Happy Birthday WWW from Python

Python Hack Night 004 @ Hack Portland

Python Hack Night

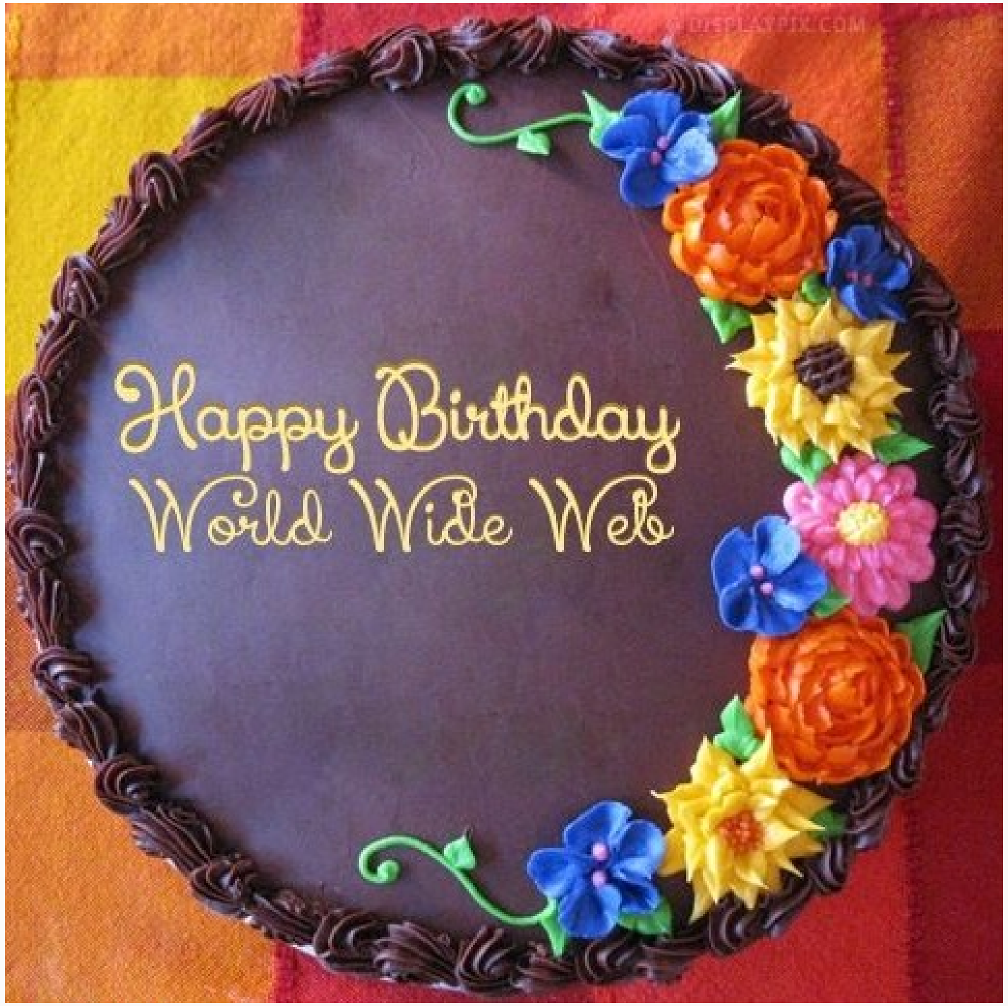
- Welcome to Python Hack Night 0004
- Agenda:
  - Meet for less than 1 hour for a talk, etc
  - Eveything will be posted to our github account
  - Have some pizza and hang out for rest of Hack Night
- We are sponsored by Hack Portland

