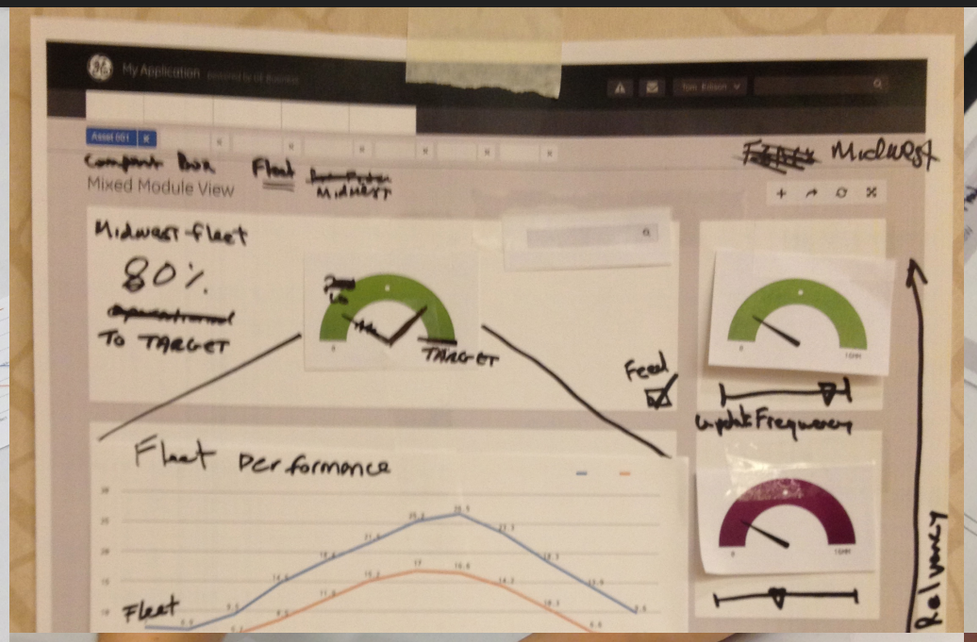
5 intense days of cross-functional collaboration

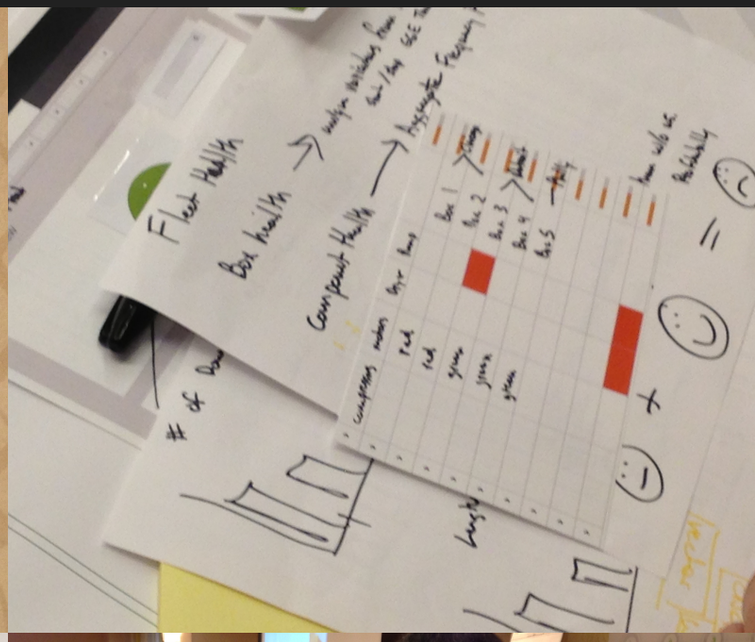
Worked side-by-side with several energy customers

Sketched and built a prototype to get user feedback

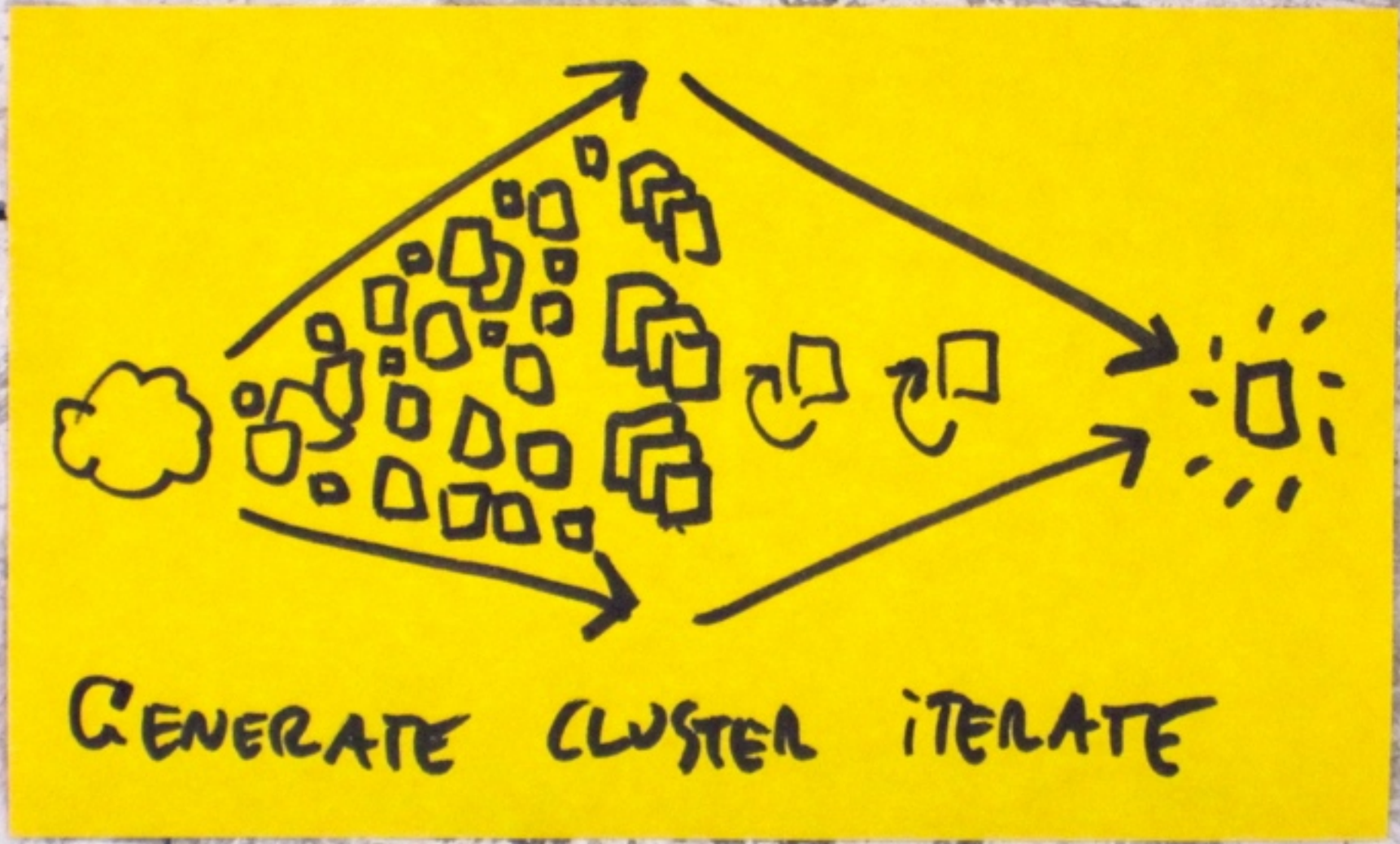

BUILD
MEASURE
LEARN

Provocation
Fresh Ideas
Maintenance History


My Application
Mixed Module View
Midwest Fleet
80%
TO TARGET
TARGET
Fleet Performance
Fleet
Update Frequency
Relevancy


Fleet Health
Box Health
Component Health

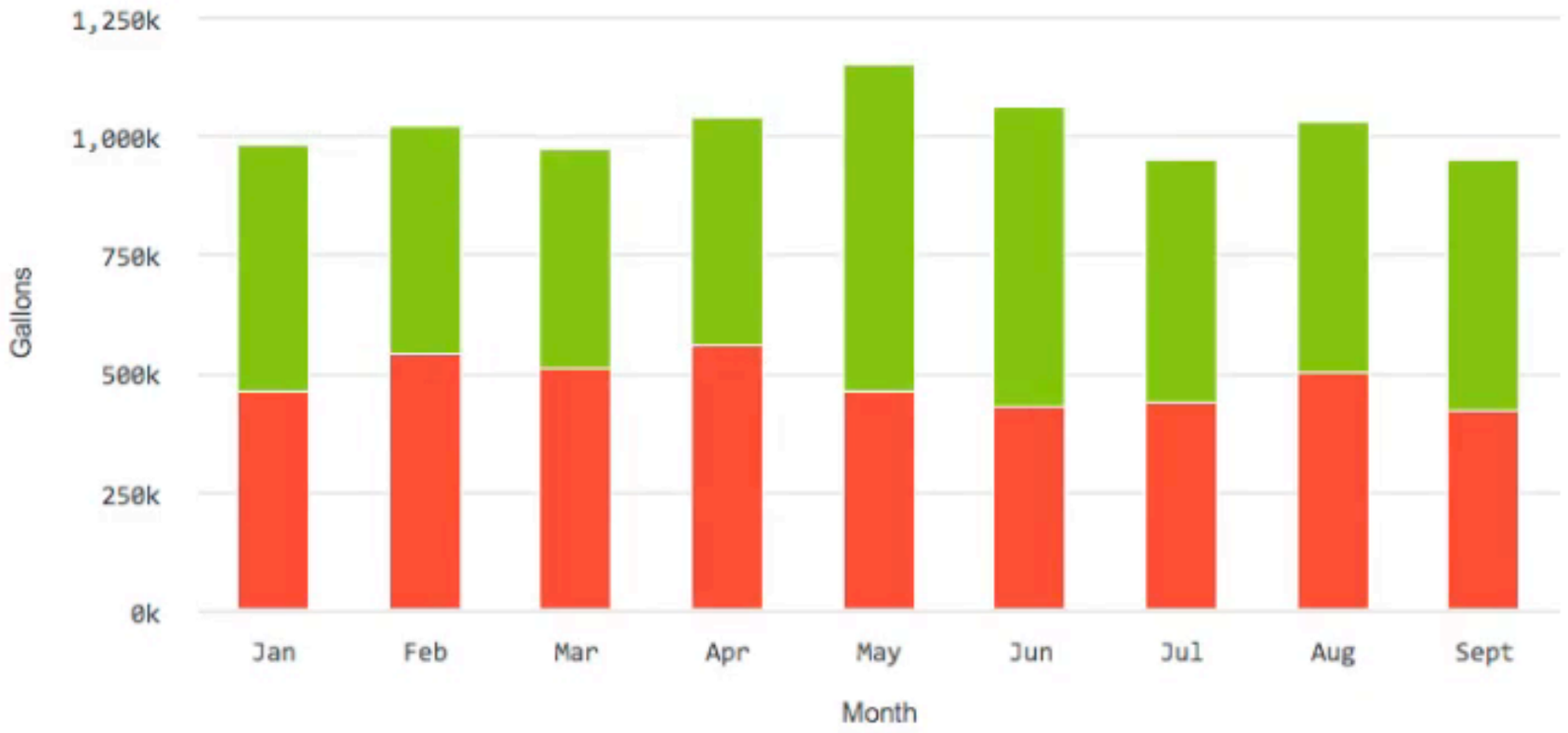
Maintenance History


GENERATE CLUSTER ITERATE

Dashboard View

Financials

Monthly Fuel Usage



Repeat Offenders

Vehicle #	Plate #	%D	$
203	AR3-D4R	34%	$1,634.68
21	V8D-4RT	28%	$1,423.35
103	V3K-ER3	26%	$1,398.38
103	Q23-D4R	34%	$1,234.68
121	V8D-4RT	28%	$1,123.35
43	V3K-ER3	26%	$1,098.38

$8,365.43 lost

Top "Good Guys"

Vehicle #	Plate #	%NG	$
203	AR3-D4R	98%	$8,634.68
21	V8D-4RT	94%	$8,423.35
103	V3K-ER3	87%	$8,398.38
103	Q23-D4R	86%	$8,234.68
121	V8D-4RT	82%	$8,123.35
43	V3K-ER3	81%	$7,098.38

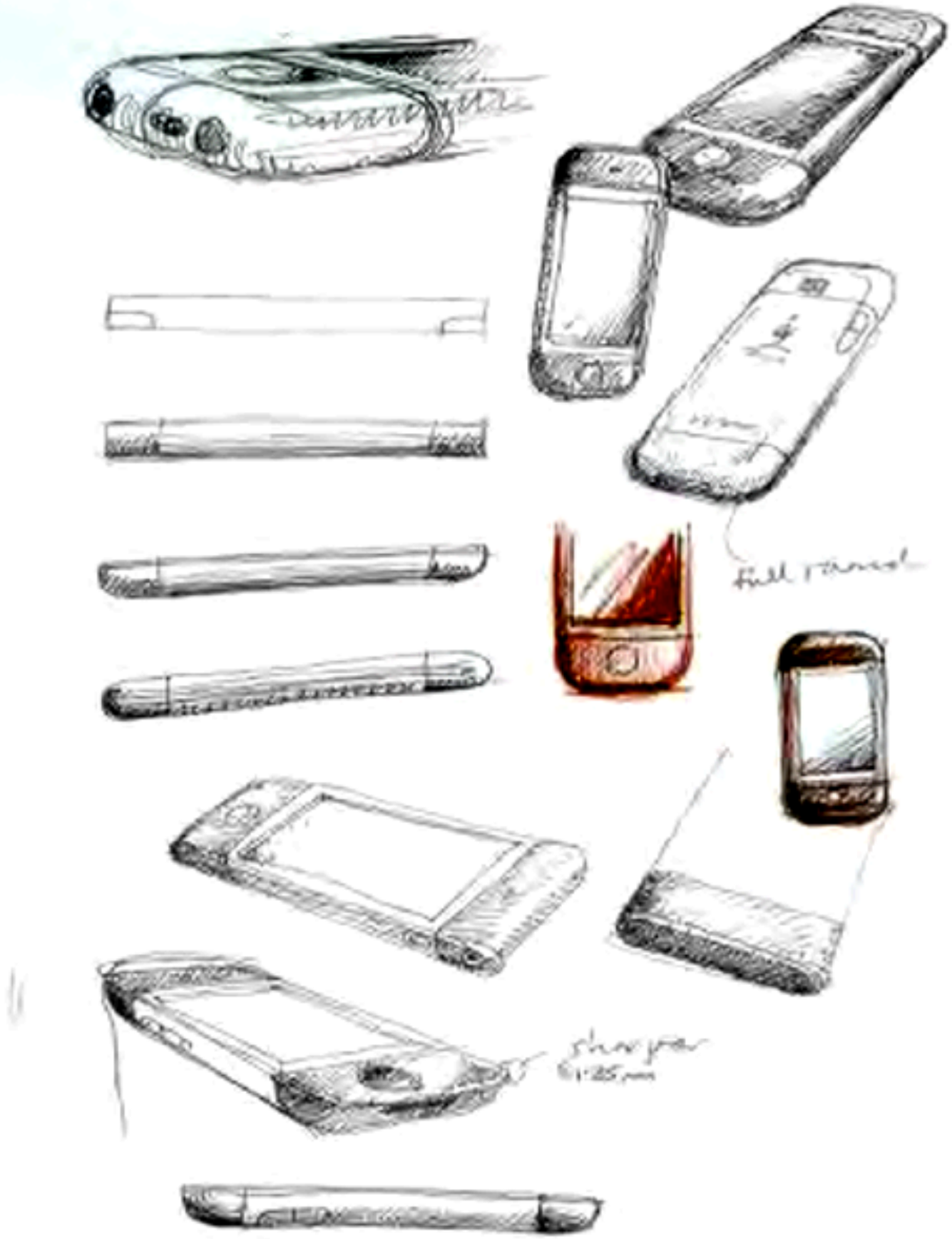
$49,365.43 saved

Environmental Impact

Sketching

THE MYTH OF THE GENIUS DESIGNER

AT&T
9:42 AM
SMS
Text
Tuesday
9
Calendar
Photos
Camera
YouTube
Stocks
280
Maps
73°
Weather
Clock
Calculator
Notes
Settings
Phone
Mail
Safari
iPod



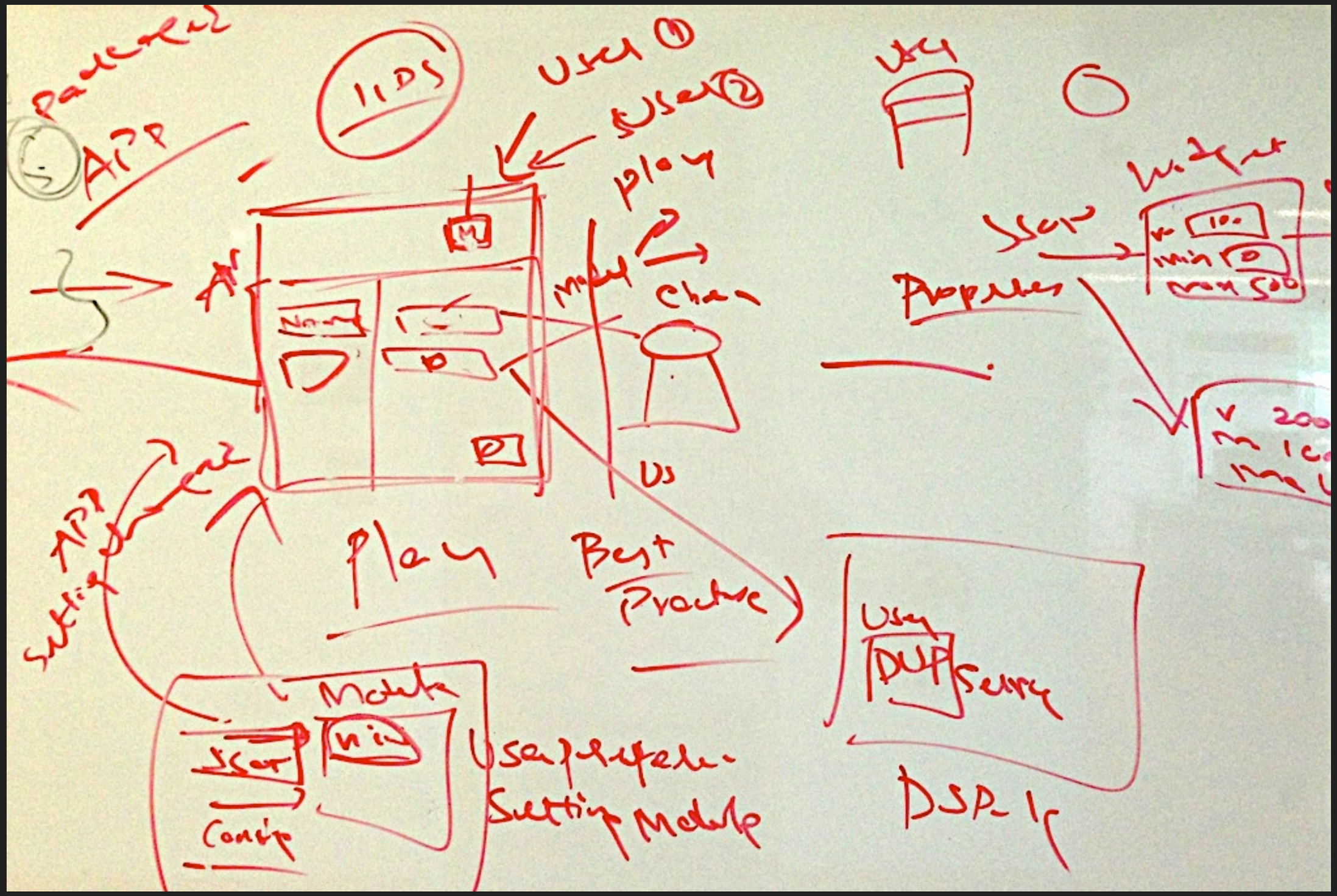
iPod
Apple Proto 1015

Apple Proto 1017

GREAT DESIGN
IS AN ACT
OF CHOICE, NOT
AN ACT OF
GENIUS.

THE FASTEST
PIVOT YOU'LL
EVER MAKE...

