CHARCTIC
FROM HACKATHON TO PRODUCTION
Kevin Beam
National Snow and Ice Data Center
University of Colorado Boulder
• Supports research into Earth's cryosphere
• Manages and distributes scientific data
• Creates tools for data access
• Supports data users
• Performs scientific research
• Performs public education and outreach
• Distributes more than 500 cryospheric data sets
ABOUT ME

- Software Developer at NSIDC
- Java (that Enterprisey-stuff)
- Ruby on Rails
- JavaScript
- Python
- kwbeam.com
NSIDC HACKATHON

- Two or three day hackathons
- Every three to four months
- Work on something experimental and maybe edgy
WHAT TO BUILD...?
A BIT ABOUT ARCTIC SEA ICE

- Huge public interest
- Declining sea ice extent
- Sea ice minimum set a new record in 2012
Ending Its Summer Melt, Arctic Sea Ice Sets a New Low That Leads to Warnings

A view of the east coast of Greenland, where the ice sheet meets the sea.

By JUSTIN GILLIS
Published: September 19, 2012
ASINA

ARCTIC SEA ICE NEWS AND ANALYSIS

- Updated daily with near-realtime sea ice extent data
- Blog from NSIDC scientists and writers about Arctic sea ice conditions
- Highest traffic on the nsidc.org site
- ~180K visitors per month
WHAT IF

A Google Finance-like ASINA time-series?
CHARCTIC IS BORN

- Public data?
- Yep: **Sea Ice Index**
- Alright, let's roll!
SO EASY...

Ruby on Rails
JUST A SECOND...

How do we plot the time series?
LOTS OF OPTIONS...ONE WINNER: HIGHCHARTS.JS

- Rich dynamic behavior
- Good online documentation and examples
- Commercial Product
- Free to educational and non-profit institutions
- Highcharts.js FTW
CODE TO USE HIGHCHARTS IS DECIDEDLY NOT INTERESTING

chart = new Highcharts.Chart({
    chart: {
        ...,
    },
    exporting: {
        ...,
    },
    tooltip: {
        ...,
    },
    credits: {
        ...,
    },
    legend: {
        ...
    },
    title: {
        ...,
    },
RAILS MODELS

- DailyExtent
- ClimatologyExtent
INITIAL PAGE LOAD

- Current and record year
- 20 and 30-year climatologies
- Pass data back via custom data attributes on div
AJAX

- Get extents for a specific year
- Simply exposes the model via a RESTful endpoint
class Api::DailyExtentsController < ApplicationController
respond_to :json

  def index
    year = params[:year].to_i
    year = Date.today.year if year == 0
    respond_with DailyExtent.year_smoothed(year)
  end
end
SOME NUMBERS

- Rails models and controllers: ~150 LOC
- Specs: ~290 LOC
- JS: ~450 LOC
LET’S ROLL THIS TO PRODUCTION!
IE: NOT SO FAST, MY FRIENDS

• Decent amount of time spent on IE 7, 8, 9 testing
• Did you know IE's JS doesn't support Array.forEach?
• Neither did we
• Answer: underscore.js -- functional JS
_.each(_.range(12), function (i) {
    ticks.push(moment(new Date(currentYear, i, 1)));
});
READY NOW?

- One IE bug stymied us for a day or two
- The JS appeared to get loaded before the page was ready
- Thought it was IE
- Nope, jQuery 1.8.0 was borked. 1.8.x to the rescue.
- Lesson: Be suspicious of everything, not just IE. :)
<table>
<thead>
<tr>
<th>Browser</th>
<th>Visits</th>
<th>Contribution to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Internet Explorer</td>
<td>279,186</td>
<td>29.40%</td>
</tr>
<tr>
<td>2. Chrome</td>
<td>233,206</td>
<td>24.56%</td>
</tr>
<tr>
<td>3. Firefox</td>
<td>214,271</td>
<td>22.56%</td>
</tr>
<tr>
<td>4. Safari</td>
<td>170,870</td>
<td>17.99%</td>
</tr>
<tr>
<td>5. Android Browser</td>
<td>19,903</td>
<td>2.10%</td>
</tr>
<tr>
<td>6. Safari (in-app)</td>
<td>12,766</td>
<td>1.34%</td>
</tr>
<tr>
<td>7. Opera</td>
<td>9,941</td>
<td>1.05%</td>
</tr>
<tr>
<td>8. Opera Mini</td>
<td>3,419</td>
<td>0.36%</td>
</tr>
<tr>
<td>9. IE with Chrome Frame</td>
<td>2,772</td>
<td>0.29%</td>
</tr>
<tr>
<td>10. Mozilla Compatible Agent</td>
<td>936</td>
<td>0.10%</td>
</tr>
</tbody>
</table>
A LITTLE DEMO WOULD BE NICE...

CHARCTIC
SO, HOW’D IT GO?

- Enthusiastic public response
- One of the top destinations on nsidc.org
- ~9K hits / month on the main page
- 100K hits / month for all requests (JSON)
- Visits from more than 50 countries
THIS WAS NICE

Hans Rosling @HansRosling
Great new interactive graph: Arctic sea ice area at Nat Snow & Ice Data center, US governments service at its best!
nsidc.org/arcticseaicene...

39 RETWEETS 17 FAVORITES

3:54 PM - 11 Jan 13 · Details
COOL STUFF WE LEARNED

• Try your own hackathon!
• Highcharts.js is *very* capable
• Use underscore.js
• The little stuff is time consuming
• Cross-browser testing is crucial
OUR TEAM

- Kevin Beam
- Matt Savoie
- Hannah Wilcox
- Donna Scott
- Walt Meier
- Teri Hoyer
- Jane Beitler
- Others!
THANKS
KEVIN