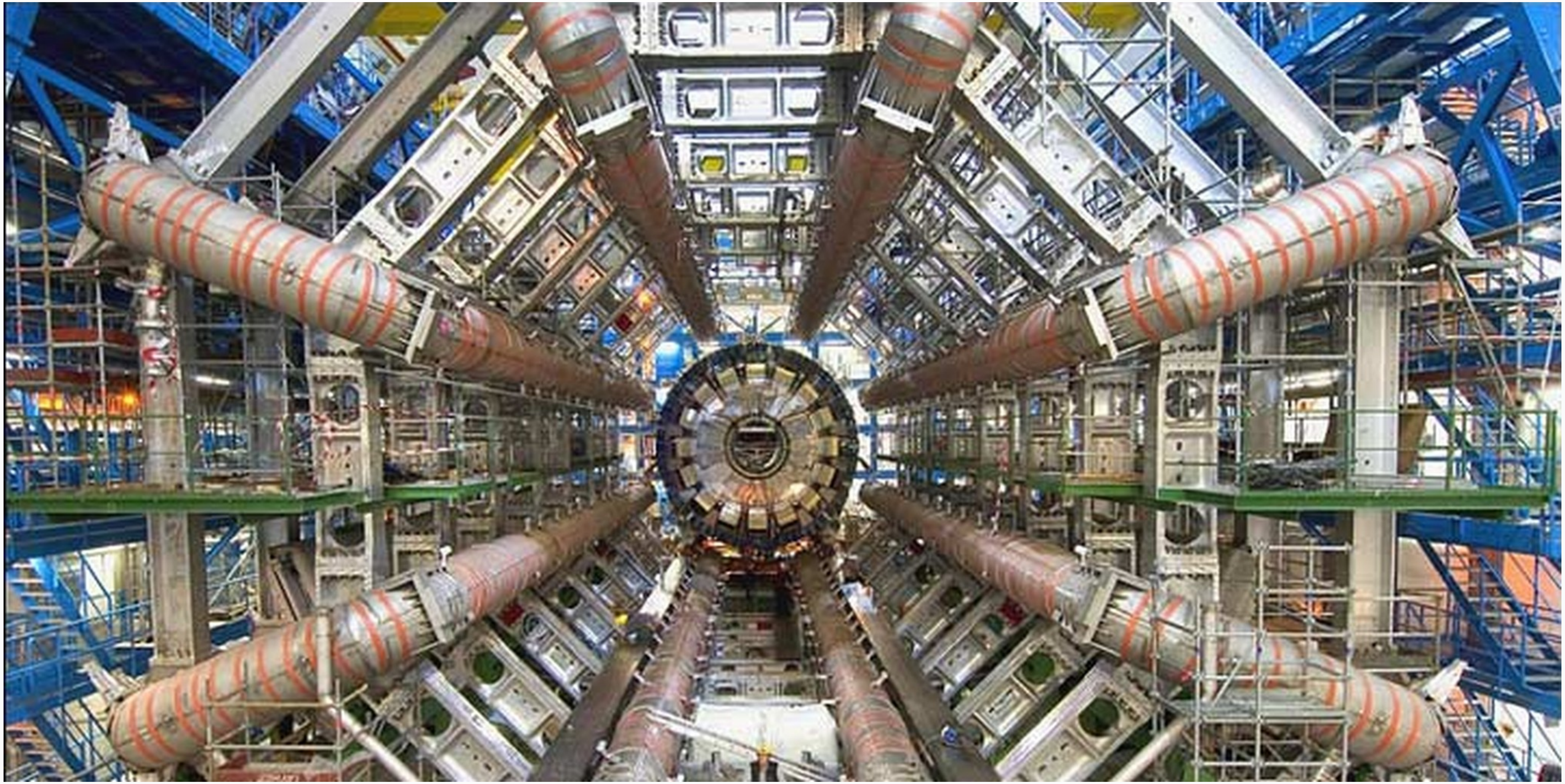
Introductions

- Tell us:
  - Your Name
  - What you use Python for
  - The first time you used the web?