GE HAS A SKETCHING CULTURE



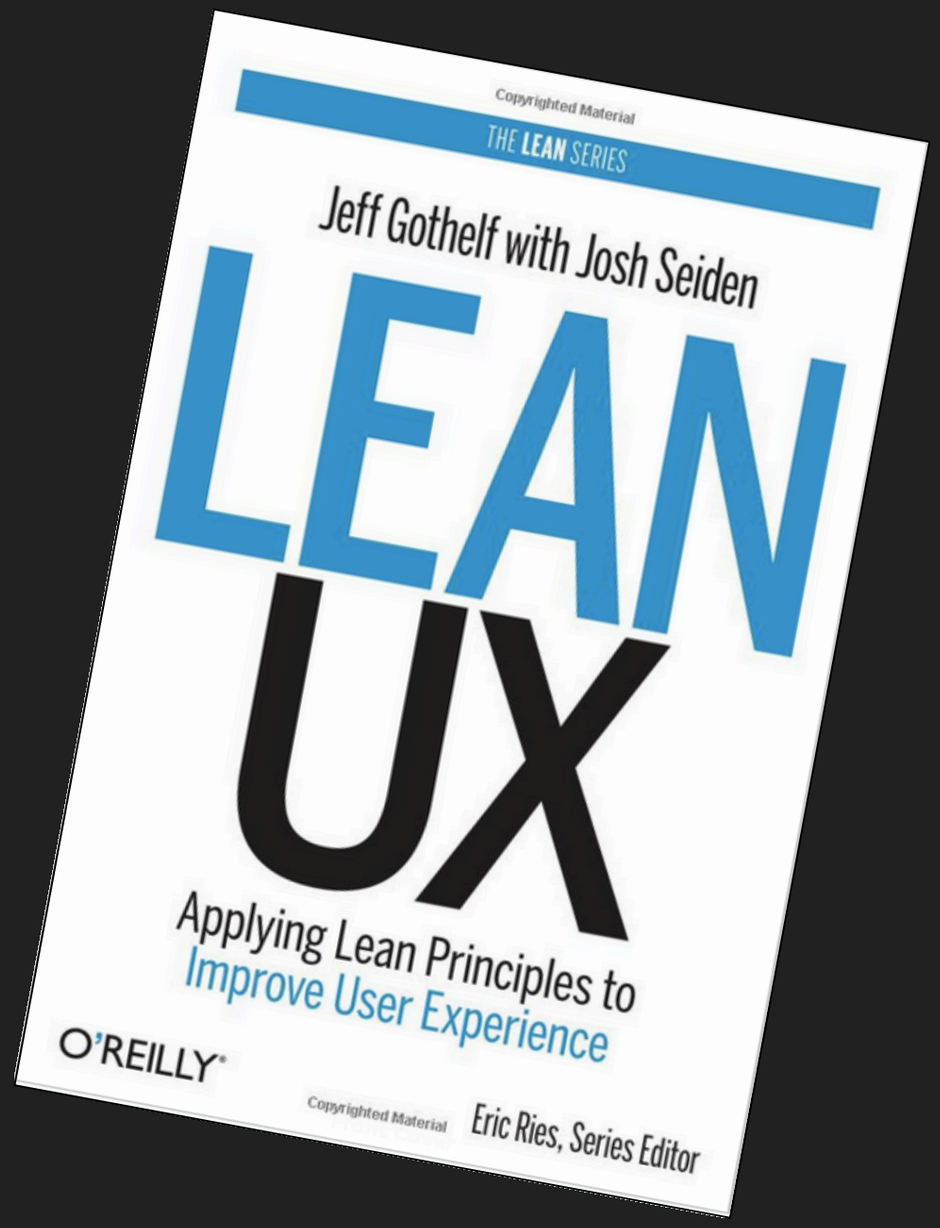
FOUR LEAN UX PRINCIPLES

Externalizing Your Work

Making Over Analysis

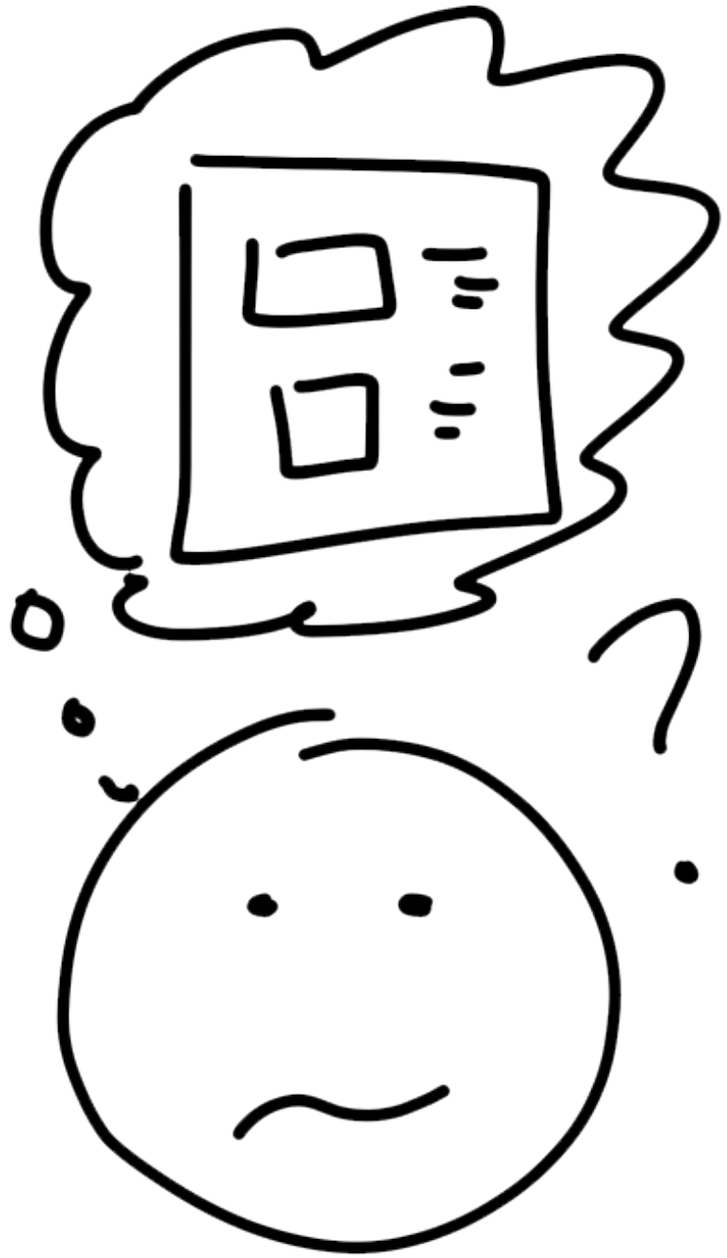
Shared Understanding

Permission to Fail



SKETCHING IS EXTERNALIZING YOUR WORK

Sketching is all about getting ideas out of your head.

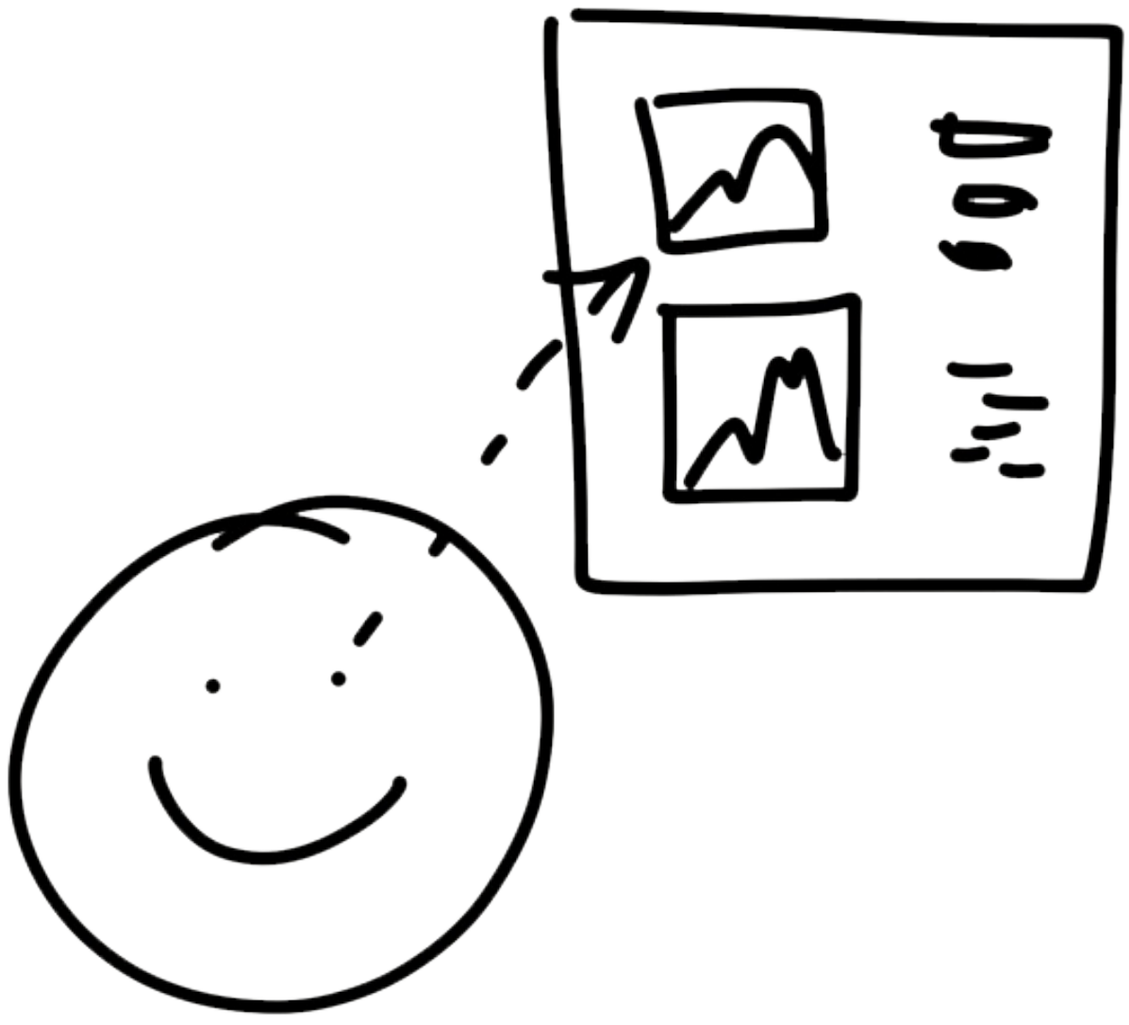


SKETCHING IS EXTERNALIZING YOUR WORK

Sketching is all about getting ideas out of your head.

Thinking only exercises one part of your brain. Looking engages more of your brain.

Getting sketches in front of coworkers and users engages their brains too.

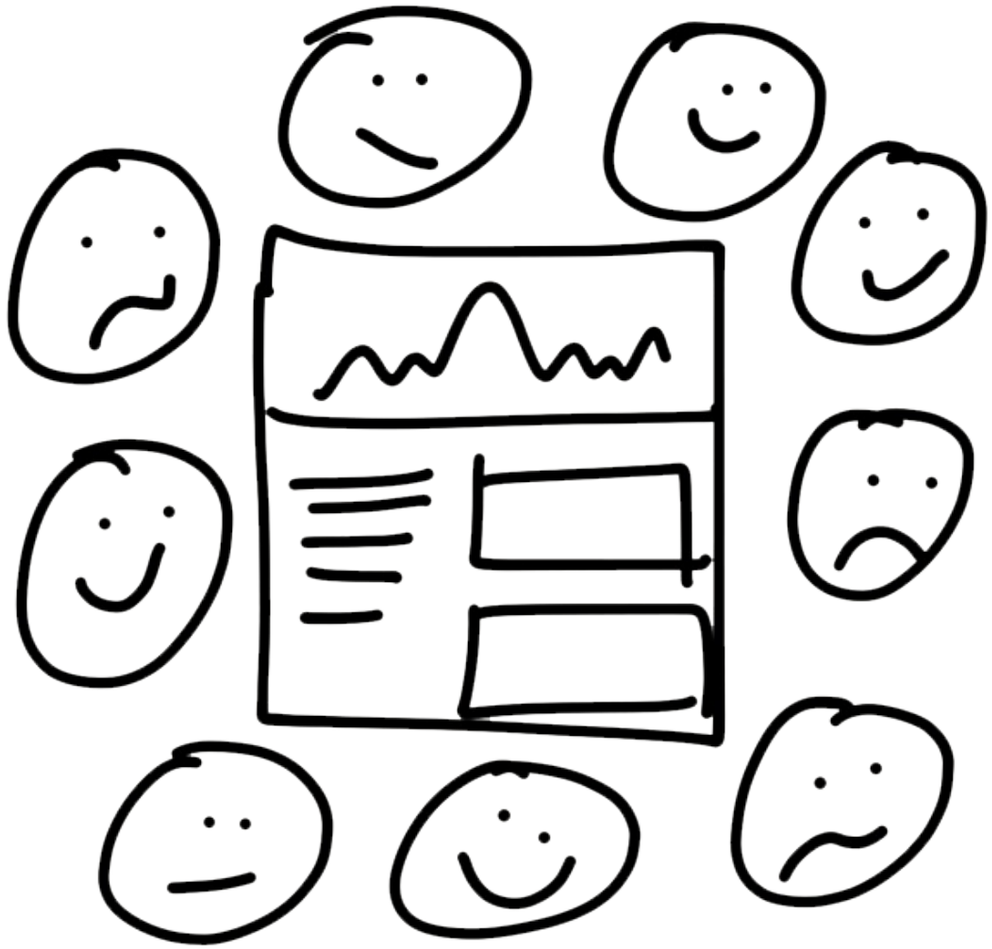


SKETCHING IS MAKING OVER ANALYSIS

Make to think!

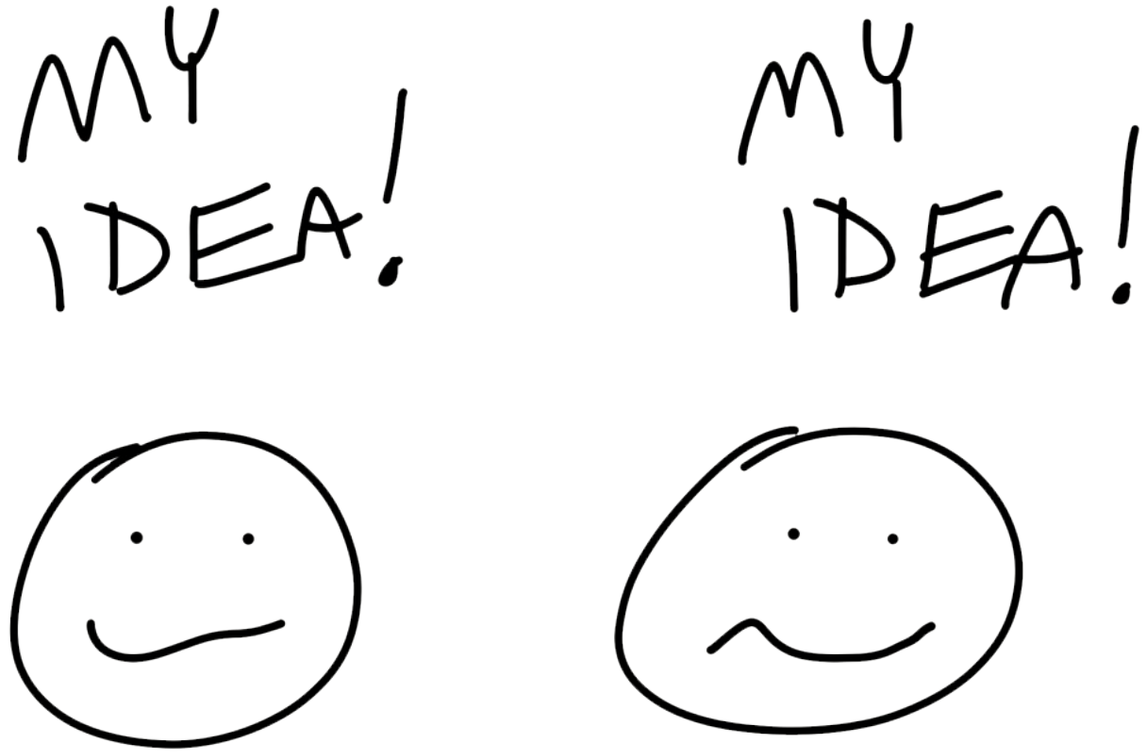
Over-analyzing a problem can lead to fear that you're missing something, which leads to analysis paralysis.

Making rough things helps you get a direct response from your target users.



SKETCHING HELPS SHARED UNDERSTANDING

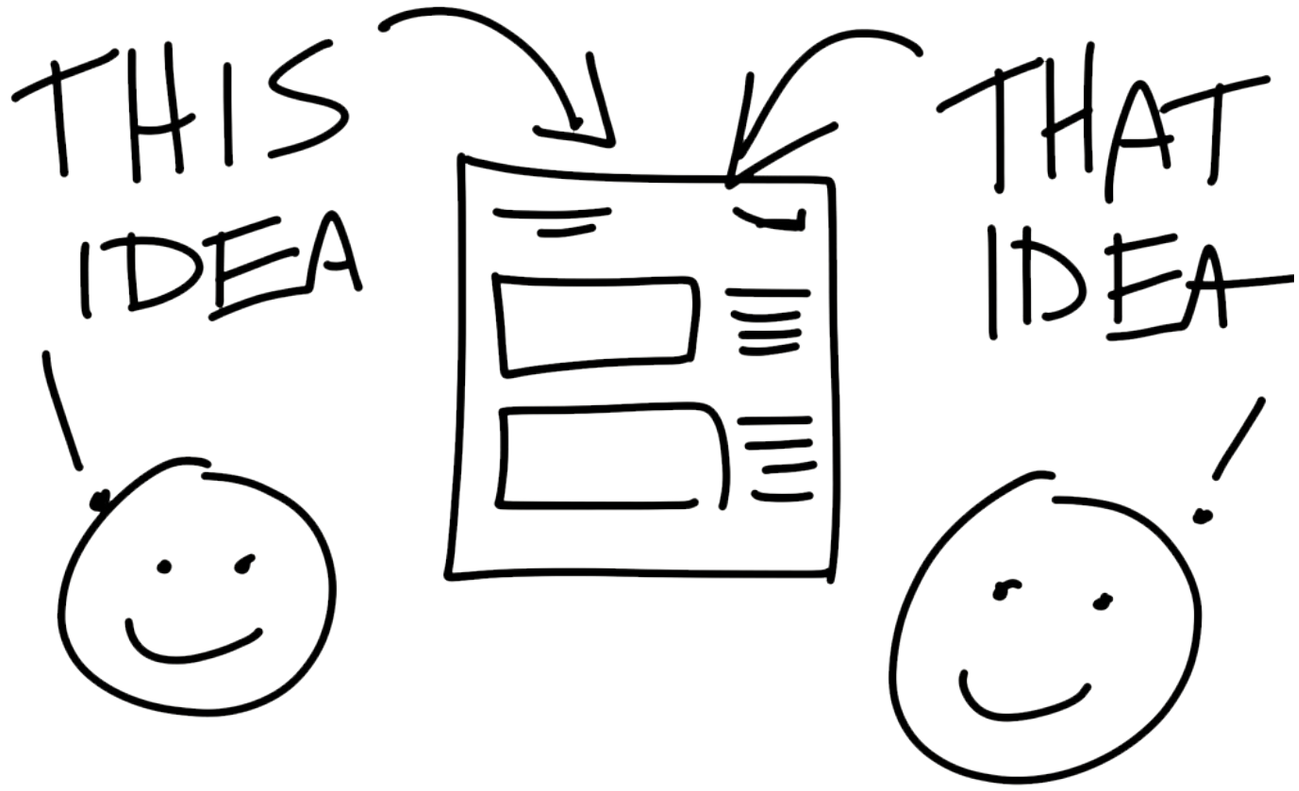
Sketching minimizes competition between different ideas.



SKETCHING HELPS SHARED UNDERSTANDING

Sketching minimizes competition between different ideas.

It turns the idea into a third party that everyone is free to critique.

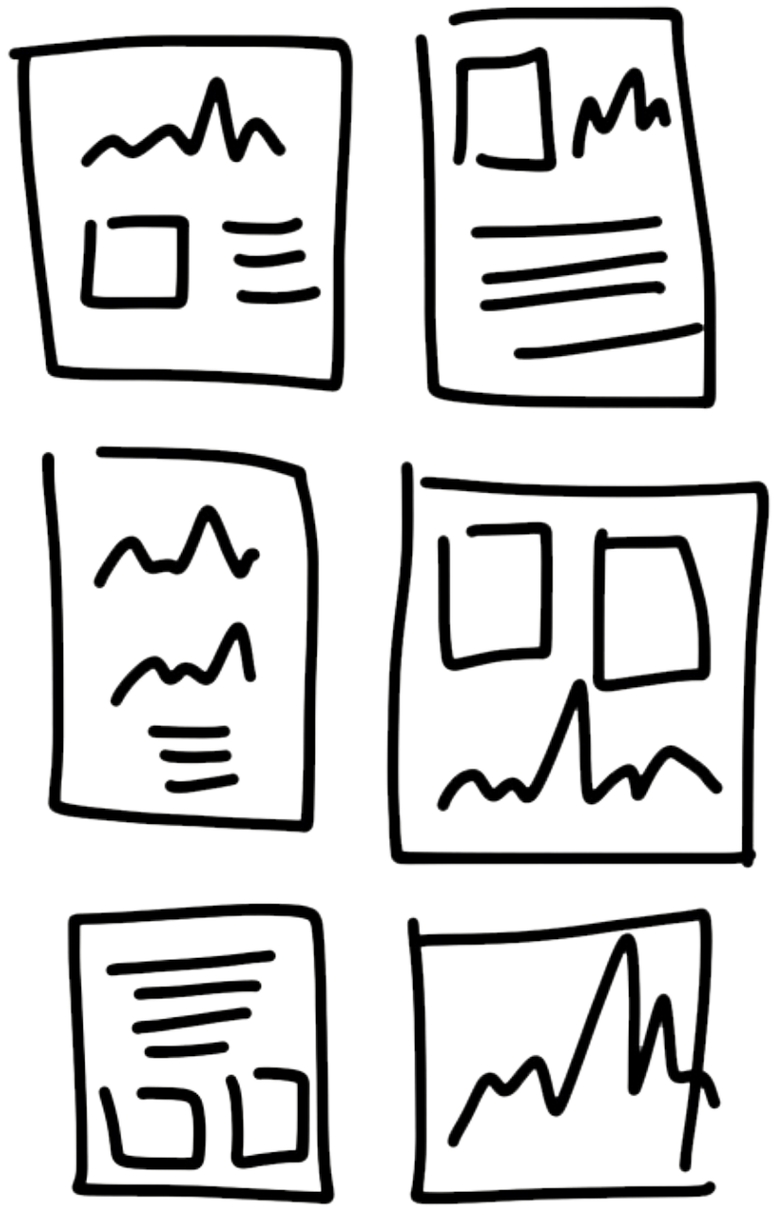


SKETCHING IS ALL ABOUT RAPID FAILURE

Your first solution probably won't be your best one.

Use paper to make your mistakes cheaply and quickly.

And then make some more!



SKETCHING IS NOT DRAWING

Anybody can sketch. This isn't about art!

Ugly is fine! And expected!

Speed is more appropriate than perfection.

And remember...

SKETCHING IS NOT DRAWING

Anybody can sketch. This isn't about art!

Ugly is fine! And expected!

Speed is more appropriate than perfection.

And remember...

Activity #1: Sketching

YOUR TOOLS, YOUR FRIENDS

Blank paper

Sticky notes

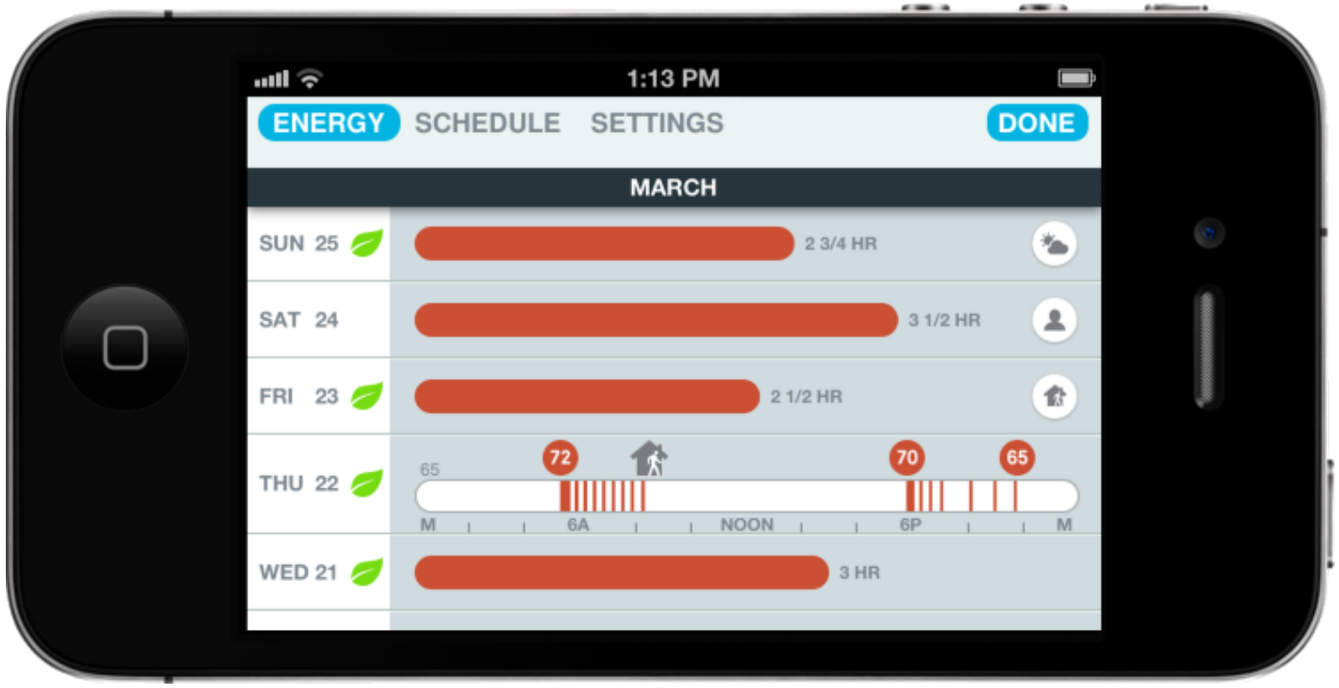
Sharpies!

