

CHARCTIC

FROM HACKATHON TO PRODUCTION

Kevin Beam



National Snow and Ice Data Center
Advancing knowledge of Earth's frozen regions

- 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



Andrew Testa for The New York Times

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**
- Allright, 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: {
```

BASIC DESIGN

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

A LITTLE RUBY

```
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

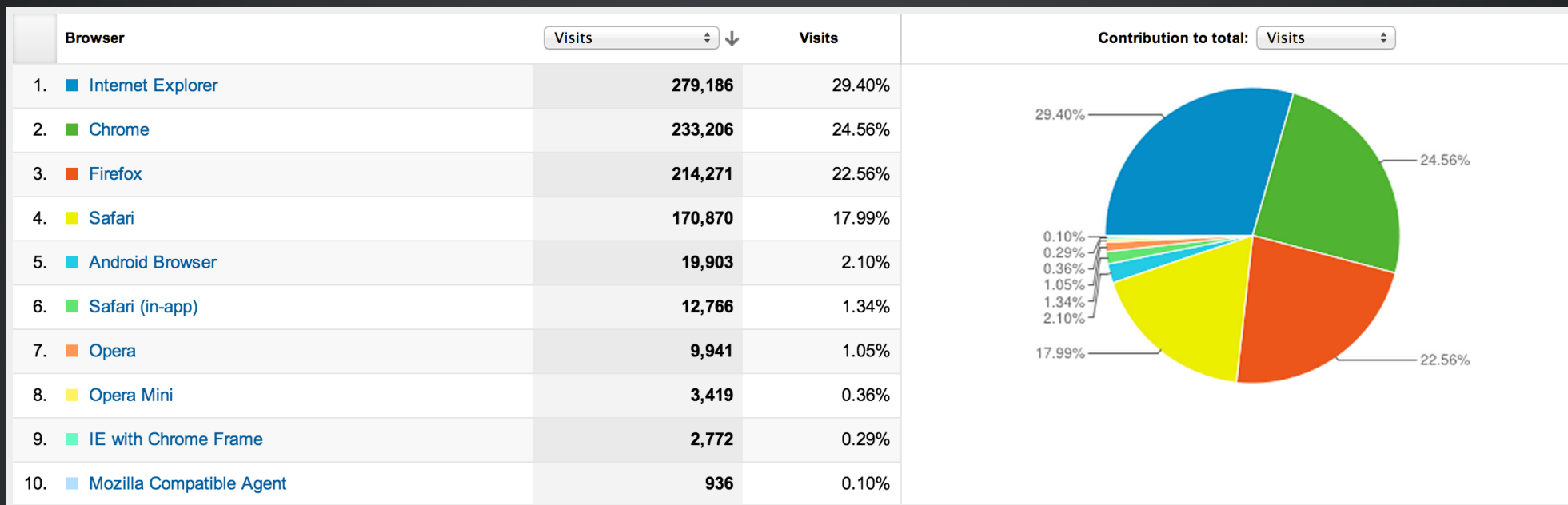
- Decent amount of time spent on IE 7, 8, 9 testing
- Did you know IE's JS doesn't support `Array.forEach` ?
- Neither did we
- Answer: [underscore.js](#) -- functional JS

EXAMPLE UNDERSCORE WINNINGNESS

```
_ .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. :)



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

Explorer

Site Usage

Pageviews ▾

vs. [Select a metric](#)

Day

Week

Month



● Pageviews

1,000

500

December 2012 January 2013 February 2013 March 2013

Pageviews

36,952

% of Total: **1.14%** (3,237,210)

Unique Pageviews

33,041

% of Total: **1.28%** (2,585,741)

Avg. Time on Page

00:02:49

Site Avg: **00:01:45** (60.45%)

Bounce Rate

78.68%

Site Avg: **69.47%** (13.25%)

% Exit

63.14%

Site Avg: **47.58%** (32.71%)

THIS WAS NICE

**Hans Rosling** @HansRosling 16h

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

[Collapse](#) [Reply](#) [Retweeted](#) [Favorite](#)

39 RETWEETS	17 FAVORITES	      
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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