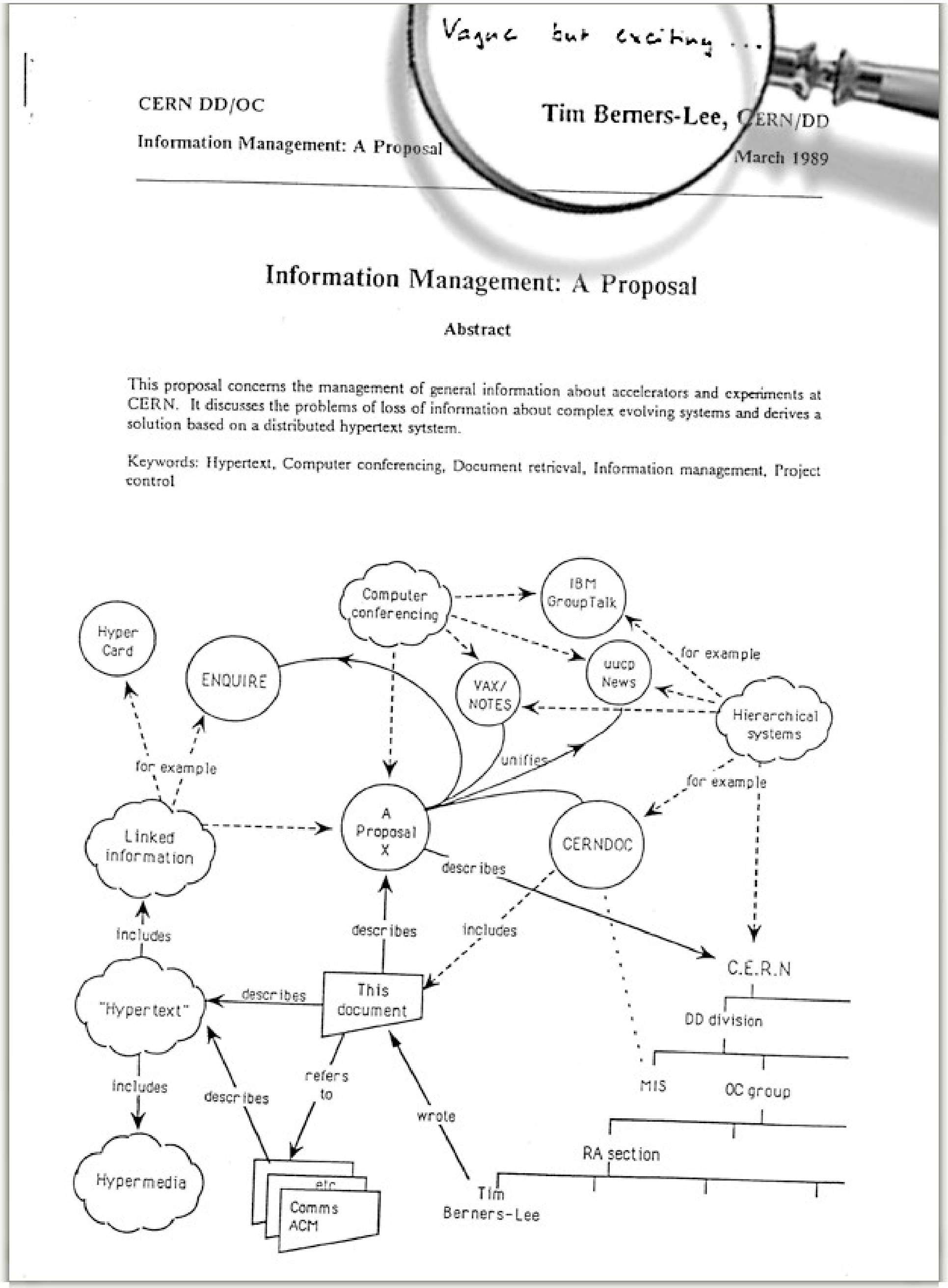
This Week's Theme

- The Internet is 30 yrs old
- It started at CERN in 1989
- Time goes so fast…





CERN



Vague but exciting ...

CERN DD/OC

Information Management: A Proposal

Tim Berners-Lee, CERN/DD

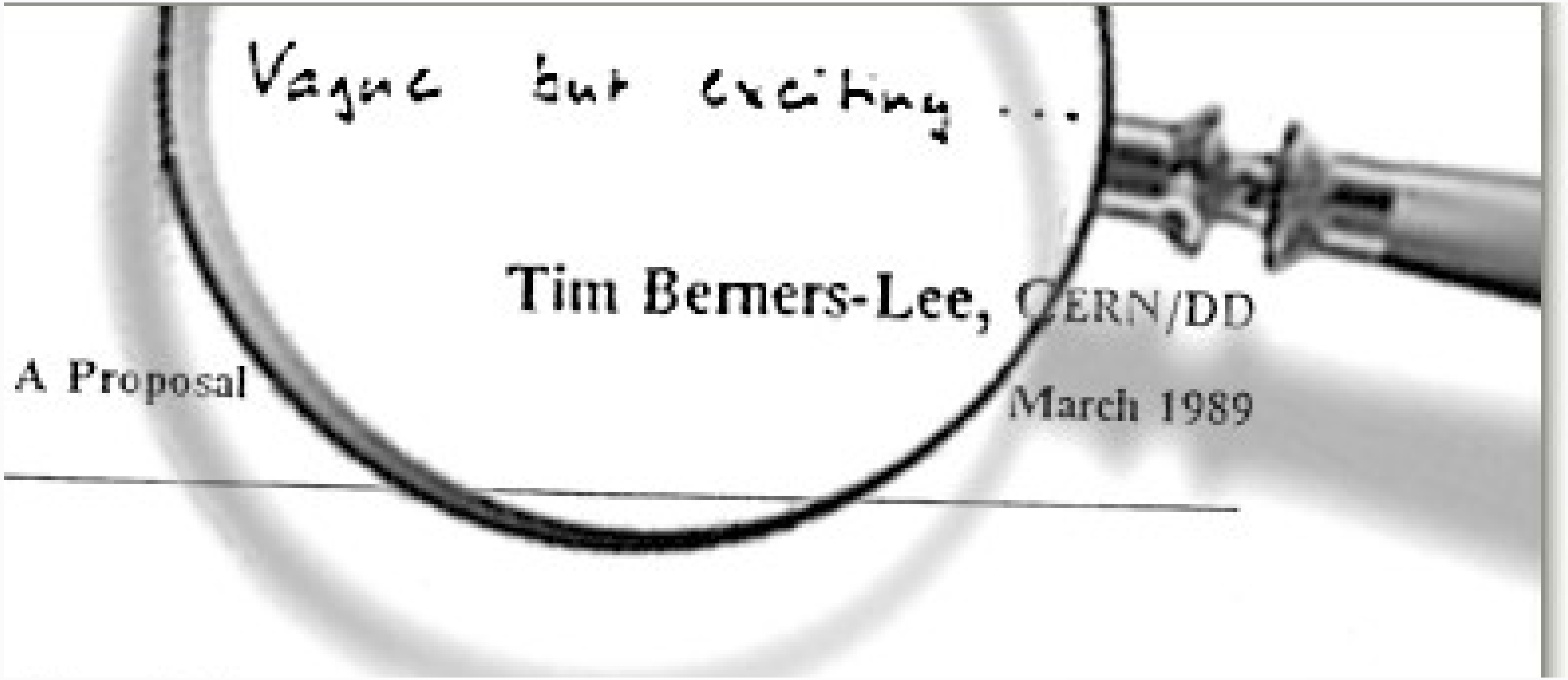
March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext sytstem.

Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

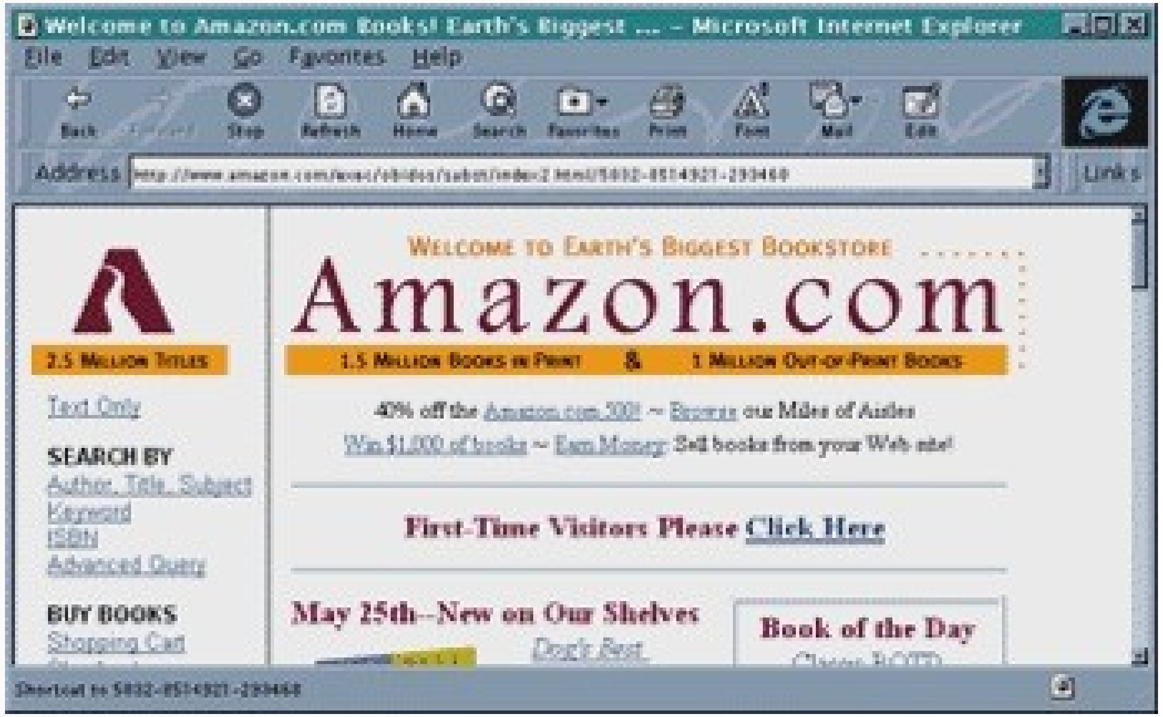


Vague but exciting ...

Tim Berners-Lee, CERN/DD

A Proposal

March 1989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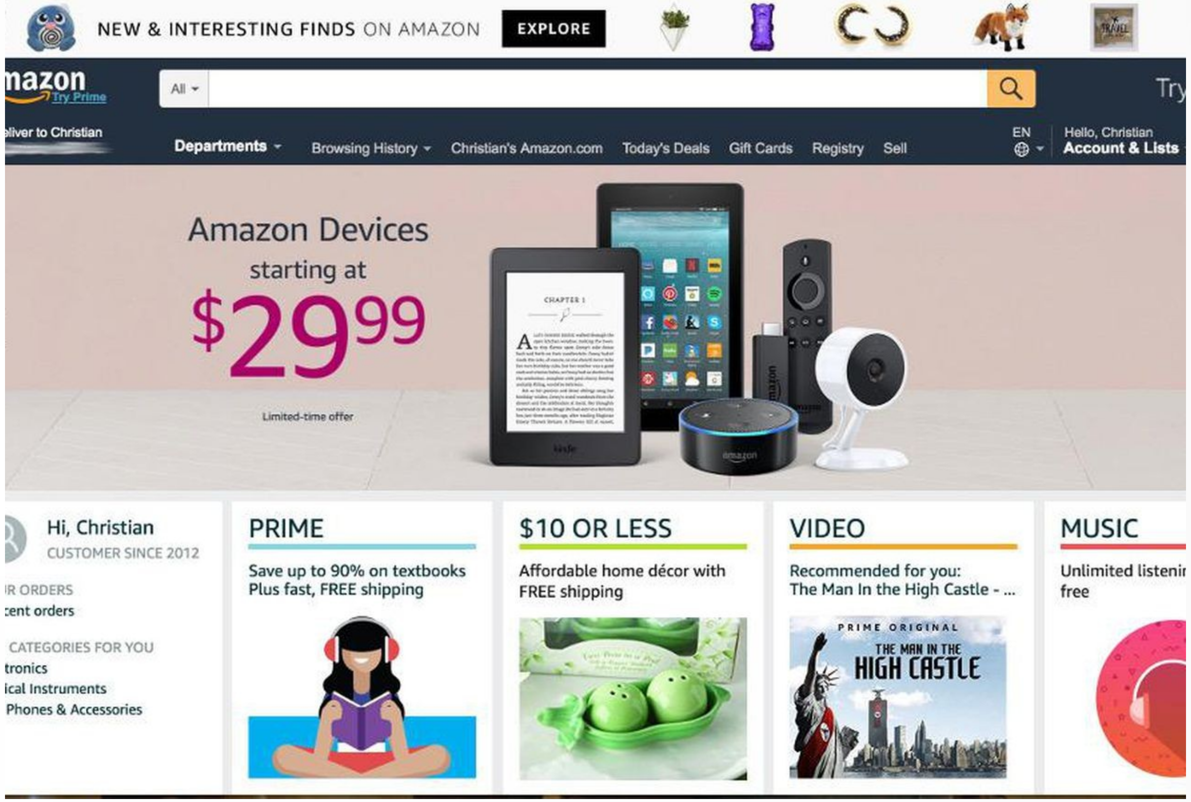
1996