ACTIVITY #1: SKETCHING

Theme: The Smart Home Manager

nest
IN 20 MIN
72
75

nest
IN 20 MIN
72
75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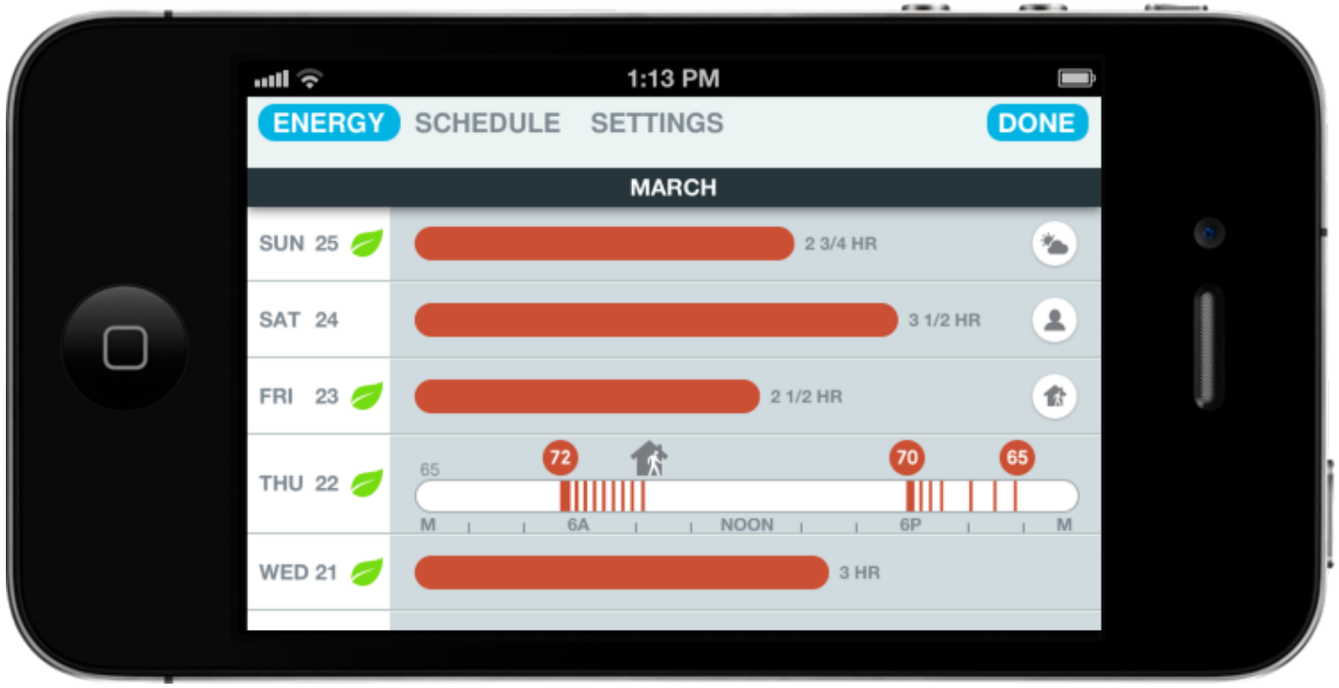
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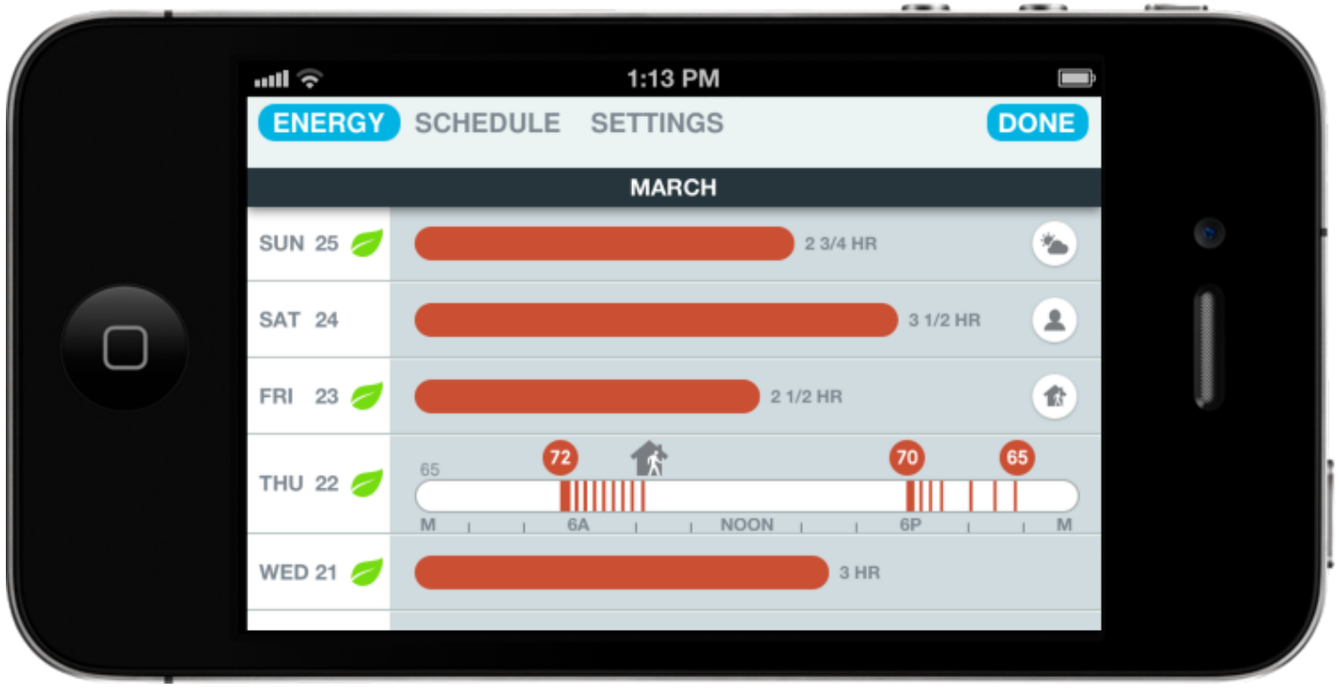
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Roku 2
Roku

nest
IN 20 MIN
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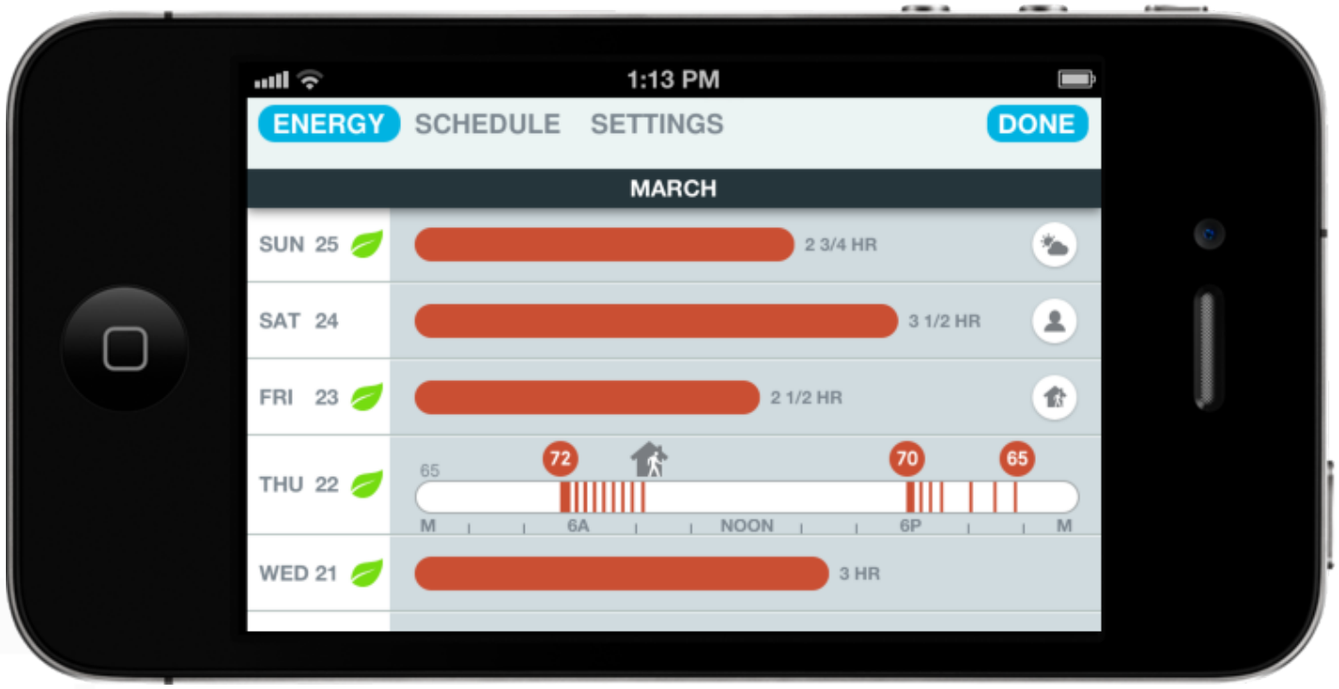
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MPG
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Score
4:35
HOURS
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MILES
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Feb 6
Mission St, SF, CA
66.3 miles
$9.06
3:56 PM
Trenton Rd, Santa Rosa, CA
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$1.23
Round Barn Blvd, Santa Rosa, CA
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Petaluma
Vallejo
Concord
San Francisco
Oakland
Hayward
Fremont
San Francisco Airport (SFO), CA
4.8 miles
$0.68

Roku 2
Roku

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IN 20 MIN
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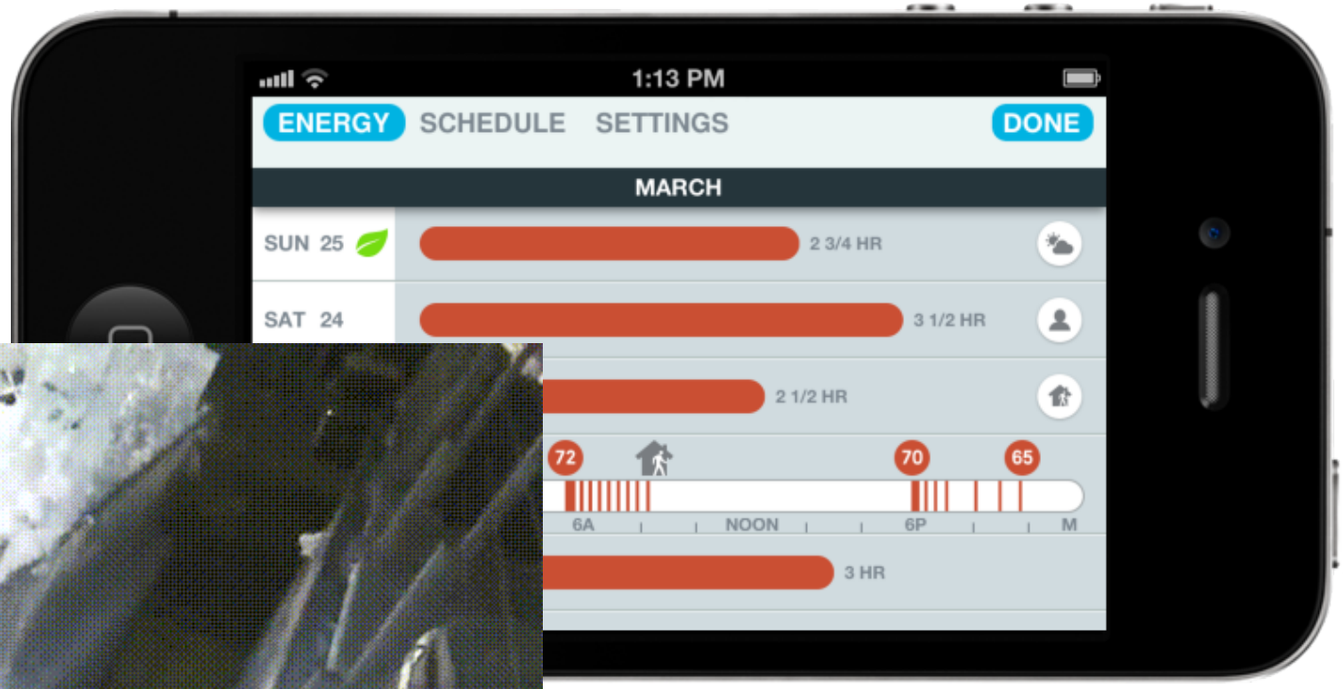
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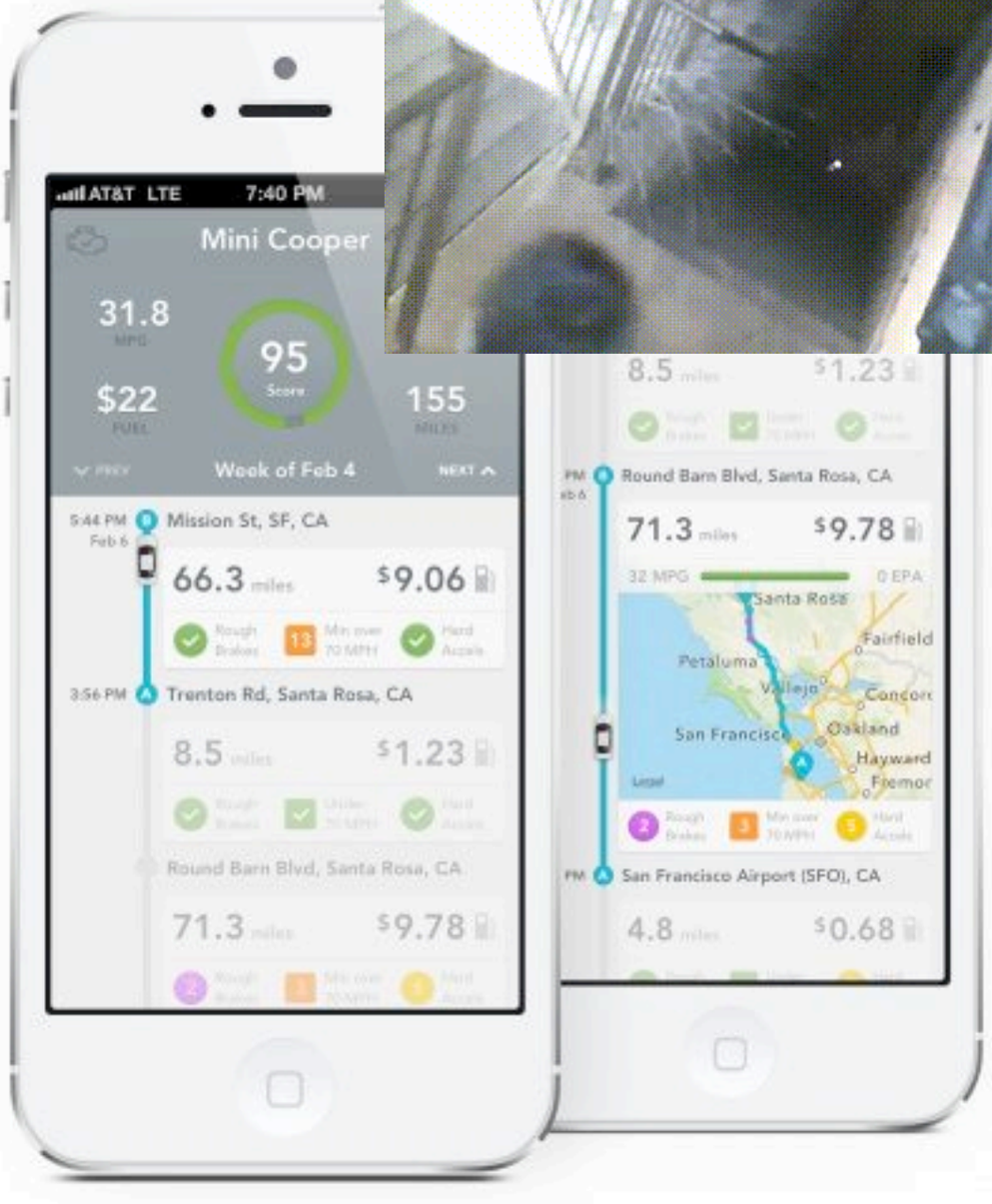
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Roku

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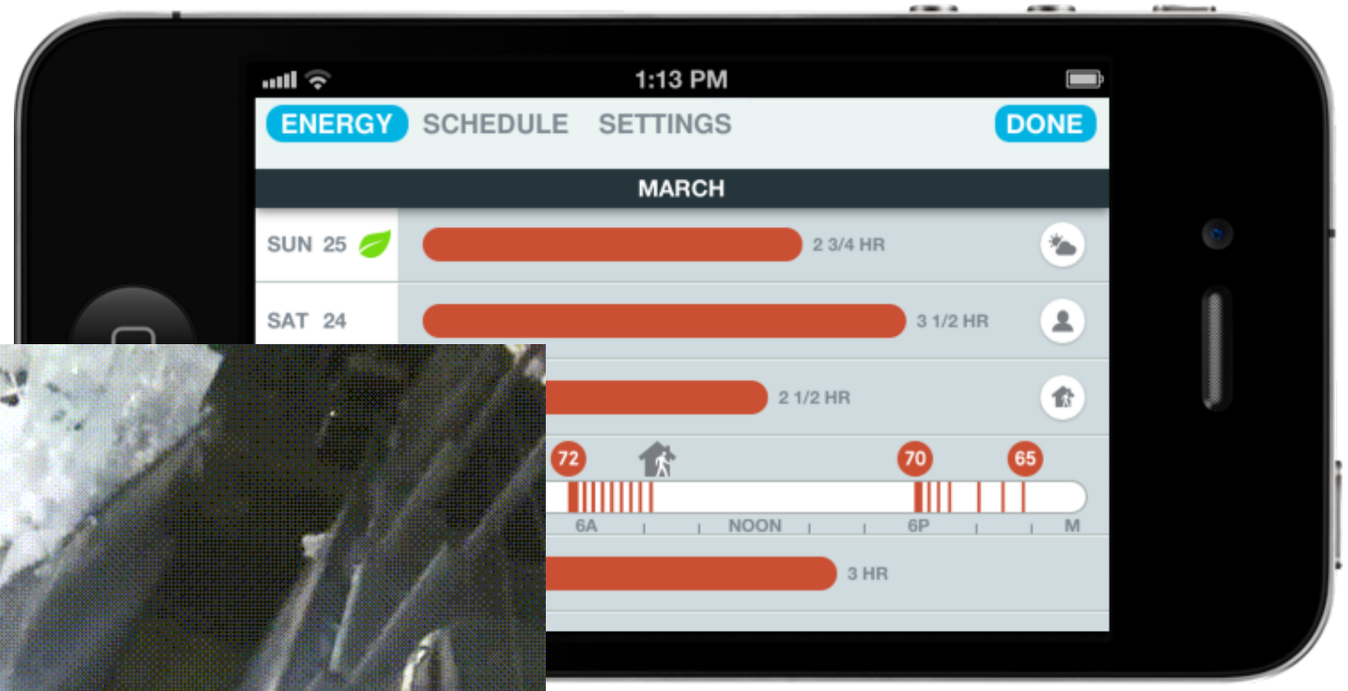
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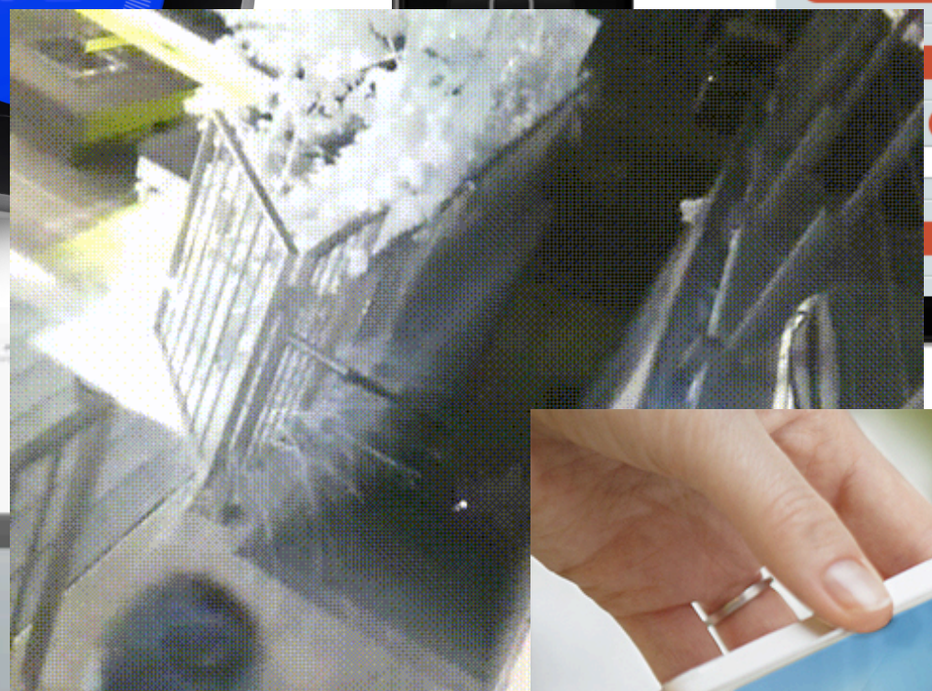

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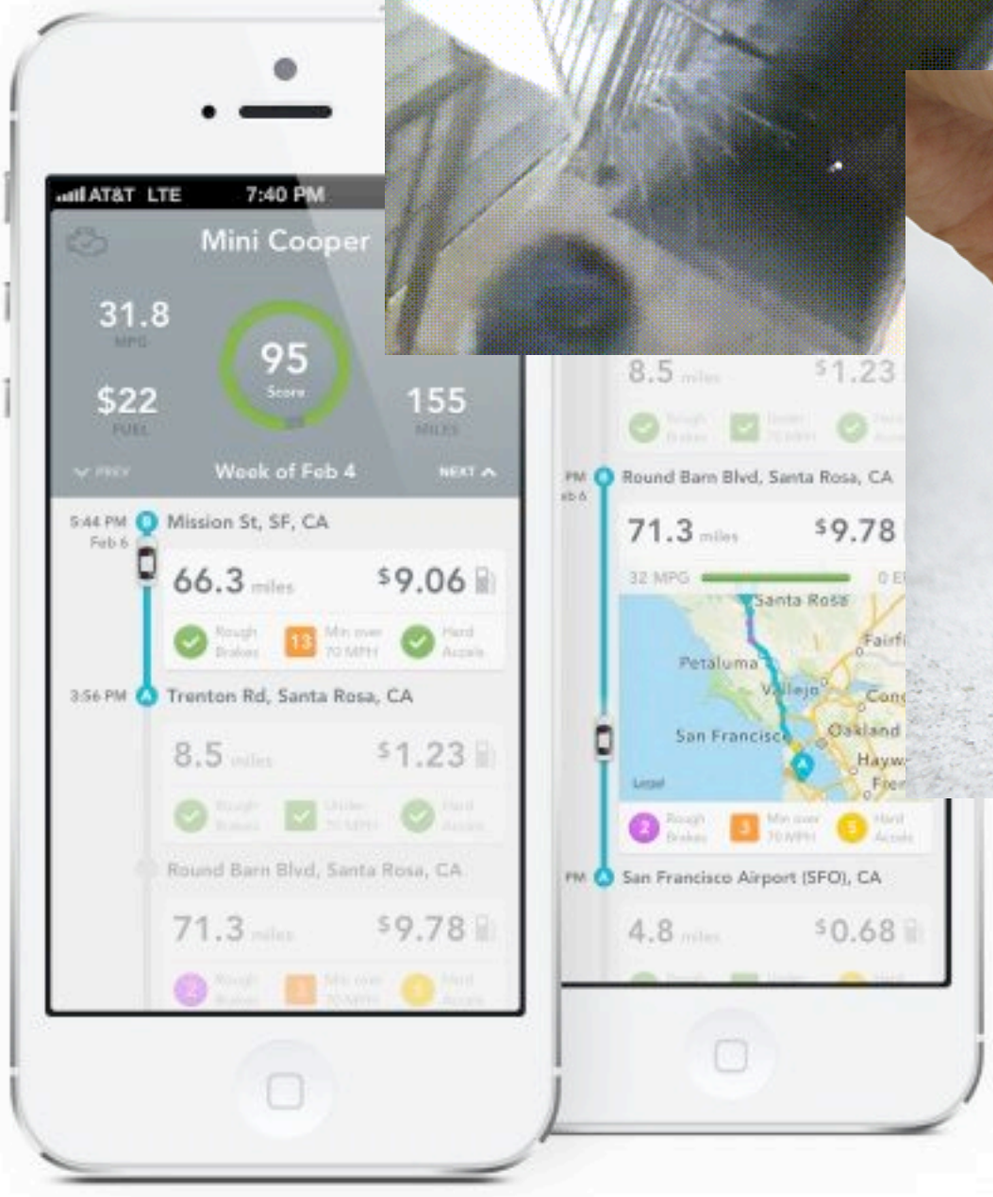
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71.3 miles
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32 MPG
Santa Rosa
Petaluma
Vallejo
San Francisco
Oakland
PM
San Francisco Airport (SFO), CA
4.8 miles
$0.68

Roku 2
Roku

ACTIVITY #1: SKETCHING

Theme: The Smart Home Manager

Think of all the connected things in your home

Imagine a system that lets you view and manage all of those things

FIRE-BREATHING ROBOT, WITH... TOUCH SCREEN.

ACTIVITY #1: SKETCHING

Sketch as an individual (15 min)

Share your sketches with your team (1 min per person)

Establish a design direction as a team (5 min)

As a team, iterate on your shared design (15 min)

Present your design to the other teams (1 min per group)

ACTIVITY #1: SKETCHING

Feeling stuck?

Start with words

One idea per sticky

Quantity over quality

Cluster and iterate

ACTIVITY #1: SKETCHING

Feeling stuck?

Who uses it?

What does it do?

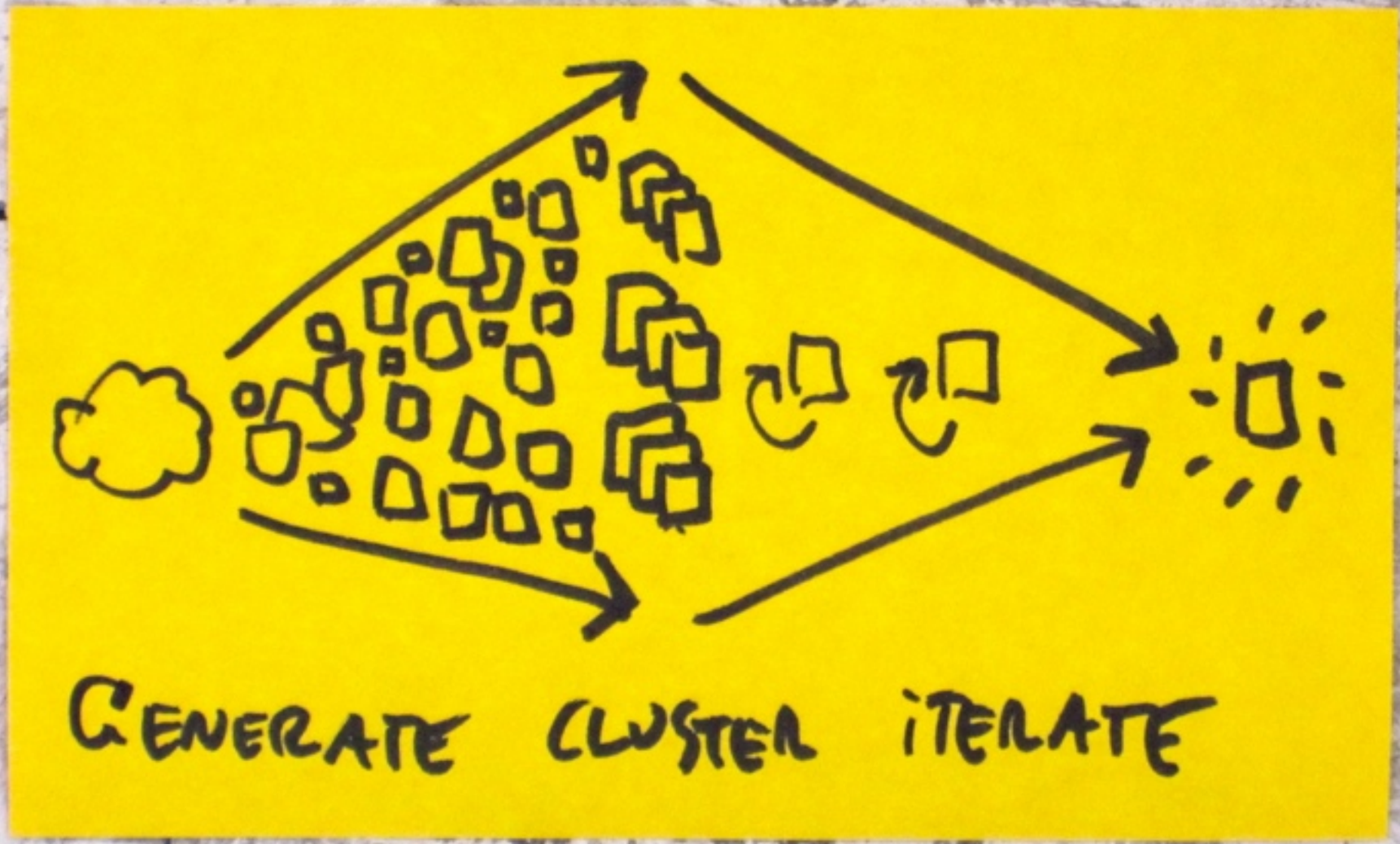
Where do they use it?

When do they use it?

How do they use it?

Why would they use it?

Nice work!


GENERATE CLUSTER ITERATE

Break

15 minutes

TODAY'S SCHEDULE

1:00–1:10 Settle In & Introductions (10min)

1:10–1:20 Our Perspective (10min)

1:20–1:30 Sketching (10min)

1:30–2:30 Sketch Activity (60 min)

2:30–2:45 **Break** (15 min)

2:45–3:00 Design Systems (15 min)

3:00–3:15 Coding (15 min)

3:15–4:15 Coding Activity (60 min)

4:15–4:30 Wrap Up (15 min)

Design Systems

A design system is a collection of visual and interaction elements that embodies the brand

The system is often expressed across many channels including web, mobile, desktop, and service so that a consistent user experience is produced

COMPONENTS OF A DESIGN SYSTEM

Logo. A visual metaphor and often the most recognizable part of a design system.

Color. A consistent color palette supports the system by communicating brand tone.

Imagery. Enhances core qualities of the brand and provides recognizable anchors.

Structure. Organizes content and interface for software and hardware design.

Messaging. Expresses intangible emotional values and purpose or instruction.

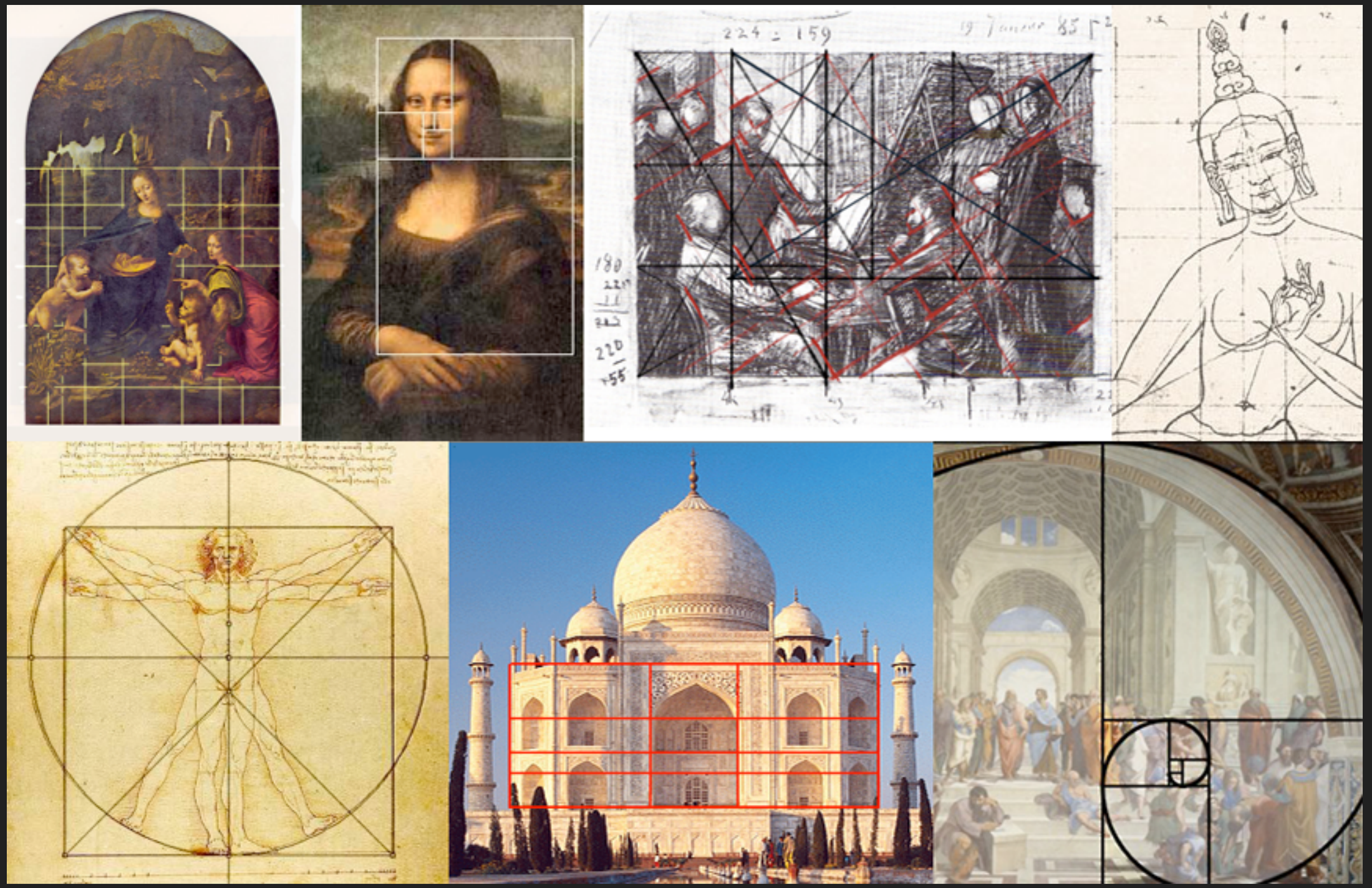
Typography. A recognizable brand element that reinforces a unified experience.

Interaction. Patterns for interacting with UI elements creating a quality experience.