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Python and the Web

- Many Python tools for ‘The Web’ (Http/CSS/etc):
  - Downloading Data
    - Requests
    - Beautiful Soup
    - Easy to role your own
  - Hosting Content
    - CMS’s (Zope)
    - static sites (Jekyll)
    - dynamic sites (Django, Flask, Bottle)
  - Data Exploration
    - Jupyter notebooks

Today's Demos

- Grab some data from the web
  - Download stock market information using web scraping
- Hosting some data
  - Showing a real-time output of a rotary encoder

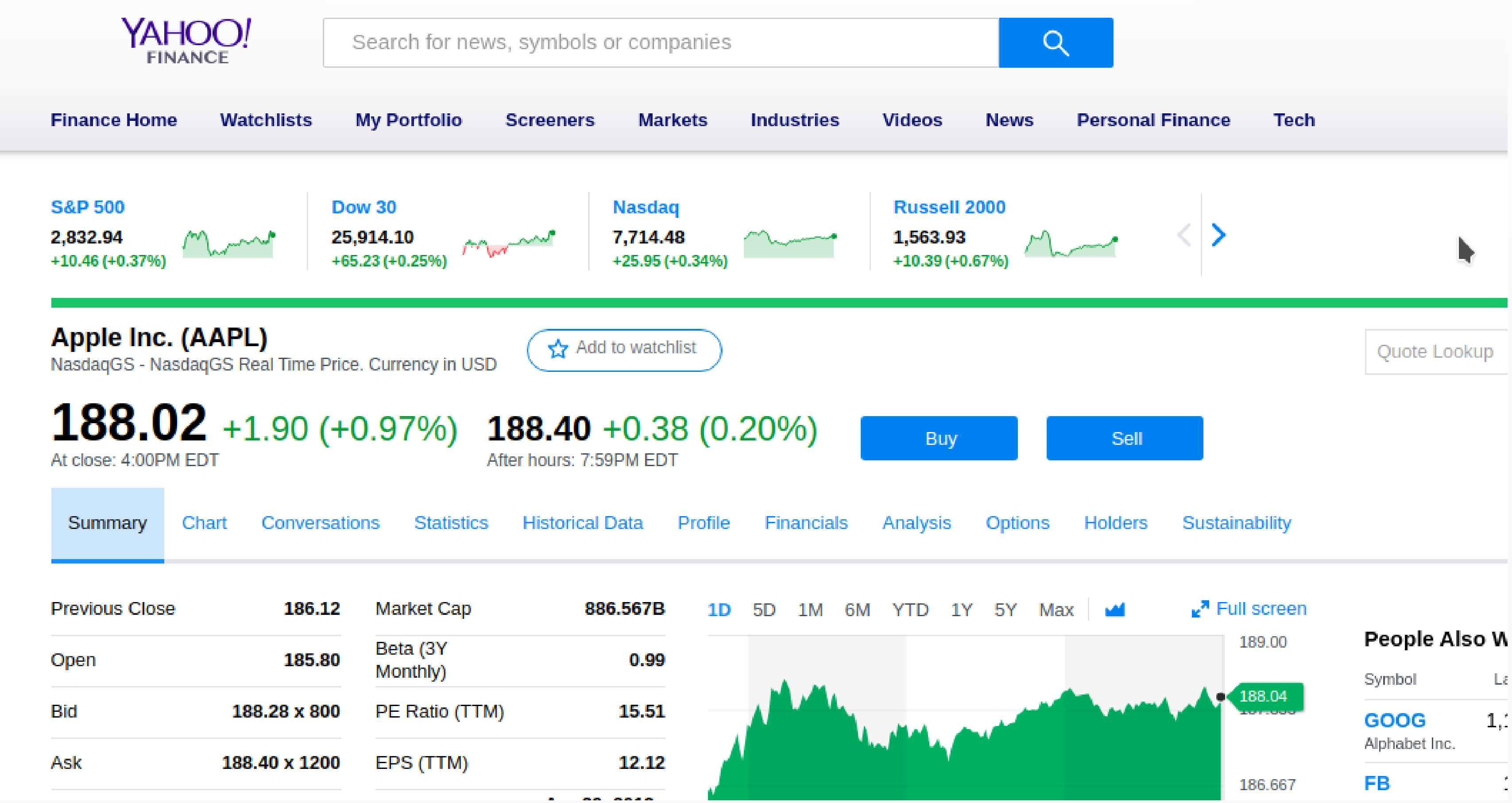
Scraping Web Data

- Want to download data for monitoring/analysis?
  - Look for existing modules (Python is BOP)

  - If you have to role your own:
    - Use Requests
    - Use modules like Beautiful Soup for complex web pages
    - Parse text directly if the page is simple
    - Many pages use Javascript → use Selenium or OCR

Downloading Stock Data

- Use Yahoo Finance as a data source (BOP)