DIETER RAMS - BRAUN 1955-1995

PHYSICAL WORLD

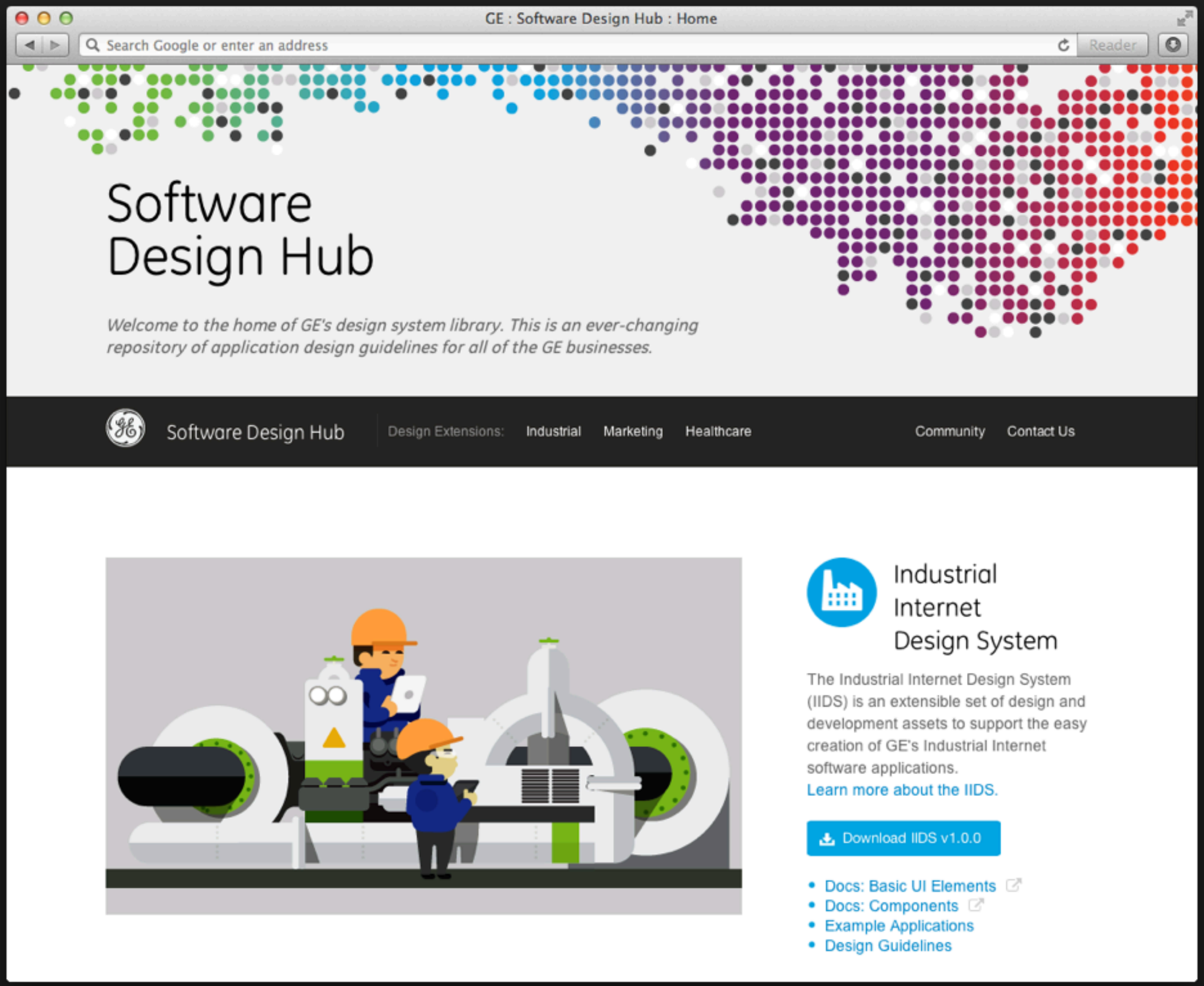
DESIGN SYSTEMS ARE NOTHING NEW



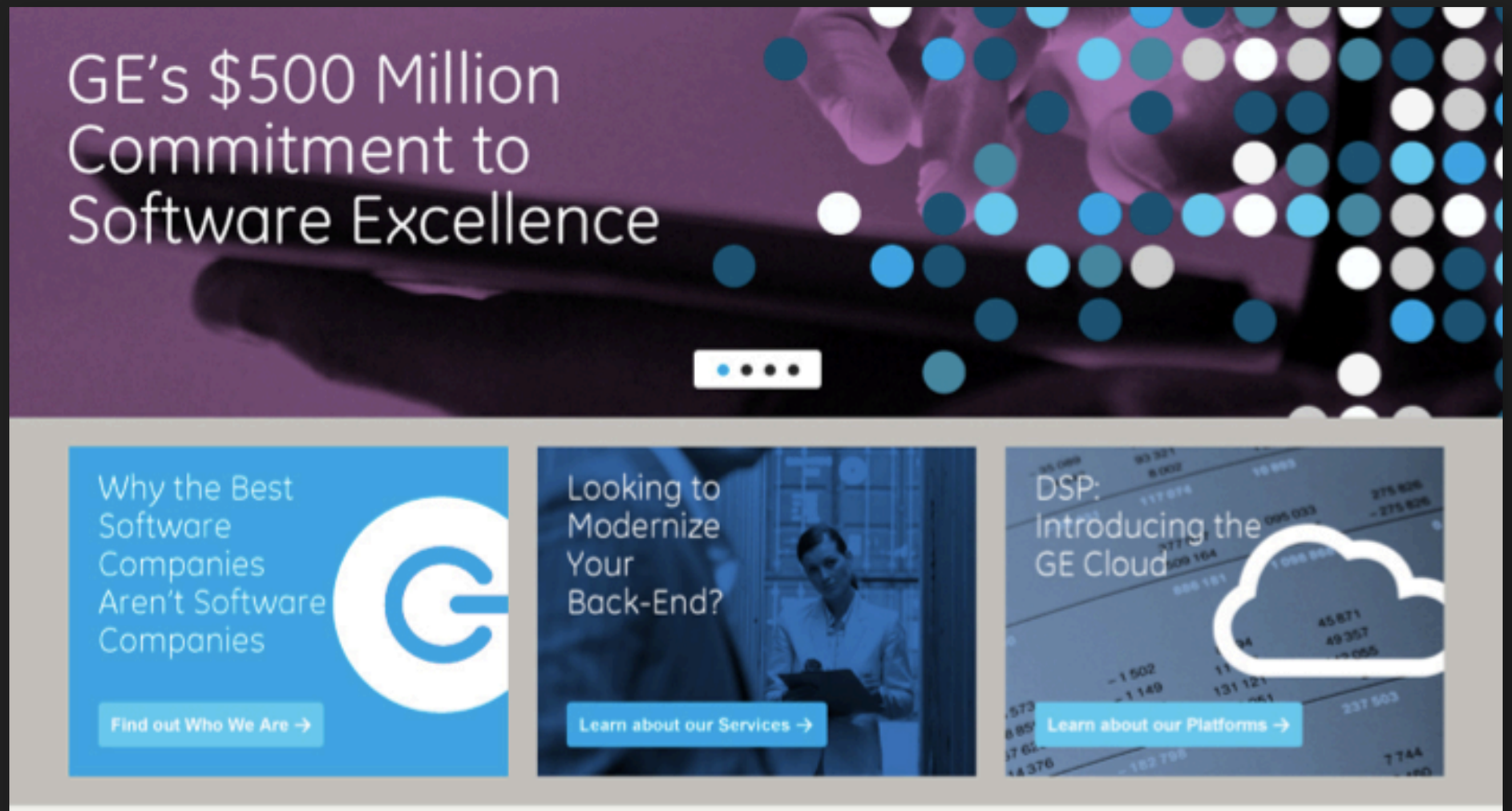
HARDWARE & SOFTWARE

GE Design Systems

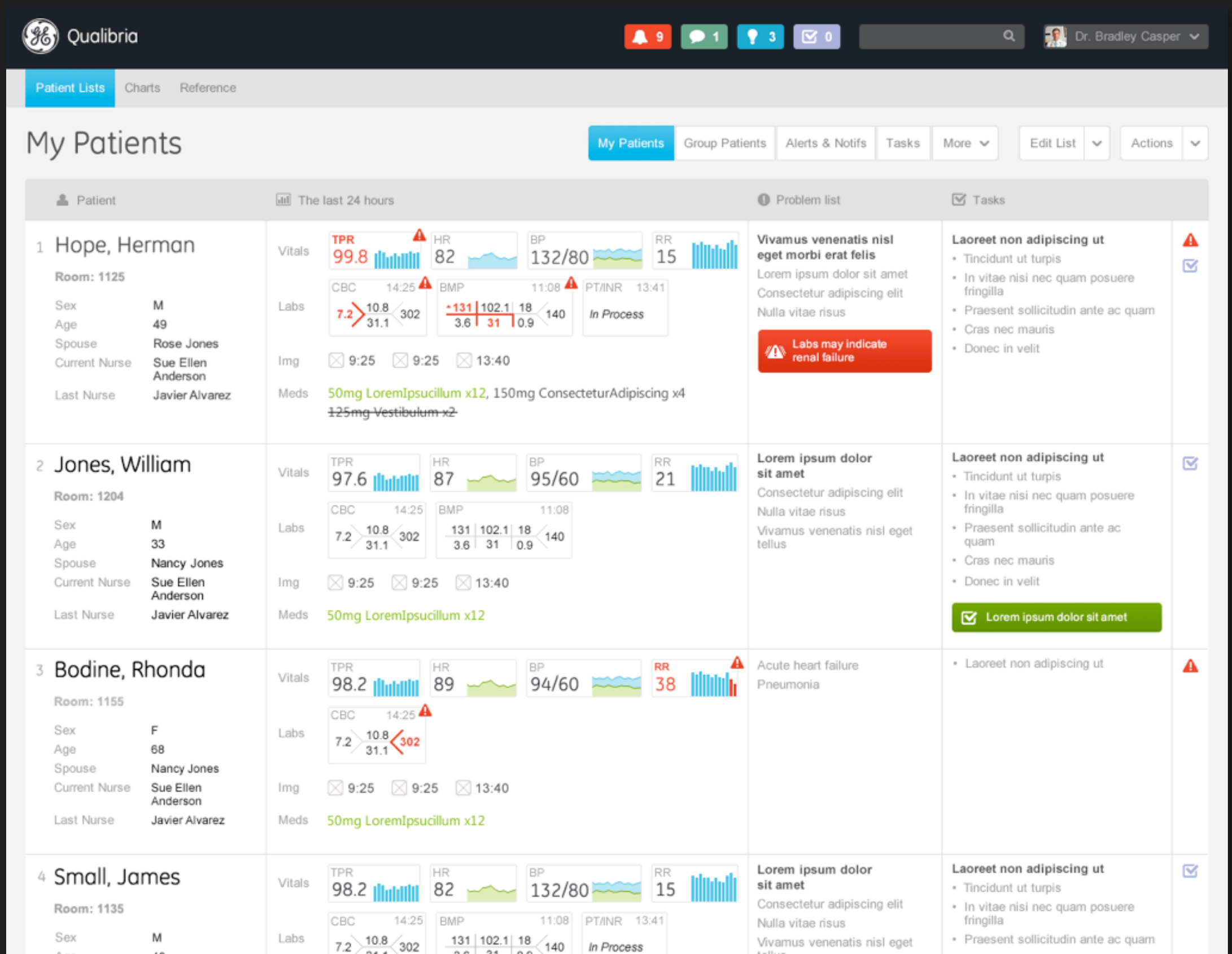
SHARING DESIGN SYSTEMS WITH OTHERS



MARKETING DESIGN SYSTEM

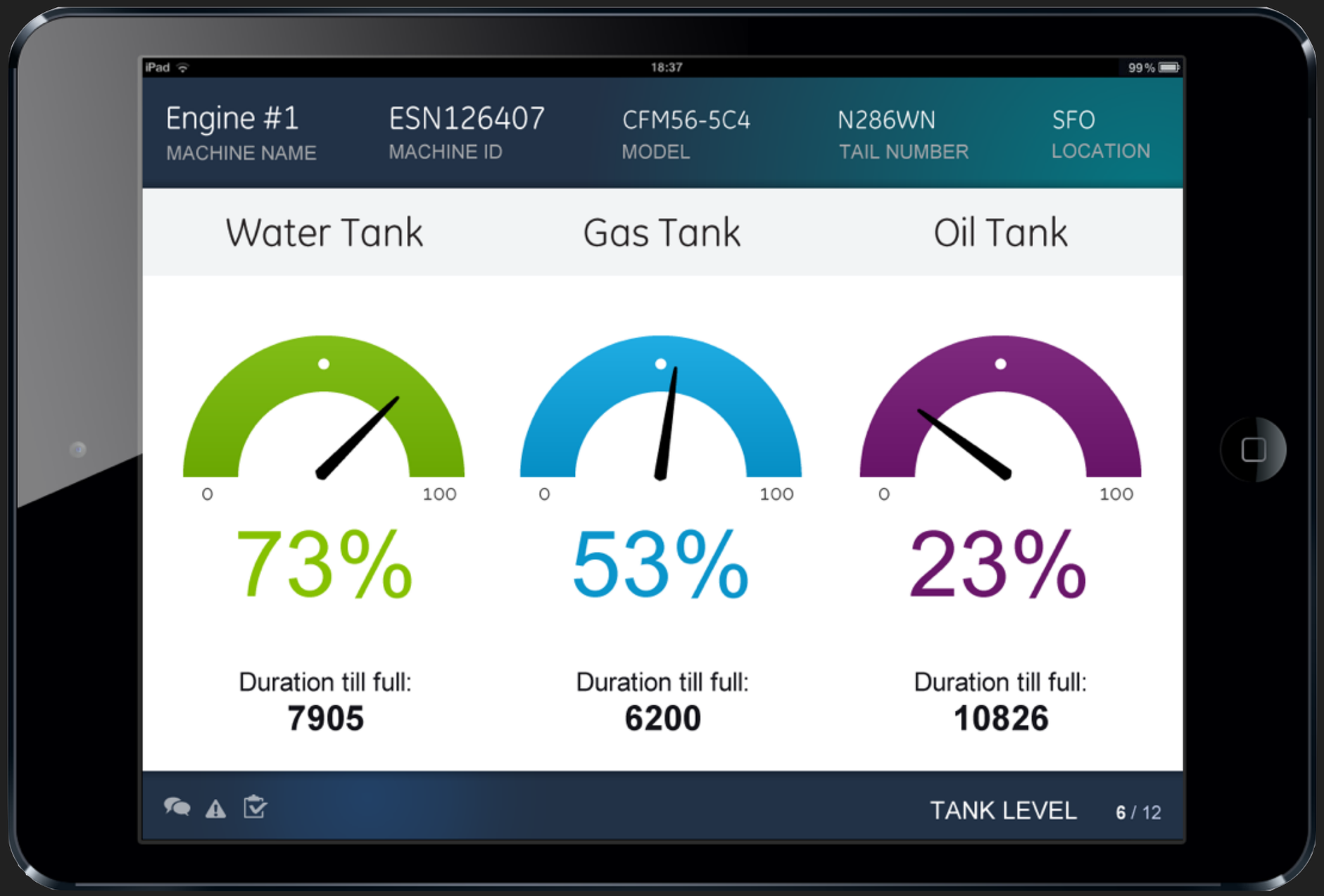


HEALTHCARE DESIGN SYSTEM

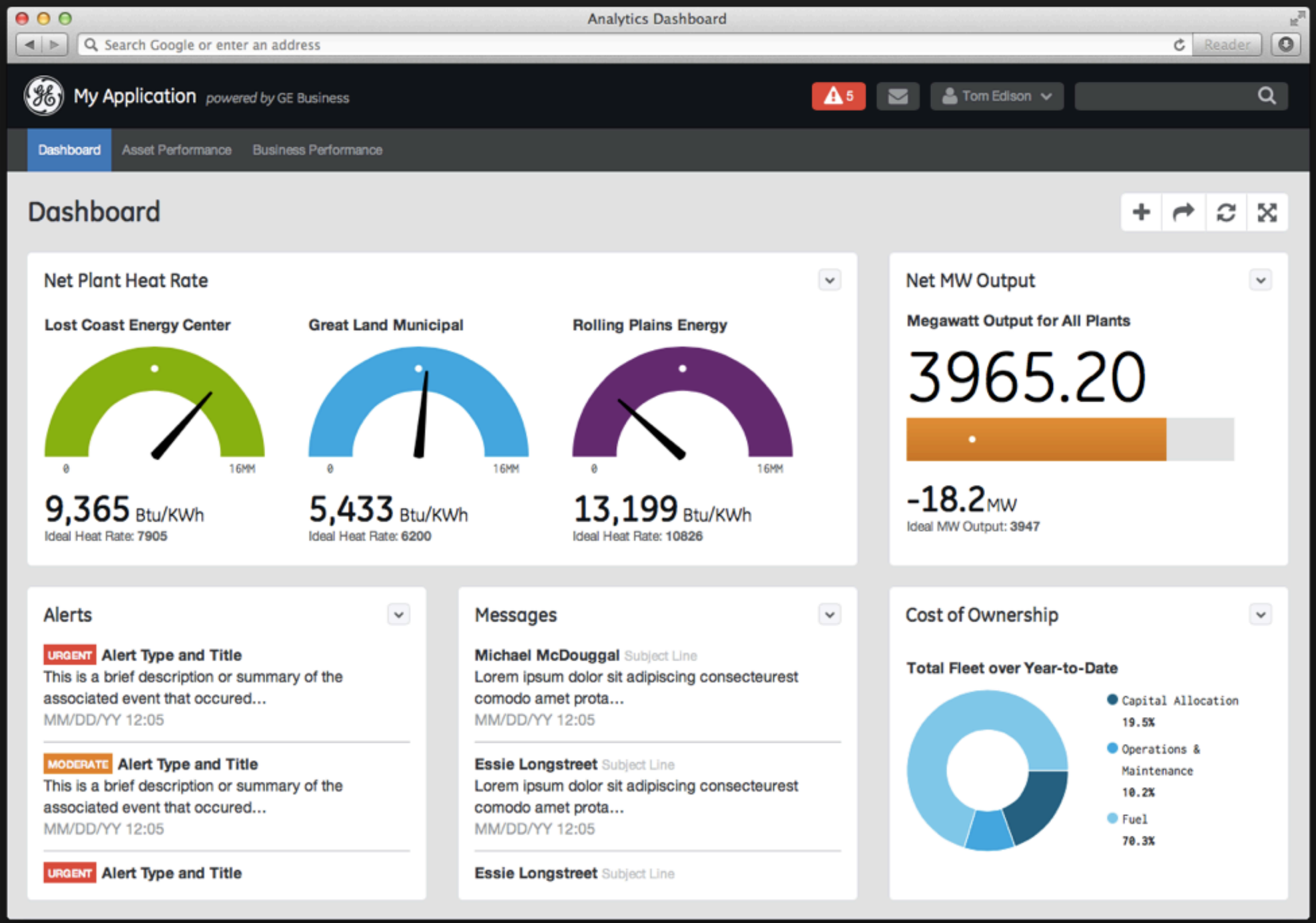


MOBILE DESIGN SYSTEM

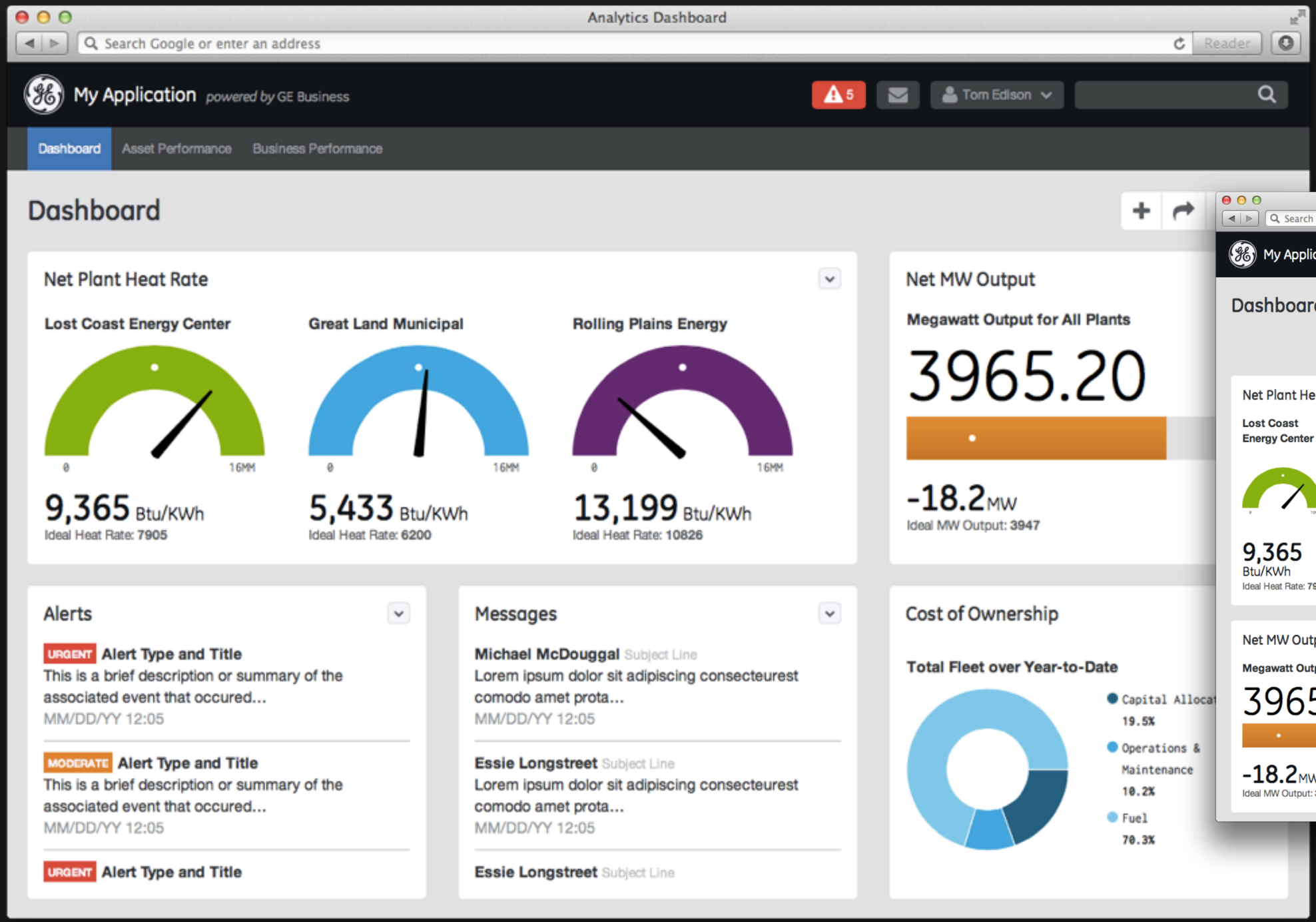
TABLET DESIGN SYSTEM

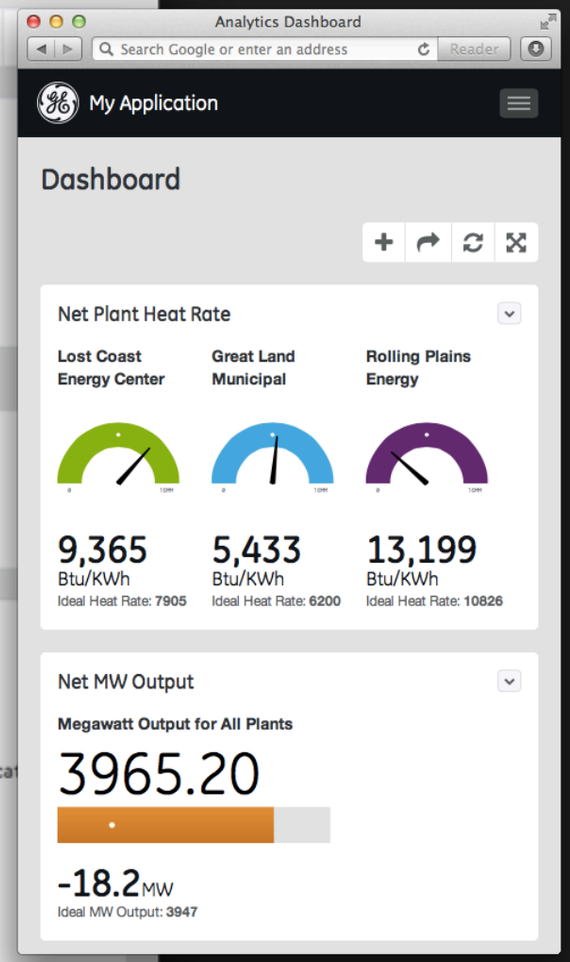


INDUSTRIAL INTERNET DESIGN SYSTEM



INDUSTRIAL INTERNET DESIGN SYSTEM

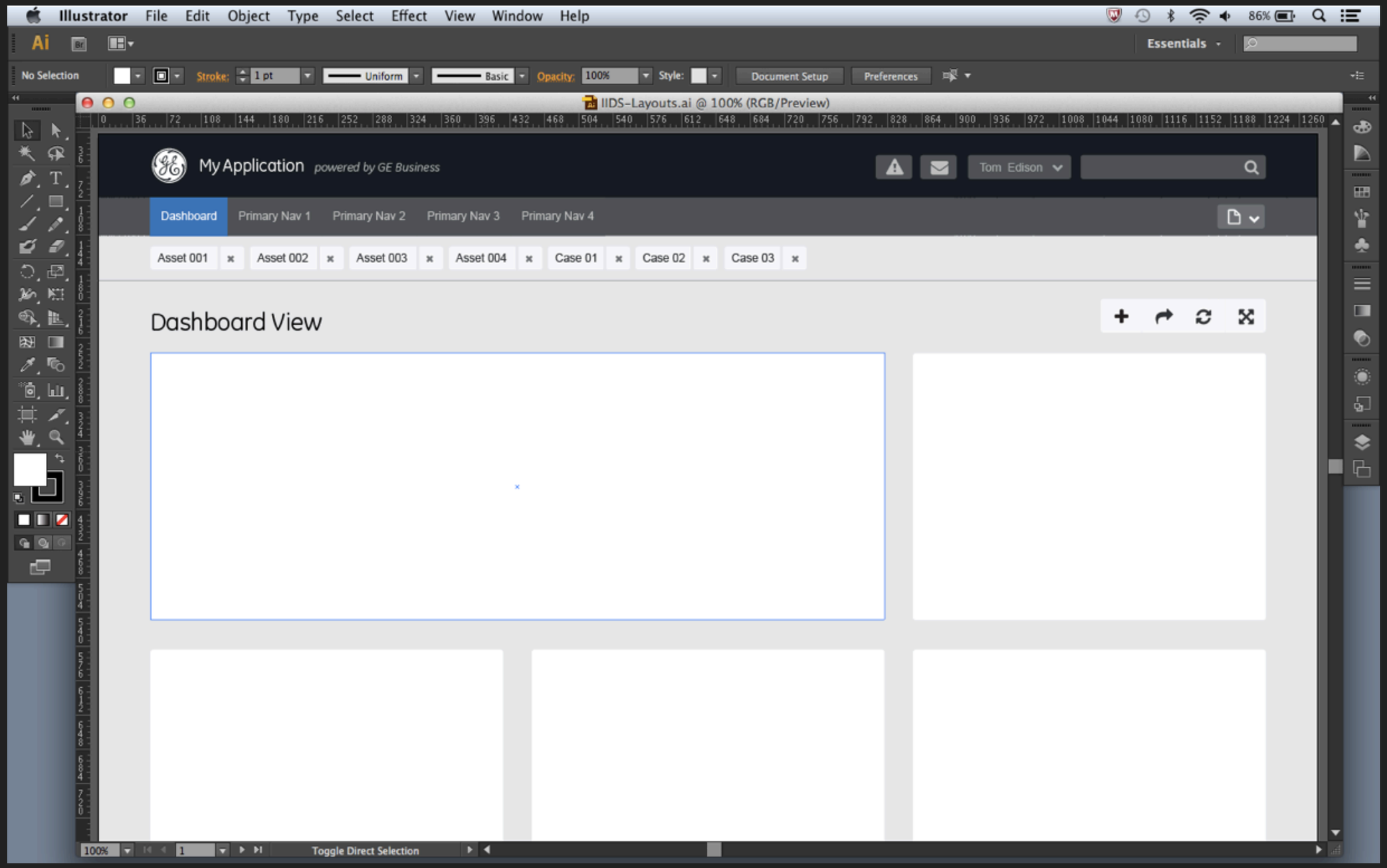




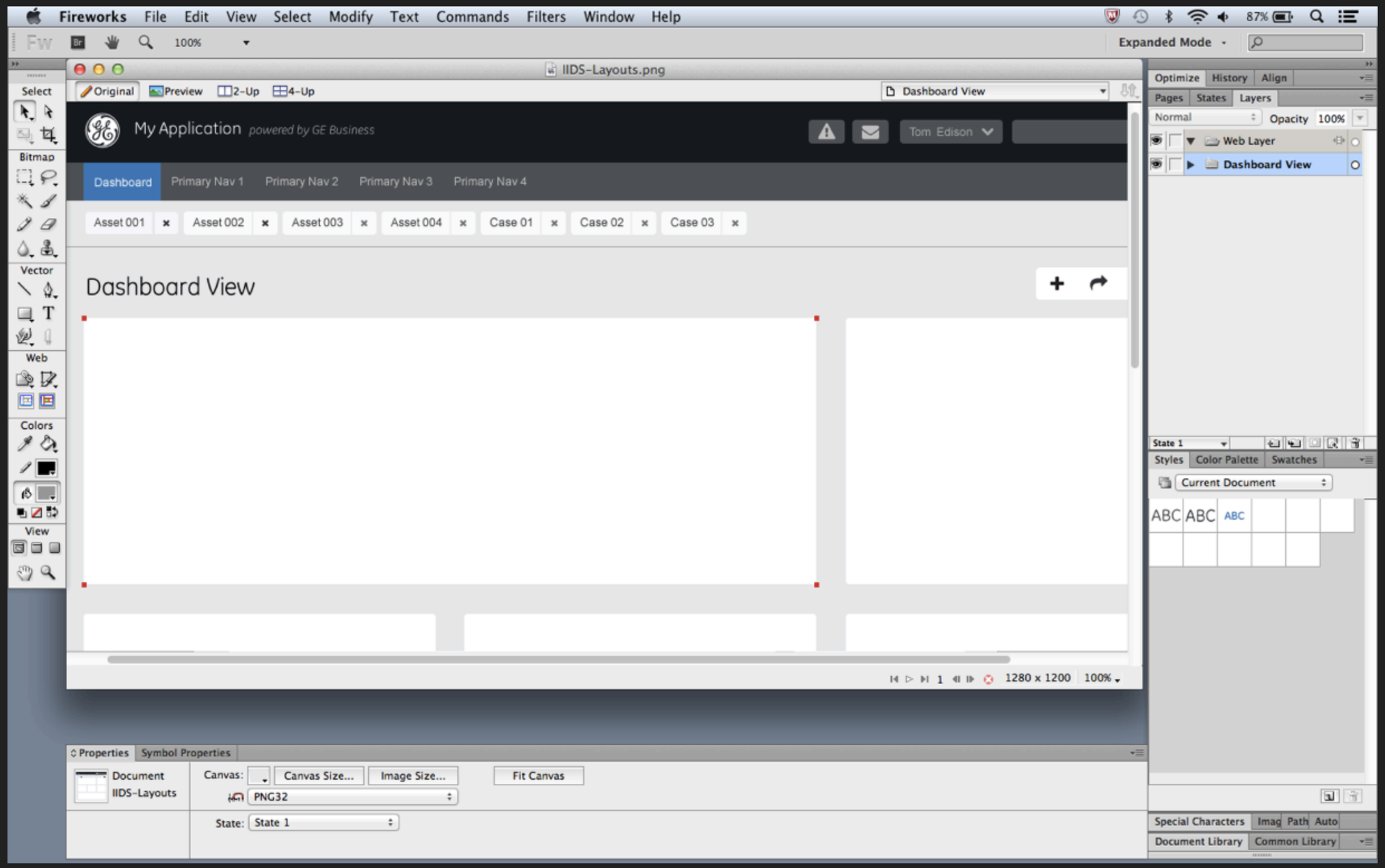
INDUSTRIAL INTERNET DESIGN GOALS

- Speed application development
- Improve software UI quality
- Enable extension and reuse
- Support additional verticals & external partners
- Minimize ongoing support needs

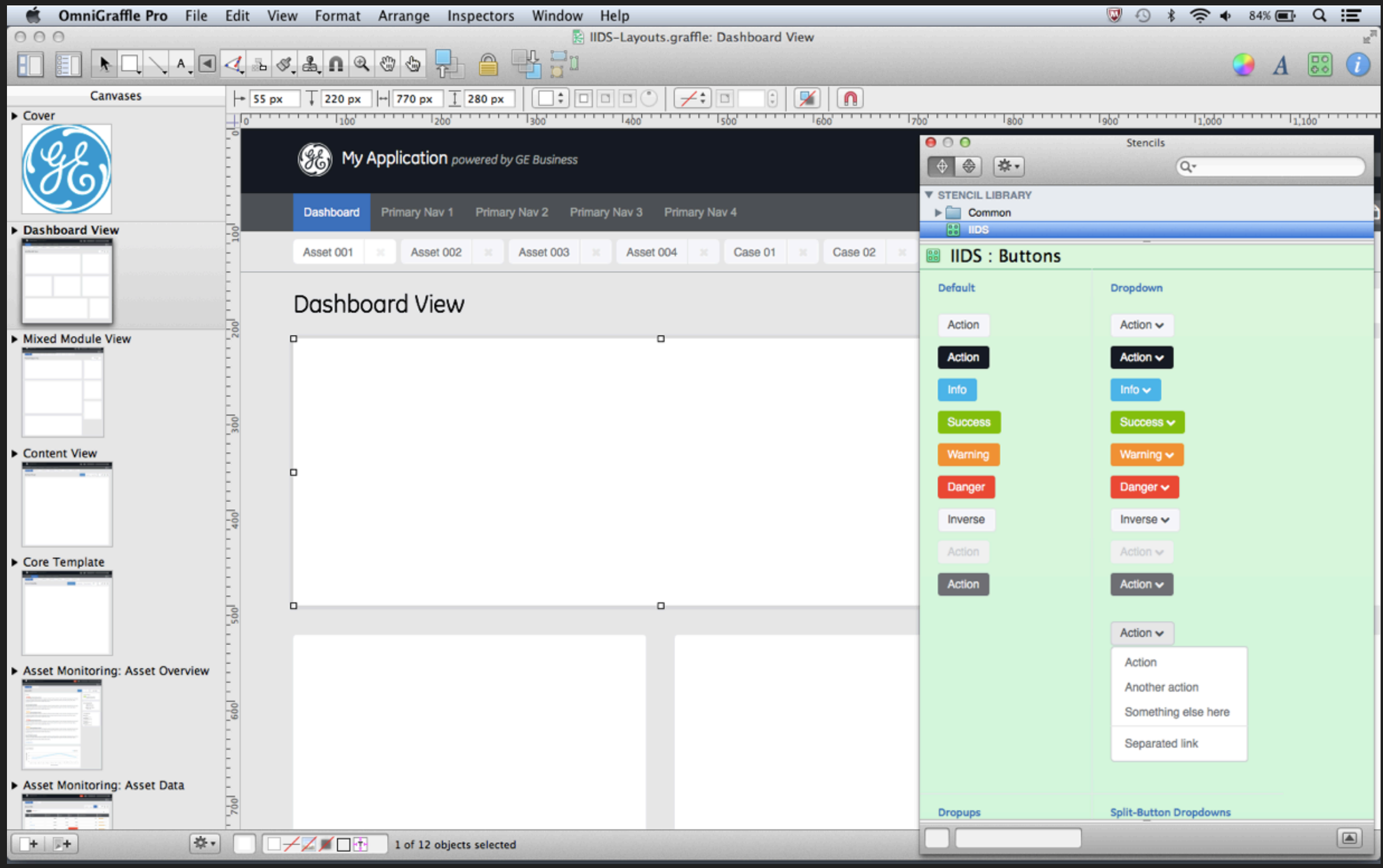
DESIGN TEMPLATES



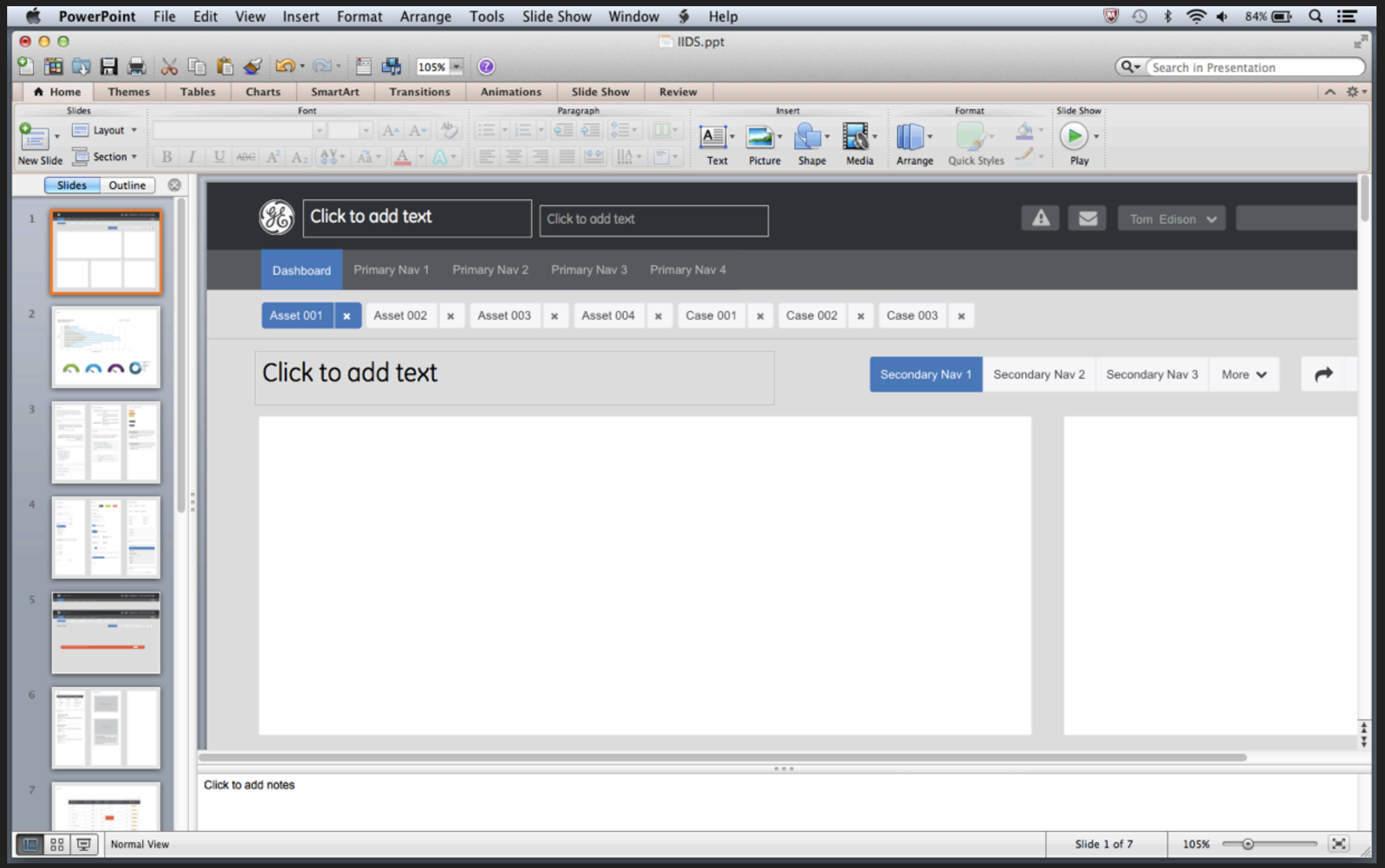
DESIGN TEMPLATES



DESIGN TEMPLATES



DESIGN TEMPLATES

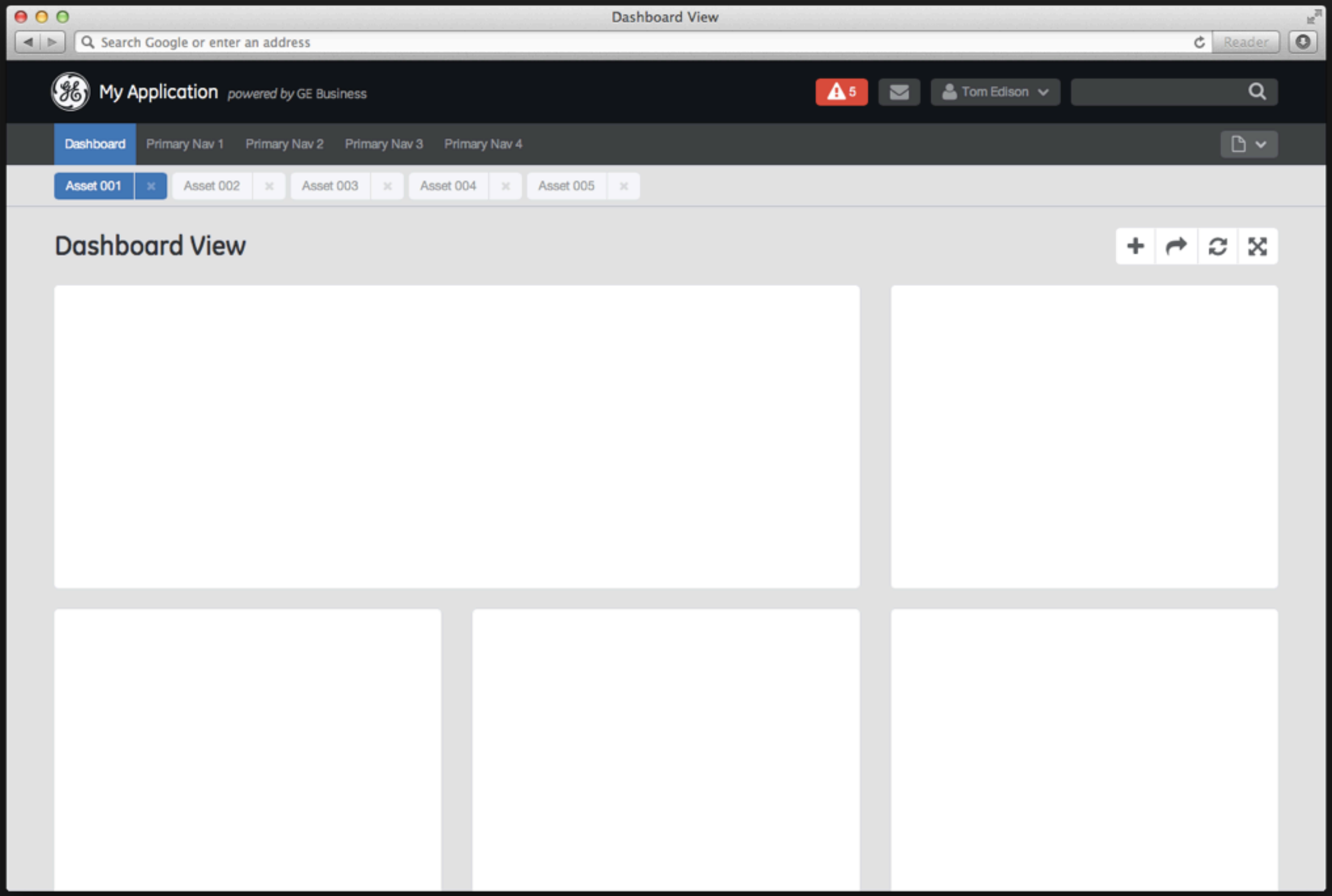


Prototyping in Code

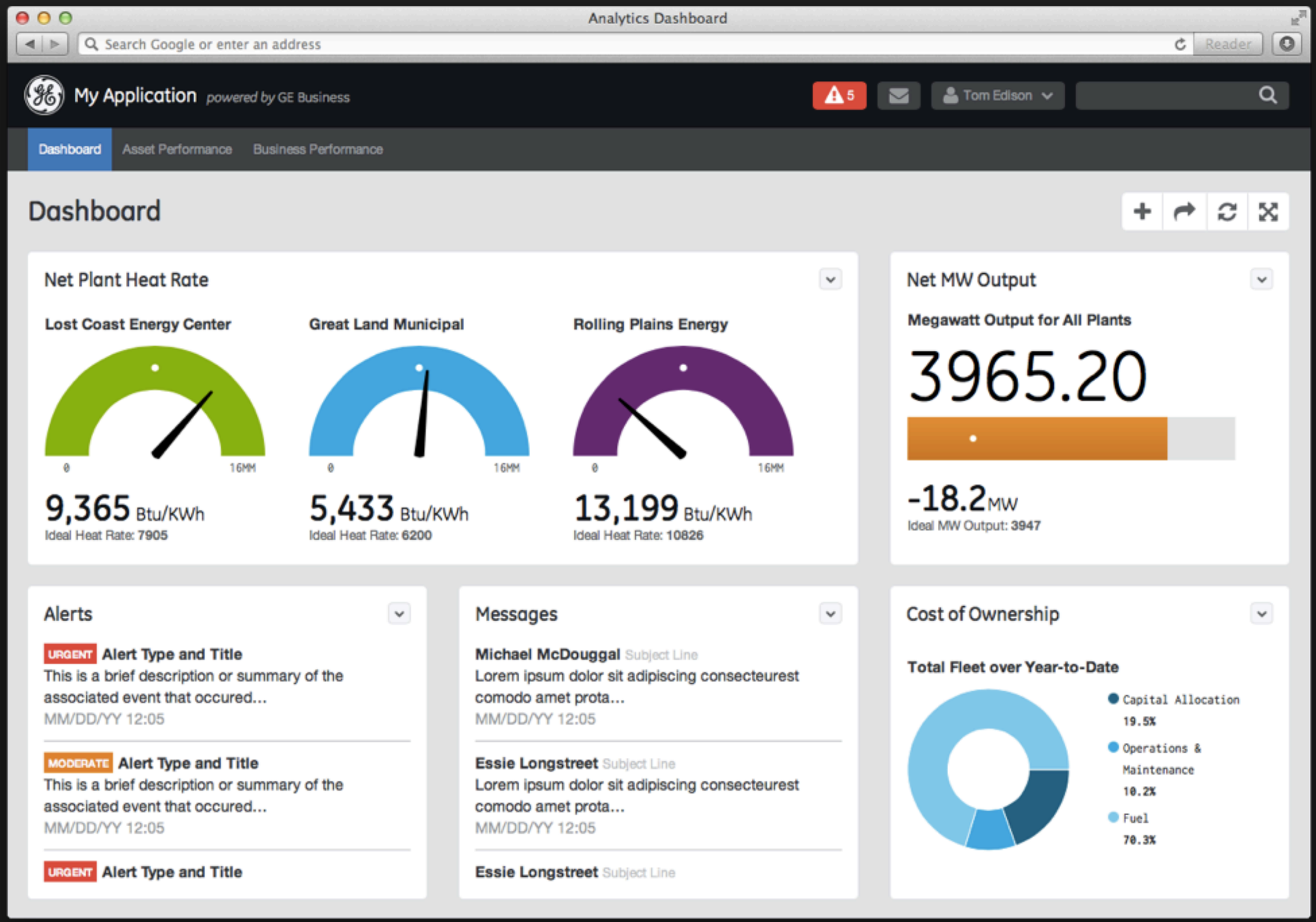
The Industrial Internet Design System (IIDS)

A code-based design framework that establishes visual and interactive patterns for all of GE's industrial internet software

IIDS - INDUSTRIAL INTERNET DESIGN SYSTEM

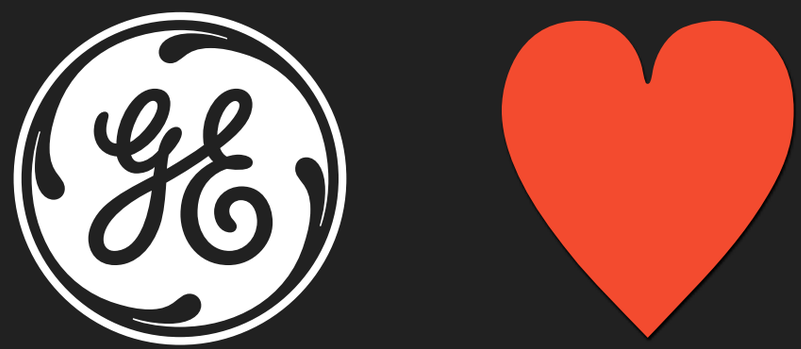


IIDS - INDUSTRIAL INTERNET DESIGN SYSTEM



<!DOCTYPE html>

```
<title>Dashboard View</title>
    <meta name="viewport" content="width=device-width">
    <link href="./css/themes/iids/iids.min.css" rel="stylesheet"
    <!--
    Include modernizr and respond first so they can shim any
    elements which are missing in older browsers. Other javascri
    should be included at the end of the page to improve load ti
    -->
    <script src="./js/vendor/modernizr-respond.js"></script>
  </head>
  <body>
    <div class="navbar">
      <div class="masthead navbar-inner">
        <div class="container">
          <a class="brand" href="#"><span class="ge-logo">Genera
          <button class="btn btn-collapse" data-toggle="collapse
            <i class="icon-bar"></i>
            <i class="icon-bar"></i>
            <i class="icon-bar"></i>
          </button>
```



Bootstrap

jQuery
write less, do more.

less

Highcharts JS

D3.js

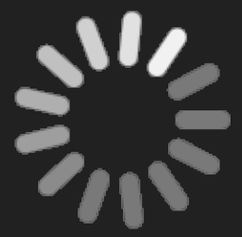
TM

Knockout.

D3.js

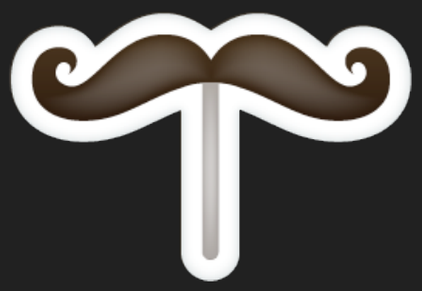
jQuery
user interface

jQuery
write less, do more.



express

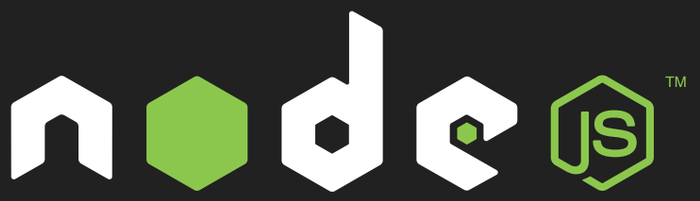
handlebars



play

{less}

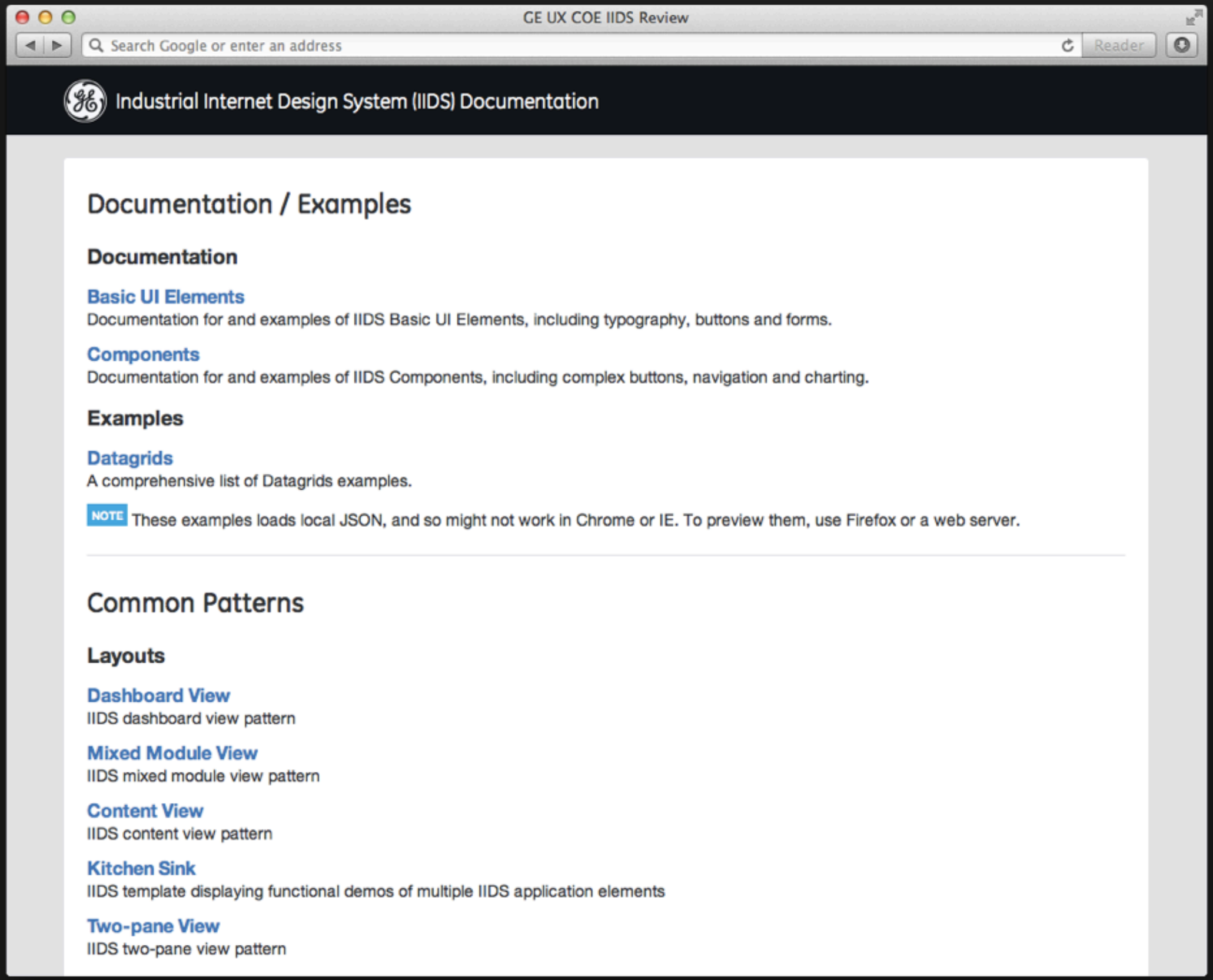
Bootstrap



Highcharts JS

DataTables

Font Awesome


GE UX COE IIDS Review
Search Google or enter an address
Reader
Industrial Internet Design System (IIDS) Documentation
Documentation / Examples
Documentation
Basic UI Elements
Documentation for and examples of IIDS Basic UI Elements, including typography, buttons and forms.
Components
Documentation for and examples of IIDS Components, including complex buttons, navigation and charting.
Examples
Datagrids
A comprehensive list of Datagrids examples.
NOTE These examples loads local JSON, and so might not work in Chrome or IE. To preview them, use Firefox or a web server.
Common Patterns
Layouts
Dashboard View
IIDS dashboard view pattern
Mixed Module View
IIDS mixed module view pattern
Content View
IIDS content view pattern
Kitchen Sink
IIDS template displaying functional demos of multiple IIDS application elements
Two-pane View
IIDS two-pane view pattern

Labels, Badges & Alerts

Example	Description	Usage

DEFAULT
SUCCESS
WARNING
IMPORTANT
INFO
INVERSE
	Labels	`<span class="label">Default</span>`
		
		Add one of `.label-success`, `.label-warning`, `.label-important`, `.label-info` or `.label-inverse` to colorize the `.label` for the appropriate context.
		
		`<span class="label label-success">Success</span>`
		
		Use the Bootstrap utility classes `.pull-left` or `.pull-right` to make `.label` float alongside headlines or other block elements.

1
2
4
6
8
10
	Badges	`<span class="badge">1</span>`
		
		Add one of `.badge-success`, `.badge-warning`, `.badge-important`, `.badge-info` or `.badge-inverse` to colorize the `.badge` for the appropriate context.
		