S&P 500	Dow 30	Nasdaq	Russell 2000
2,832.94	25,914.10	7,714.48	1,563.93
+10.46 (+0.37%)	+65.23 (+0.25%)	+25.95 (+0.34%)	+10.39 (+0.67%)

Apple Inc. (AAPL)
NasdaqGS - NasdaqGS Real Time Price. Currency in USD

188.02 +1.90 (+0.97%)
At close: 4:00PM EDT

188.40 +0.38 (0.20%)
After hours: 7:59PM EDT

Previous Close	186.12	Market Cap	886.567B
Open	185.80	Beta (3Y Monthly)	0.99
Bid	188.28 x 800	PE Ratio (TTM)	15.51
Ask	188.40 x 1200	EPS (TTM)	12.12

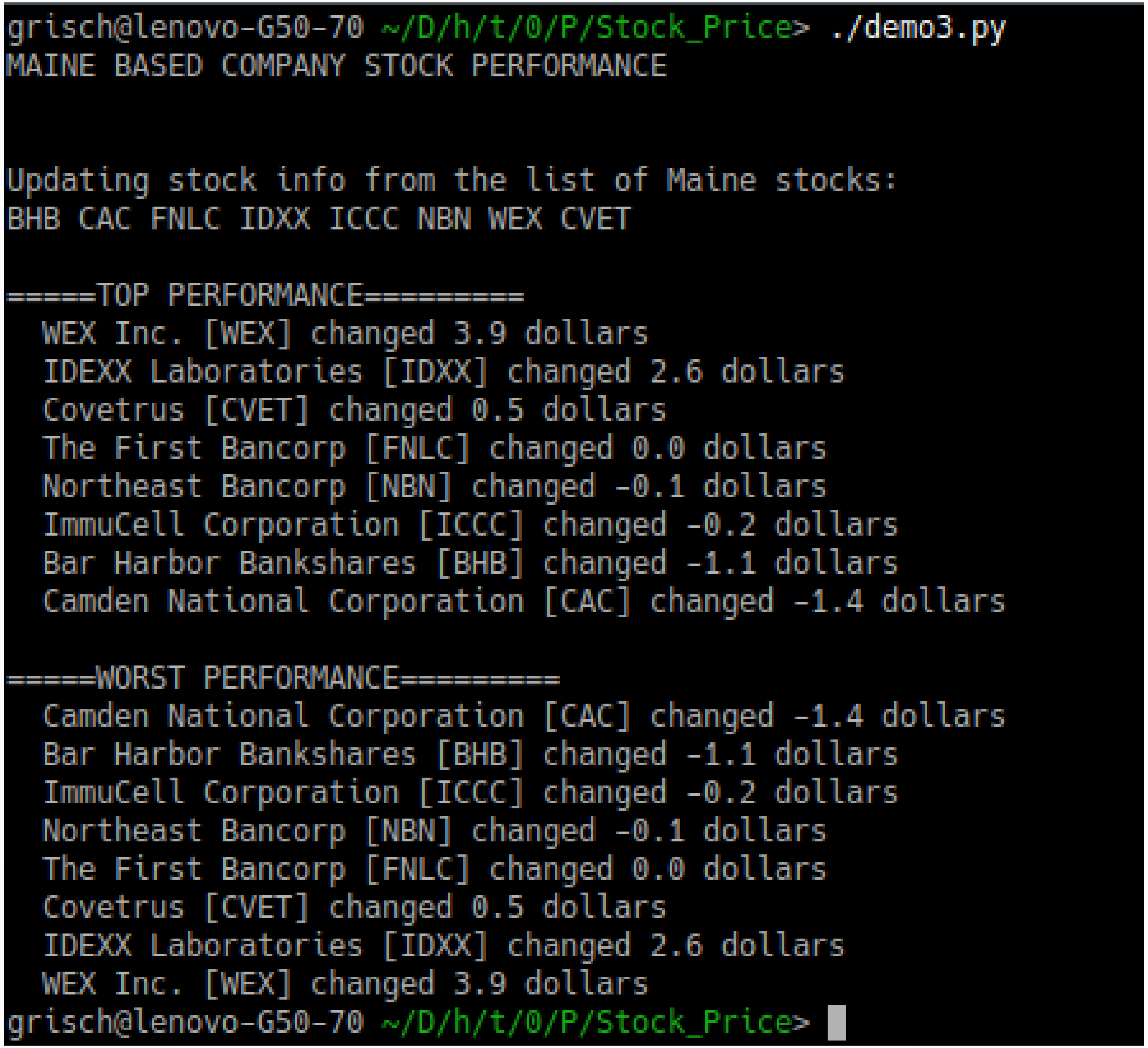
People Also W

Symbol	La
GOOG Alphabet Inc.	1,:
FB	1

Downloading Stock Data

- Review ‘driver_yahoo.py’
  - Implemented data connection as a driver
    - Can develop different drivers if needed
  - Built Yahoo driver after some experimentation
    - Grab web page with stock quote URL using requests
    - Wrote a hand parser to look for stock data
      - This was difficult, took a while (need good diagnostics)
    - Demos
    - I would use yahoofinancials for a more complete implementation:

      https://github.com/JECSand/yahoofinancials



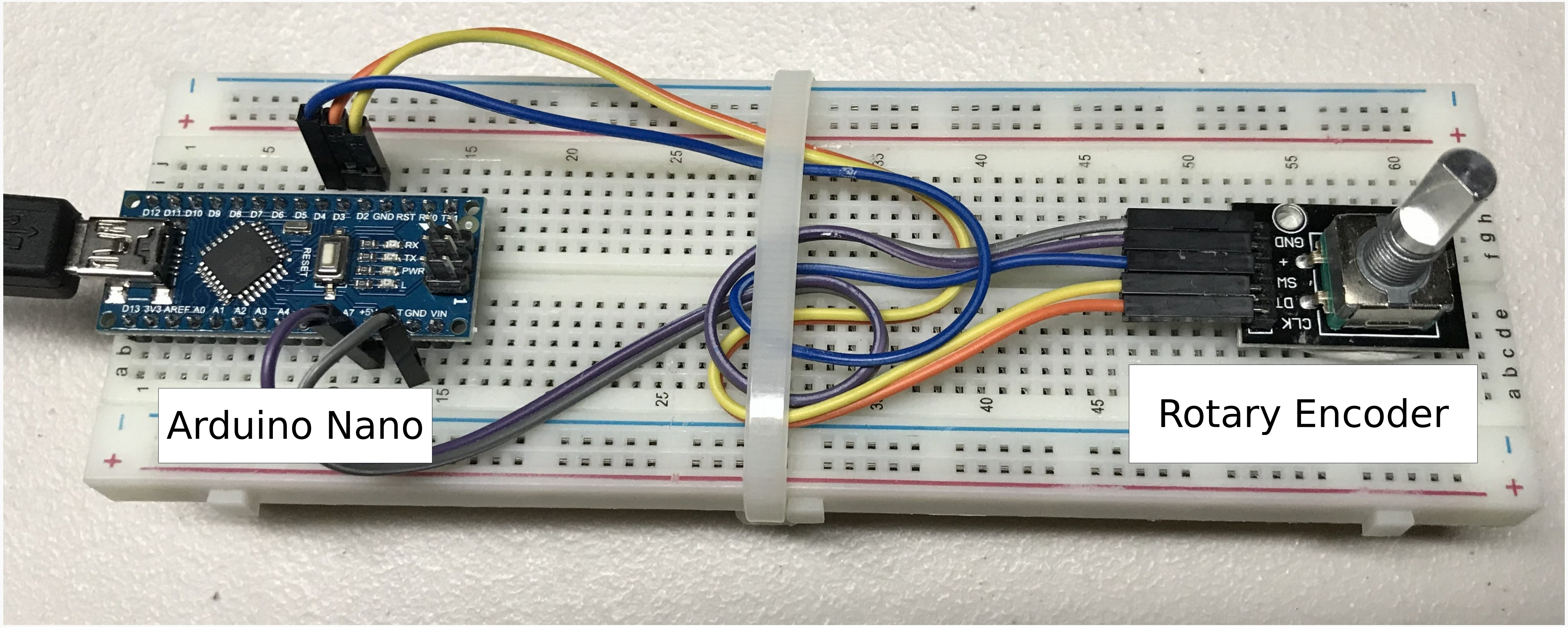
```
grisch@lenovo-G50-70 ~/D/h/t/0/P/Stock_Price> ./demo3.py
MAINE BASED COMPANY STOCK PERFORMANCE


Updating stock info from the list of Maine stocks:
BHB CAC FNLC IDXX ICCC NBN WEX CVET

=====TOP PERFORMANCE=========
  WEX Inc. [WEX] changed 3.9 dollars
  IDEXX Laboratories [IDXX] changed 2.6 dollars
  Covetrus [CVET] changed 0.5 dollars
  The First Bancorp [FNLC] changed 0.0 dollars
  Northeast Bancorp [NBN] changed -0.1 dollars
  ImmuCell Corporation [ICCC] changed -0.2 dollars
  Bar Harbor Bankshares [BHB] changed -1.1 dollars
  Camden National Corporation [CAC] changed -1.4 dollars

=====WORST PERFORMANCE=========
  Camden National Corporation [CAC] changed -1.4 dollars
  Bar Harbor Bankshares [BHB] changed -1.1 dollars
  ImmuCell Corporation [ICCC] changed -0.2 dollars
  Northeast Bancorp [NBN] changed -0.1 dollars
  The First Bancorp [FNLC] changed 0.0 dollars
  Covetrus [CVET] changed 0.5 dollars
  IDEXX Laboratories [IDXX] changed 2.6 dollars
  WEX Inc. [WEX] changed 3.9 dollars
grisch@lenovo-G50-70 ~/D/h/t/0/P/Stock_Price>
```