		`<span class="badge badge-success">2</span>`

MY APP

D

TOMV

SEARCH

DASHBOARD | FLEET

ASSET 001

ASSET 002

ASSET 001 EVENTS

ASSET EVENT

9-15-13

ASSET EVENT

9-13-13

ASSET EVENT

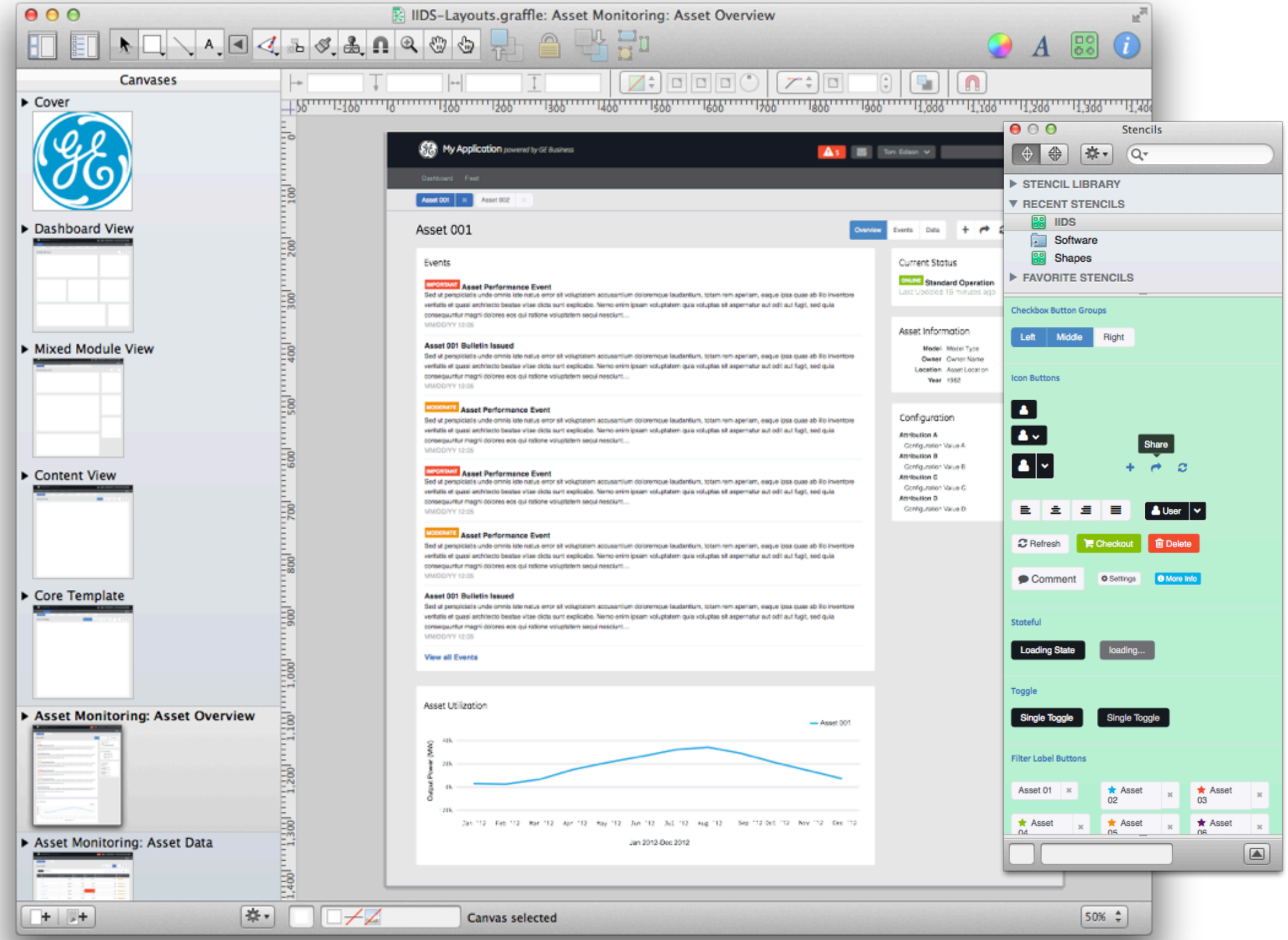
9-10-13

STATUS

ONLINE

INFO

CONFIG

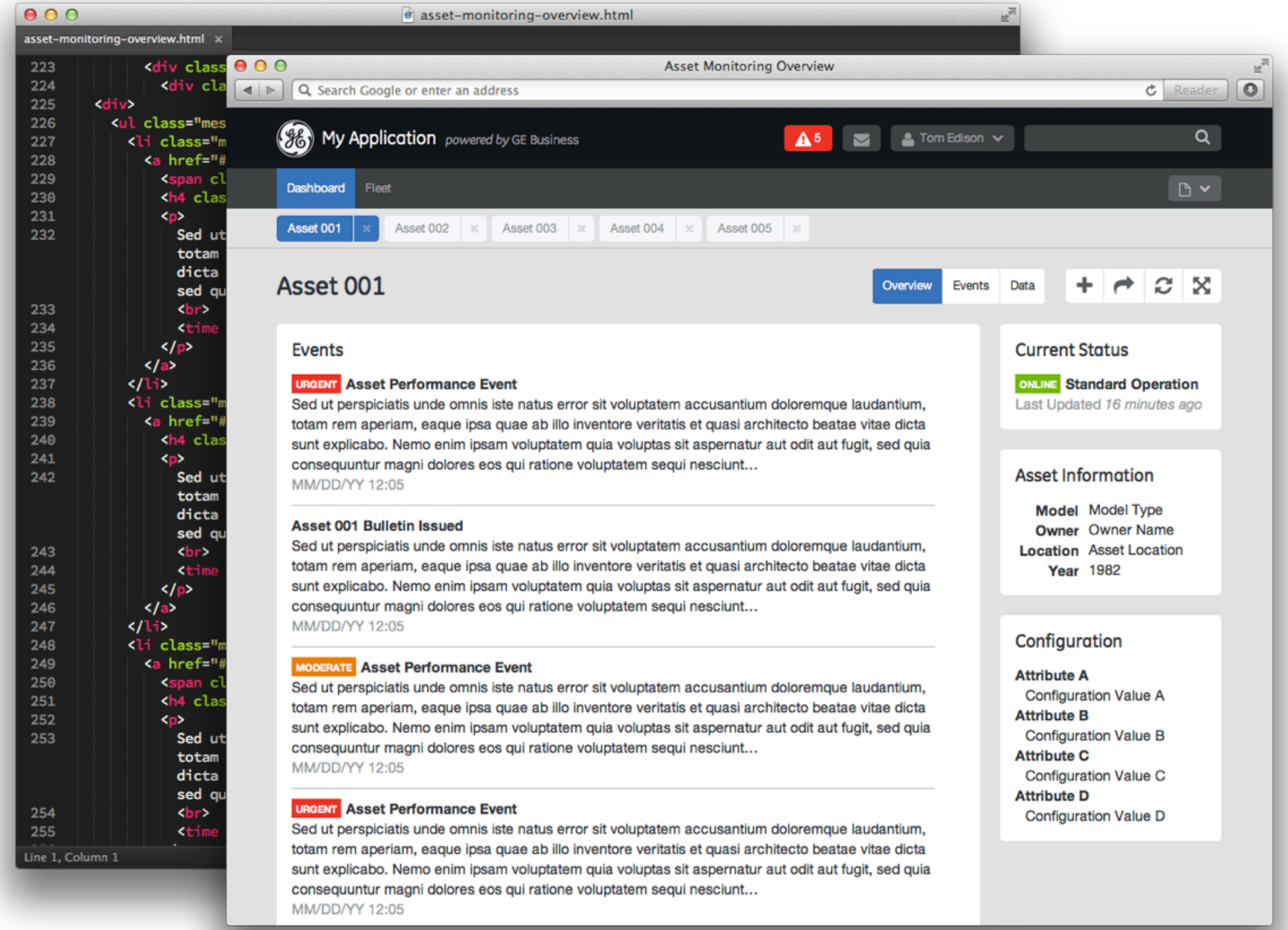

IIDS-Layouts.graffle: Asset Monitoring: Asset Overview
Canvases
Cover
Dashboard View
Mixed Module View
Content View
Core Template
Asset Monitoring: Asset Overview
Asset Monitoring: Asset Data
My Application powered by GE Business
Asset 001
Events
Asset Performance Event
Asset 001 Bulletin Issued
View all Events
Current Status
Standard Operation
Asset Information
Configuration
Asset Utilization
Jan 2012-Dec 2012
Stencils
STENCIL LIBRARY
RECENT STENCILS
IIDS
Software
Shapes
FAVORITE STENCILS
Checkbox Button Groups
Left
Middle
Right
Icon Buttons
Share
User
Refresh
Checkout
Delete
Comment
Settings
More Info
Stateful
Loading State
loading...
Toggle
Single Toggle
Single Toggle
Filter Label Buttons
Asset 01
Asset 02
Asset 03
Canvas selected
50%

asset-monitoring-overview.html

asset-monitoring-overview.html

```
223           <div class="module-body span8">
224             <div class="row">
225     <div>
226       <ul class="message-list">
227         <li class="message-item">
228           <a href="#">
229             <span class="label label-important pull-left">Urgent</span>
230             <h4 class="message-title">Asset Performance Event</h4>
231             <p>
232               Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
                  totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
                  dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
                  sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
233               <br>
234               <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
235             </p>
236           </a>
237         </li>
238         <li class="message-item">
239           <a href="#">
240             <h4 class="message-title">Asset 001 Bulletin Issued</h4>
241             <p>
242               Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
                  totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
                  dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
                  sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
243               <br>
244               <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
245             </p>
246           </a>
247         </li>
248         <li class="message-item">
249           <a href="#">
250             <span class="label label-warning pull-left">Moderate</span>
251             <h4 class="message-title">Asset Performance Event</h4>
252             <p>
253               Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
                  totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
                  dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
                  sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
254               <br>
255               <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
```

Line 1, Column 1 Spaces: 2 HTML


asset-monitoring-overview.html
asset-monitoring-overview.html
Asset Monitoring Overview
Search Google or enter an address
Reader
My Application powered by GE Business
5
Tom Edison
Dashboard
Fleet
Asset 001
Asset 002
Asset 003
Asset 004
Asset 005
Asset 001
Overview
Events
Data
Events
URGENT Asset Performance Event
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...
MM/DD/YY 12:05
Asset 001 Bulletin Issued
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...
MM/DD/YY 12:05
MODERATE Asset Performance Event
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...
MM/DD/YY 12:05
URGENT Asset Performance Event
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...
MM/DD/YY 12:05
Current Status
ONLINE Standard Operation
Last Updated 16 minutes ago
Asset Information
Model Model Type
Owner Owner Name
Location Asset Location
Year 1982
Configuration
Attribute A
Configuration Value A
Attribute B
Configuration Value B
Attribute C
Configuration Value C
Attribute D
Configuration Value D
Line 1, Column 1

Activity #2: Coding

Install a text editor:

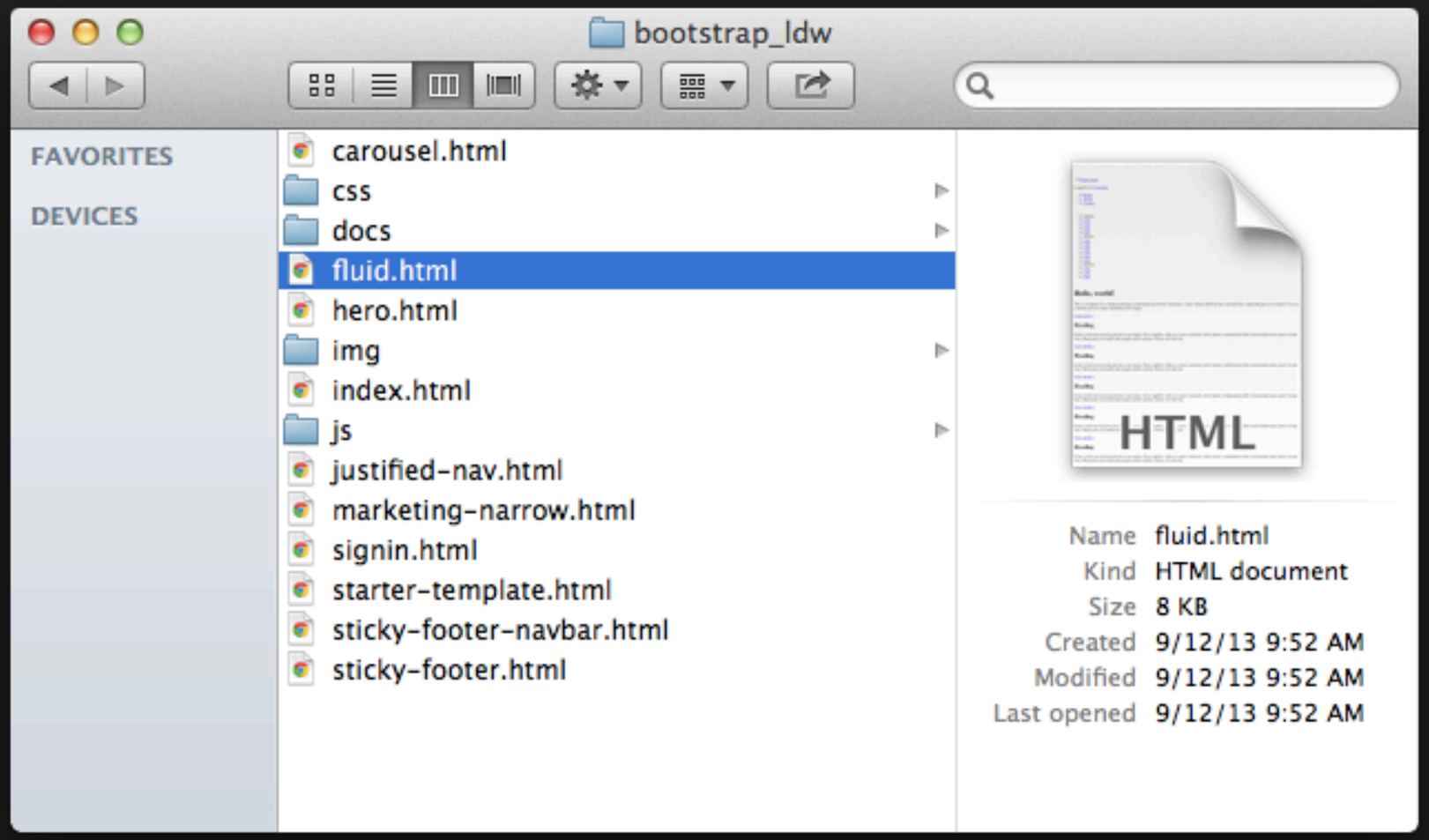
Sublime Text is great on PC and Mac

Download the zip file:

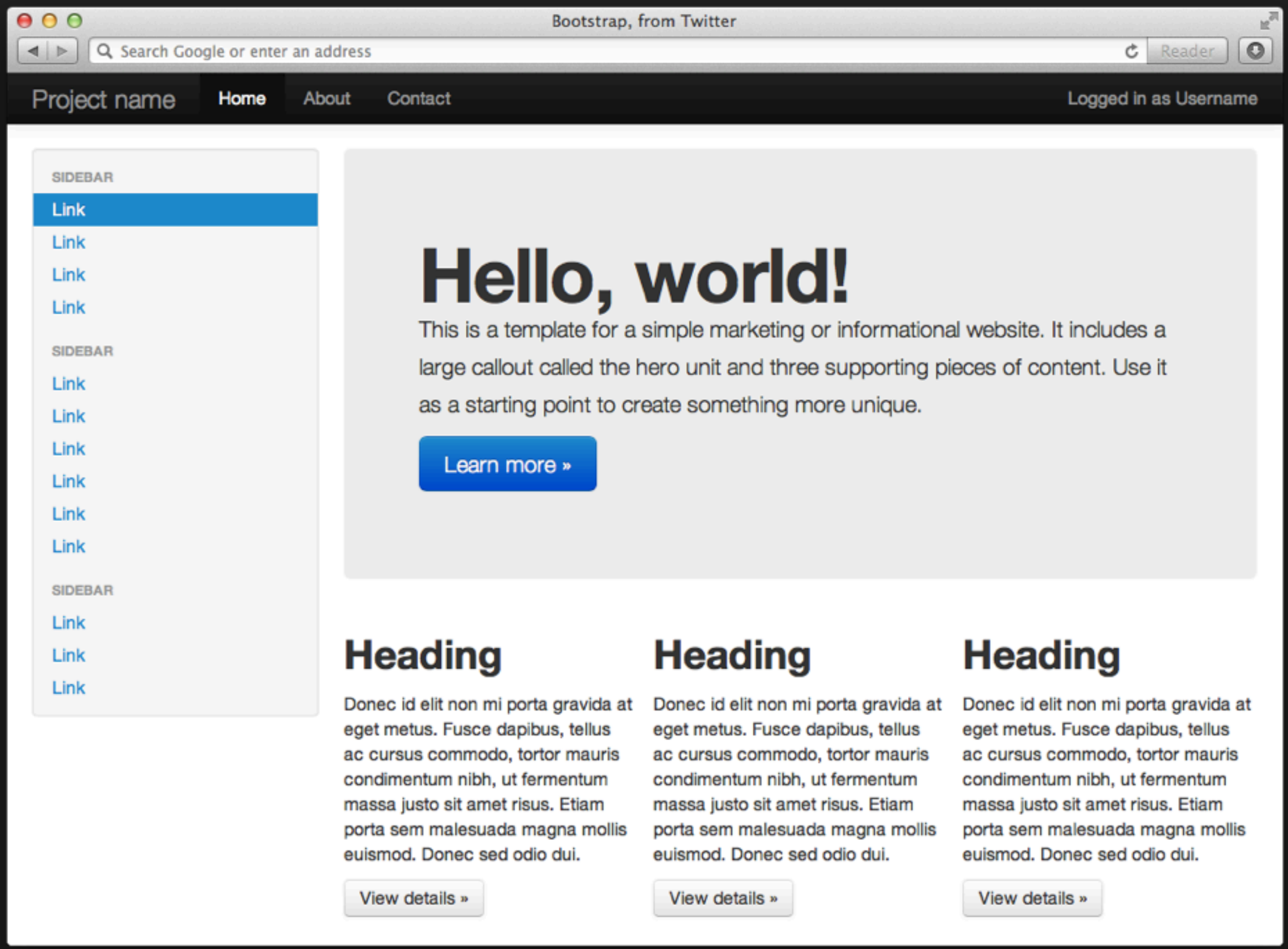
http://tr.im/4dkrc

OPEN SOURCE DESIGN SYSTEMS

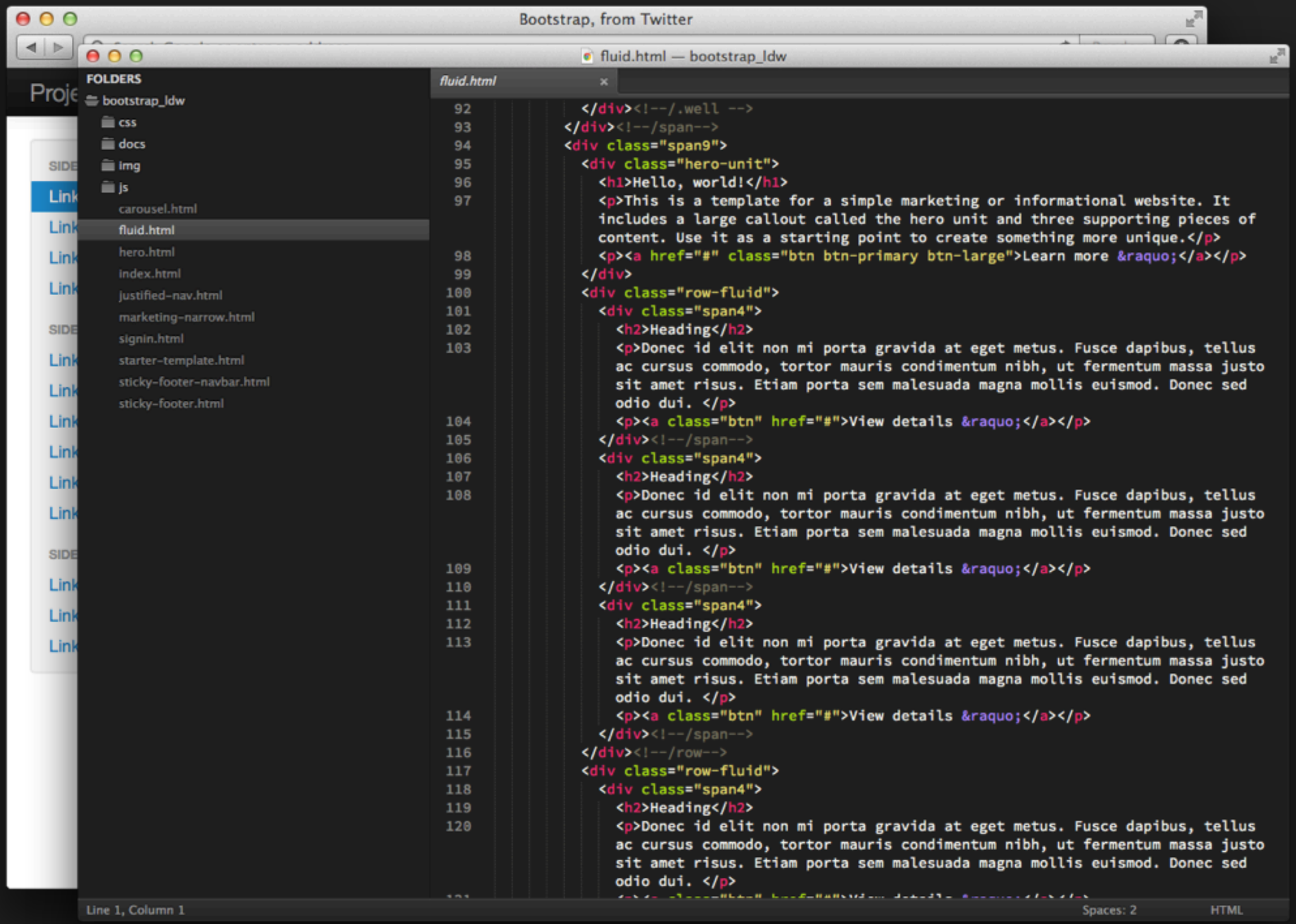
BOOTSTRAP_LDW.ZIP



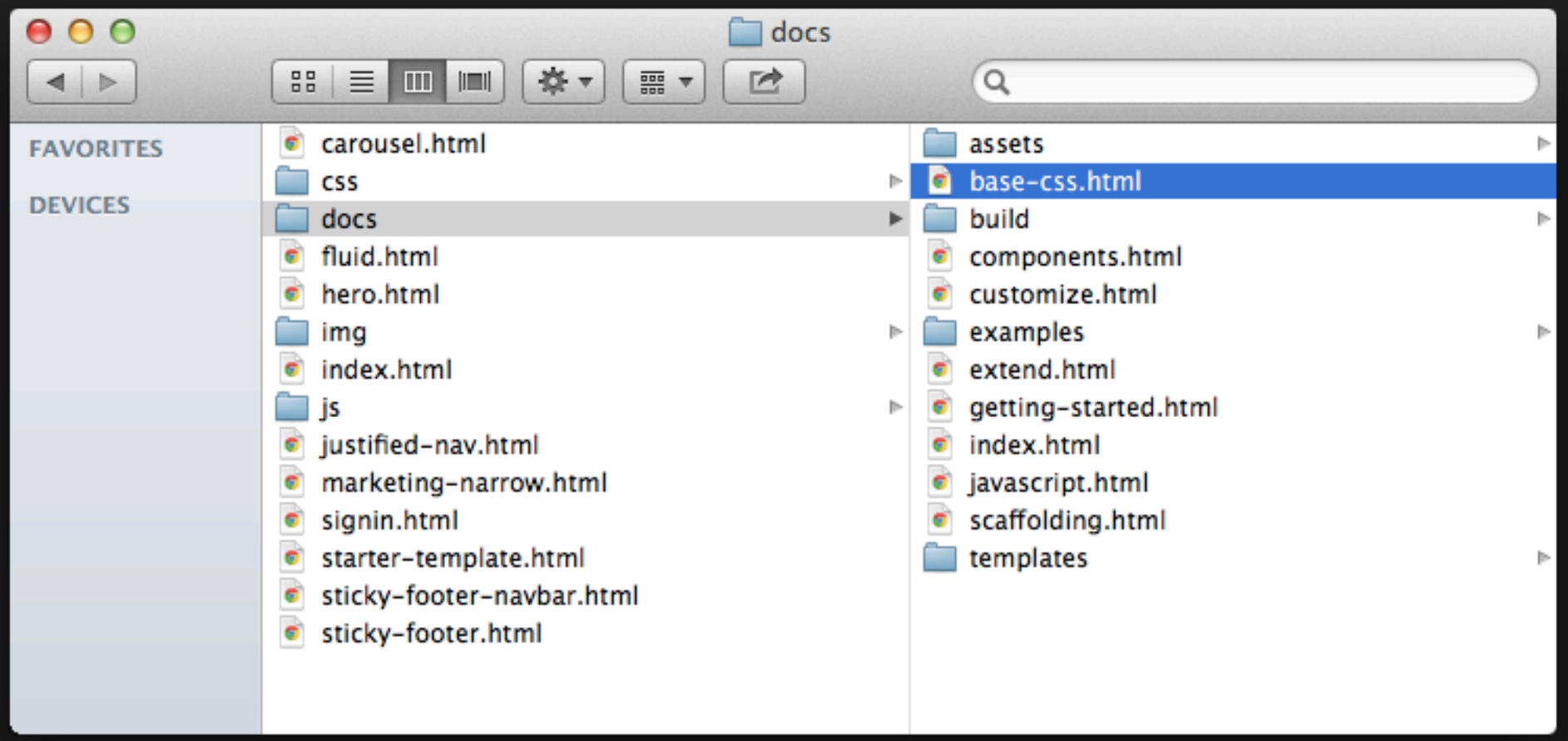
FLUID.HTML


Bootstrap, from Twitter
Search Google or enter an address
Reader
Project name
Home
About
Contact
Logged in as Username
SIDEBAR
Link
Link
Link
Link
SIDEBAR
Link
Link
Link
Link
Link
SIDEBAR
Link
Link
Link
Hello, world!
This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.
Learn more »
Heading
Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
View details »
Heading
Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
View details »
Heading
Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
View details »