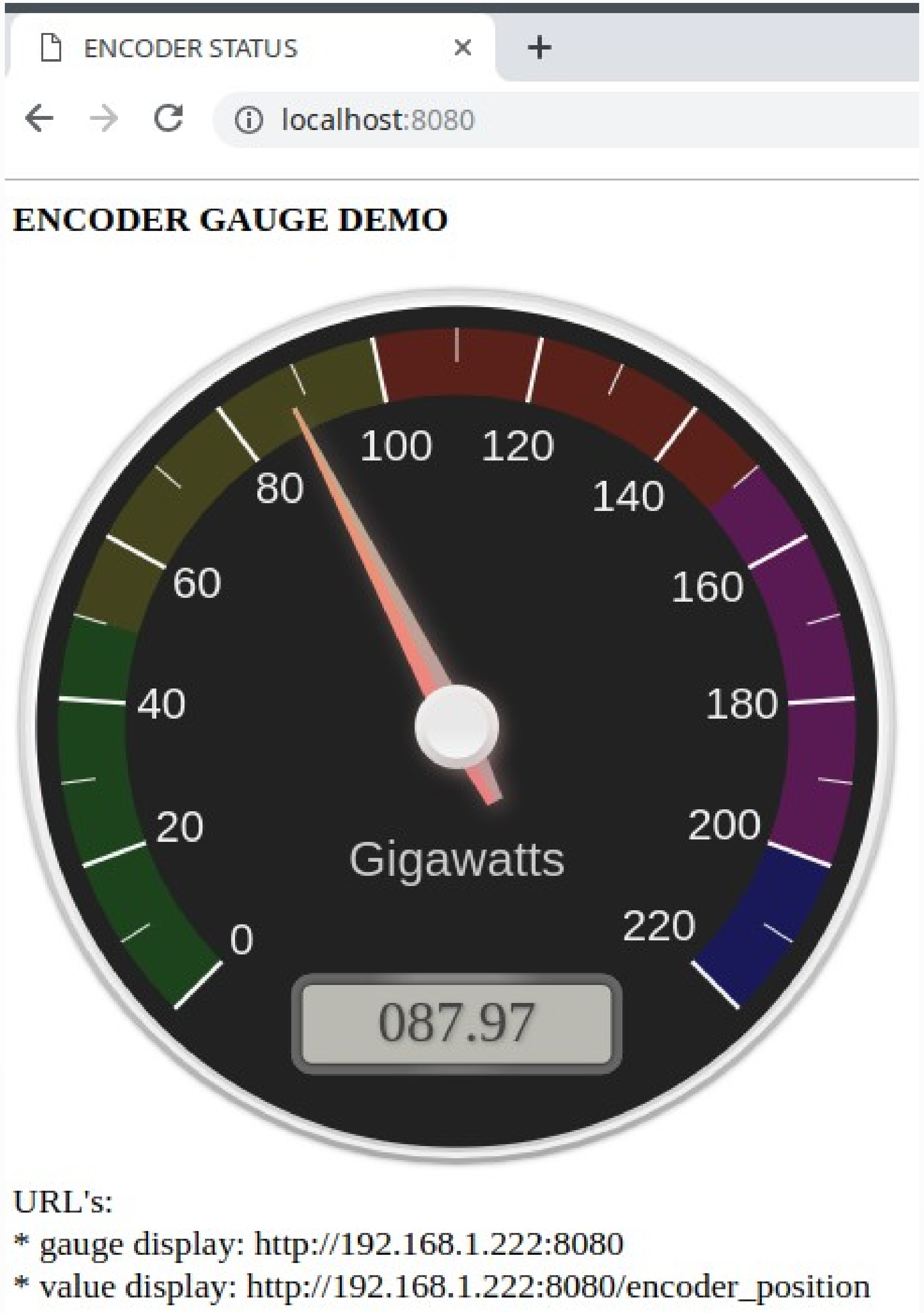
Hosting a Web App

- Typically need for a remote machine/equipment
  - Telemetry (aka ‘IoT’)
  - Need to share with colleagues
    - US, around the world
  - Need an easy interface
  - Need some iterative features like gauges, graphs, etc

Hosting a Web App

- Arduino for machine data (encoder_reader.ino)
- Python driver for encoder data (encoder.py)
- Web app is written with Bottle (server.py)
  - Bottle is a one-page framework
  - Included some fancy Javascript to display a gauge
- Demo


Arduino Nano
Rotary Encoder
GND
+
SW
DT
CLK



ENCODER GAUGE DEMO

URL's:
* gauge display: http://192.168.1.222:8080
* value display: http://192.168.1.222:8080/encoder_position

Summary

- In 30 years, WWW has come a long way
  - Static pages → Ajaxy goodness → web sockets → ???
  - Will it be needed in 30 more years (apps?)
- Get out there and see what you can make with Python!

Questions?

Have an Idea for a Talk?
Come see me...

FOR MORE INFORMATION:

GitHub for Hack Portland will have all the files (need to set up)

Python Modules:

Requests - 'HTTP for humans', a Python module to support HTTP (http://docs.python-requests.org/en/master/)
Bottle - a single file micro-framework for Python (https://bottlepy.org/docs/dev/)
ifaddr - find the IP addresses of network interfaces (https://github.com/pydron/ifaddr)
PySerial - serial support (>pip3 install pyserial)

HTML/JAVSCRIPT

Canvas Gauges - animated gauges (https://canvas-gauges.com)

Arduino:

Arduino Nano - used to implement rotary encoder (ALPS STEC12E07)
CmdArduino - Command line serial library for Arduino (https://github.com/fakufaku/CmdArduino)
Encoder - encoder library for interupt driven quadrature encoders (https://github.com/PaulStoffregen/Encoder)
Button - library to make handling of button very simple (https://github.com/madleech/Button)
JLED - Non-blockig LED effects like blinking and breathing LED's