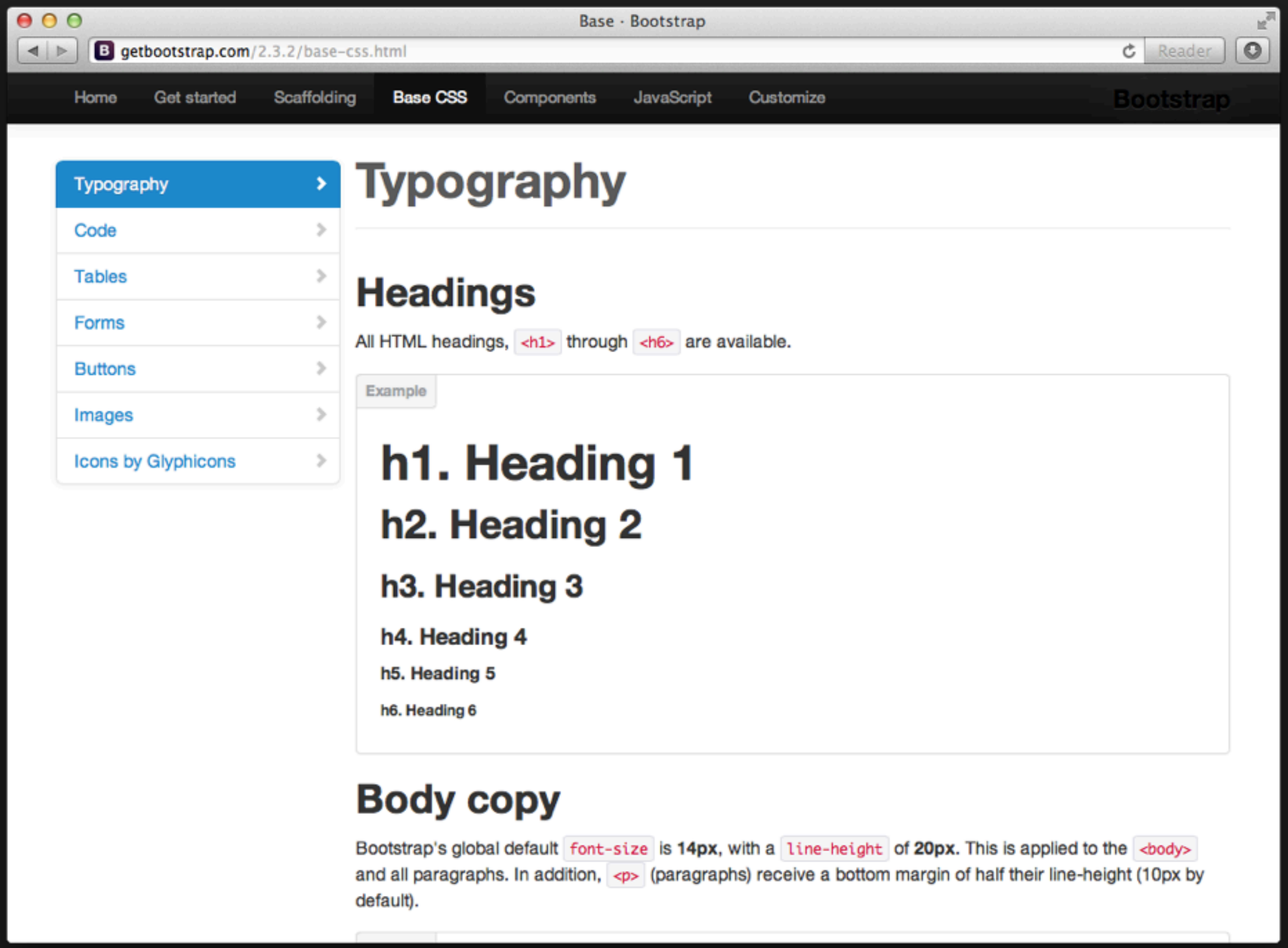
FLUID.HTML


Bootstrap, from Twitter
fluid.html — bootstrap_ldw
FOLDERS
bootstrap_ldw
css
docs
img
js
carousel.html
fluid.html
hero.html
index.html
justified-nav.html
marketing-narrow.html
signin.html
starter-template.html
sticky-footer-navbar.html
sticky-footer.html
fluid.html
92 <!--/.well -->
93 <!--/span-->
94
95
96 <h1>Hello, world!</h1>
97 This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.
98 Learn more »
99
100
101
102 <h2>Heading</h2>
103 Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
104 View details »
105 <!--/span-->
106
107 <h2>Heading</h2>
108 Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
109 View details »
110 <!--/span-->
111
112 <h2>Heading</h2>
113 Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
114 View details »
115 <!--/span-->
116 <!--/row-->
117
118
119 <h2>Heading</h2>
120 Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.
Line 1, Column 1
Spaces: 2
HTML

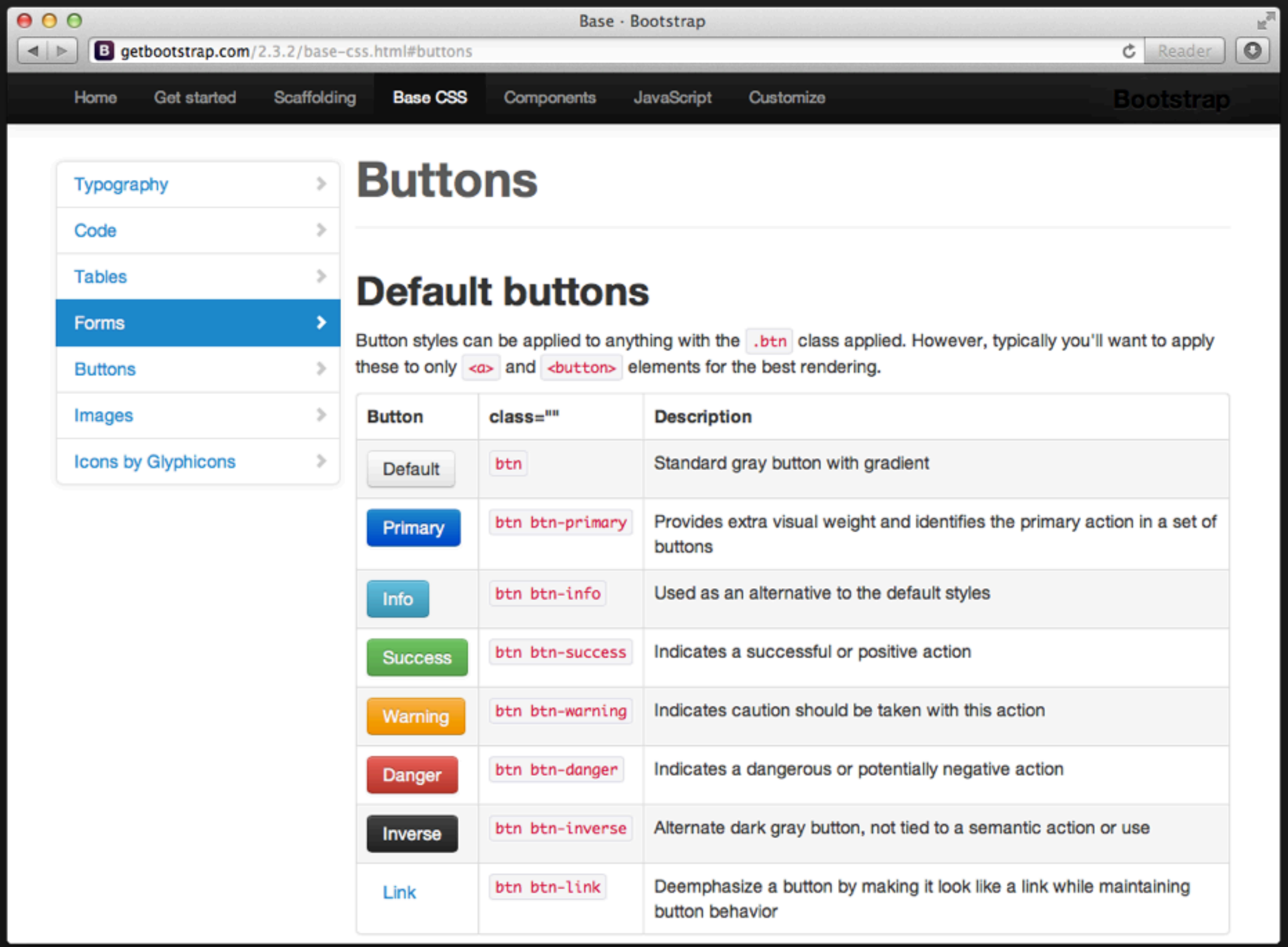
BOOTSTRAP_LDW/DOCS



BASE-CSS.HTML



BASE-CSS.HTML#BUTTONS



SCAFFOLDING.HTML#GRIDSYSTEM

Scaffolding · Bootstrap

file:///Users/212326609/Desktop/bootstrap_ldw/docs/scaffolding.html#gridSystem

Reader

Home | Get started | Scaffolding | Base CSS | Components | JavaScript | Customize | Bootstrap

- Global styles
- Grid system
- Fluid grid system
- Layouts
- Responsive design

Live grid example

The default Bootstrap grid system utilizes **12 columns**, making for a 940px wide container without responsive features enabled. With the responsive CSS file added, the grid adapts to be 724px and 1170px wide depending on your viewport. Below 767px viewports, the columns become fluid and stack vertically.

1	1	1	1	1	1	1	1	1
2	3	4						
4	5							
9								

Basic grid HTML

For a simple two column layout, create a `.row` and add the appropriate number of `.span*` columns. As this is a 12-column grid, each `.span*` spans a number of those 12 columns, and should always add up to 12 for each row (or the number of columns in the parent).

```
<div class="row">
  <div class="span4">...</div>
  <div class="span8">...</div>
</div>
```

Given this example, we have `.span4` and `.span8`, making for 12 total columns and a complete row.

Offsetting columns

Move columns to the right using `.offset*` classes. Each class increases the left margin of a column by a whole column. For example, `.offset4` moves `.span4` over four columns.

ACTIVITY #2: CODING

Turn your sketches into an interactive prototype for your Smart Home Manager

ACTIVITY #2: CODING

As a team, figure out which part of your Smart Home Manager each of you is going to work on (5 min)

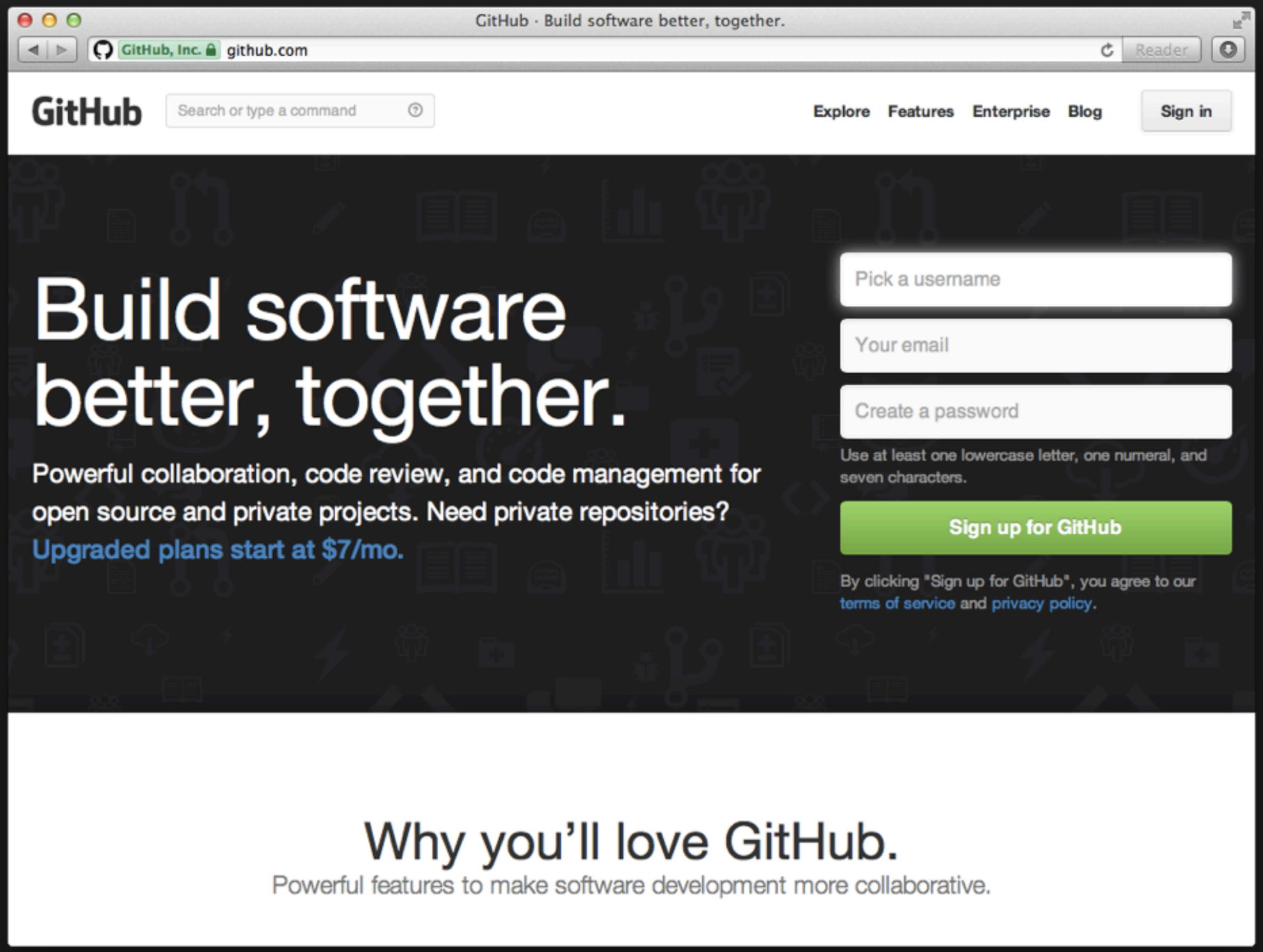
As an individual, start prototyping your part (20 min)

Share your progress with your team (1 min per person)

Iterate on your part in response to team feedback (15 min)

EXTRA CREDIT

Create a GitHub repository to collaborate with your team



EXTRA CREDIT

Add a data visualization component (Highcharts, D3, etc.)

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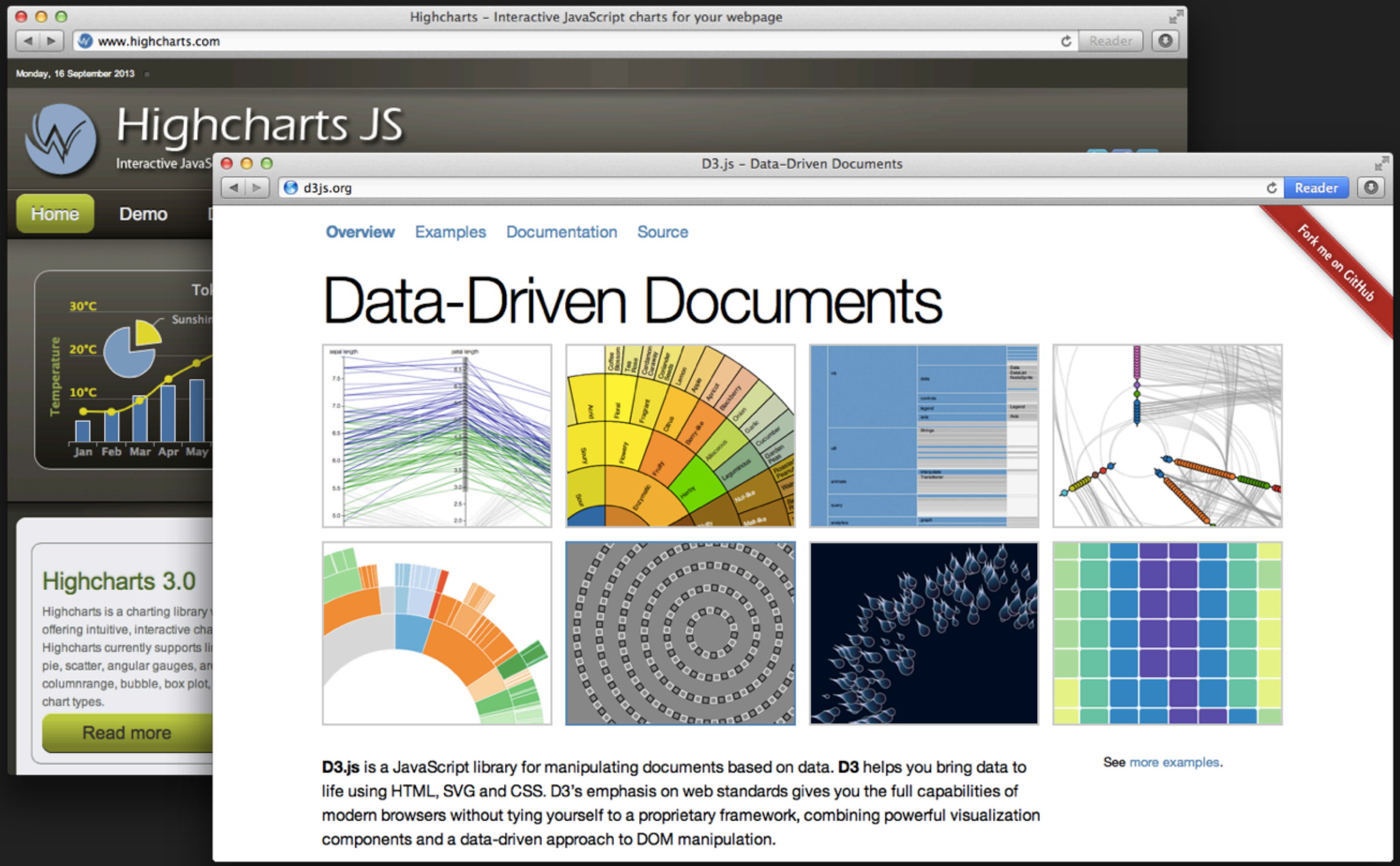
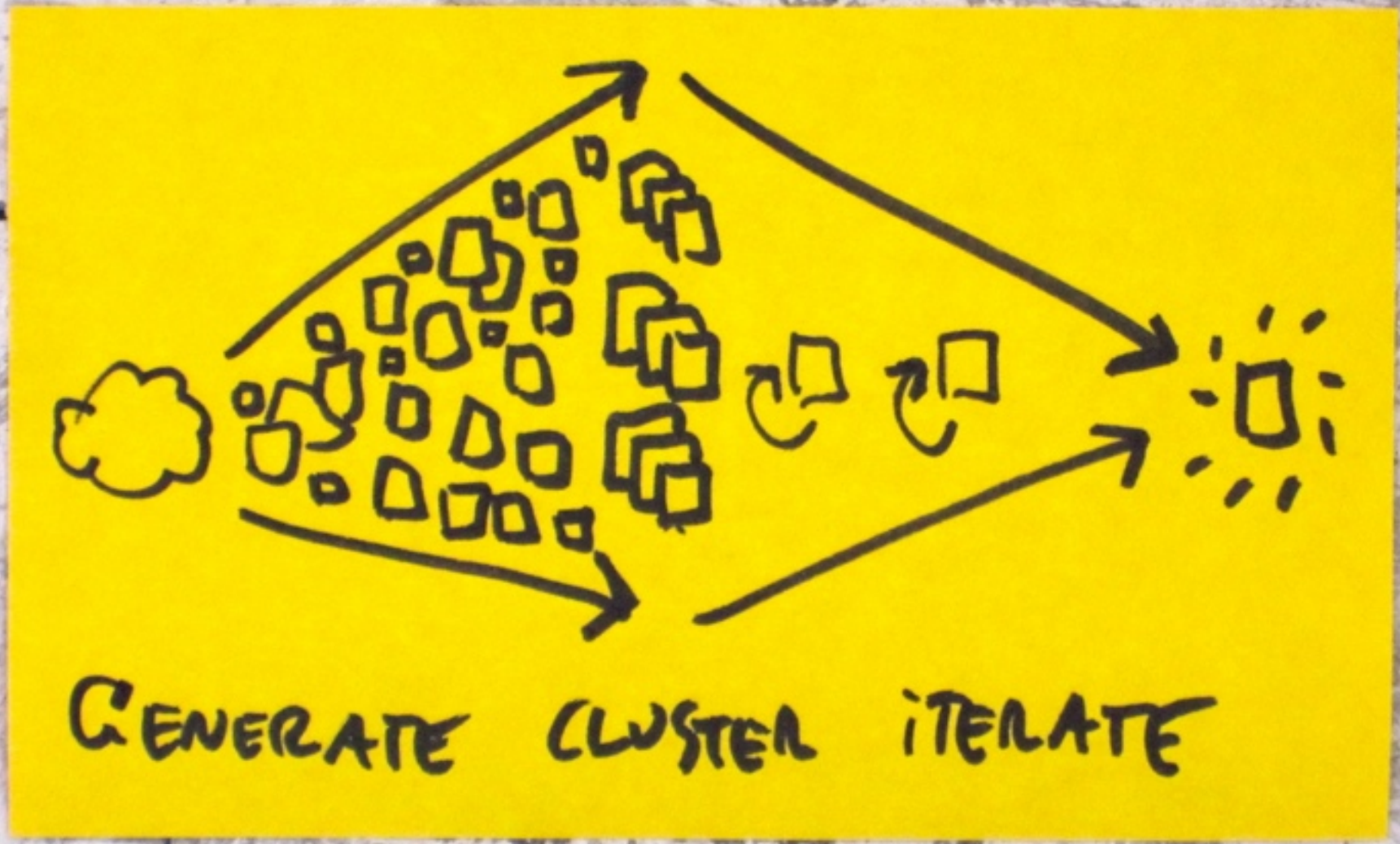


Nice work!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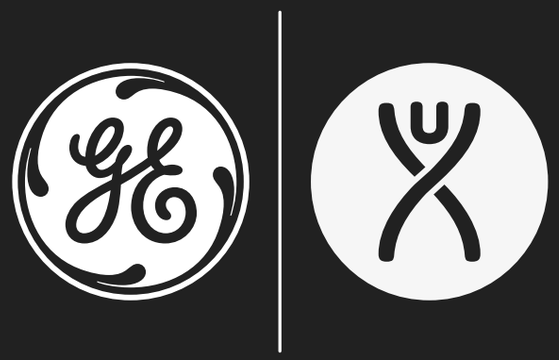

Thank you!

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