A sunset over the ocean with palm trees and beach umbrellas in the foreground. The sky is filled with orange and yellow clouds, and the water is a deep blue. The foreground shows the silhouettes of palm trees and beach umbrellas against the darkening sky.

Applications, Algorithms and Data: Open Educational Resources and the Next Generation of Virtual Learning

Stephen Downes
RELIF
Hammamet, Tunisia
November 30, 2017

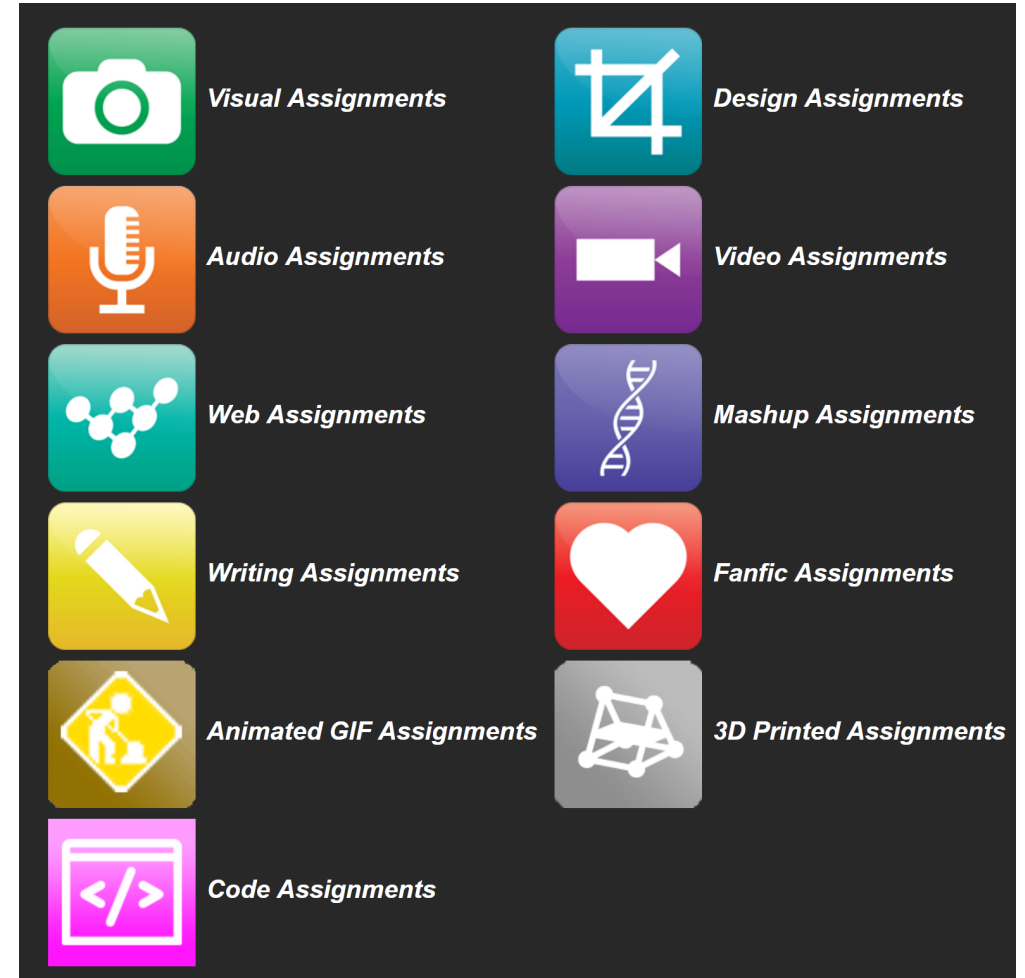
- Abstract: Open Educational Resources (OER) have traditionally been thought of as replacements for classroom materials such as textbooks, teaching aids, study guides, and background resources. In more recent years they have come to include multimedia resources such as animations, podcasts and videos, and they have led to the development of new educational modalities, such as massive open online courses (MOOCs). The next generation of OERs will take a step beyond traditional media and classroom support and begin to take advantage of the unique properties of virtual learning. Using examples such as virtual containers and actionable data books, education technology researcher Stephen Downes will sketch the future for the next generation of OERs as a distributed and interactive network of applications, algorithms and data.

State of the Art



OERs as Student Production

- DS106 – assignment bank
<http://assignments.ds106.us/>
- Domain of One's Own -
<https://reclaimhosting.com/domain-of-ones-own/>
- Creation of OERs through 'renewable assignments' – Christina Hendricks
<http://flexible.learning.ubc.ca/news-events/renewable-assignments-student-work-adding-value-to-the-world/>



Open Case Studies

- case studies that can be used by anyone, at UBC or elsewhere.
- Many focus on topics in sustainability
- cases on this site are open educational resources: they have an open license to allow for revision and reuse of the cases in other courses and contexts

Quoted from: <http://cases.open.ubc.ca/>



GWAII HAANAS NATIONAL PARK PRESERVE

Gwaii Haanas Park reserve and Haida Heritage site is an archipelago of 138 islands that lies 130km off the coast of mainland British Columbia; known simply as Gwaii Haanas, this area is protected as both a National Park reserve and an important Herit...

[Read More](#)



FORT McMURRAY AND THE FIRES OF CLIMATE CHANGE

Fort McMurray, located in a beautiful service area with vast oil sands deposit in northeast of Alberta, is surrounded by peatlands and boreal forests of aspen and spruce. Though normally very wet, Fort McMurray is relative dry and hot in summer, and ...

[Read More](#)



ECOLOGICAL AND SOCIAL COSTS OF COTTON FARMING

In today's age, cotton is one of the most versatile crops that the earth has to offer. Many of us are familiar with the usage of clothing in cotton, but cotton is also used in beauty products and food products as well. Look at the clothes that you ar...

[Read More](#)



GOLF COURSE CONSERVATION MANAGEMENT

Urbanization is a trend that continues to remain consistent and dominant in our world today. Countries continue to expand infrastructure and grow industry in order to meet both global and national demands. As countries develop, rural landscapes are C...

[Read More](#)



SUBURBAN GOLF COURSE

There is much debate within our society today about whether or not golf courses provide conservation value. While some articles portray golf courses as improving conservation value by creating habitat for sensitive organisms, others sources are cynic...

[Read More](#)



CULTURAL KEYSTONE PLACES

The Colorado river delta was once a thriving and biological productive region, which spanned two million acres across Northwestern Mexico. However, by the middle of the twentieth century, the Colorado river began to be diverted and dammed for irrigat...

[Read More](#)



BIOFUELS

Biofuel is the product of the refinement of plant biomass which can then be burned for heat or light energy. It is made of organic matter, either directly from plants or indirectly from domestic, industrial or commercial wastes. There are different t...

[Read More](#)



TEACHER BLOGGER

Sarah has recently begun her first contract as a certified teacher at a high school in Vancouver. The position allows her to teach Physical Education and coach one of the school's basketball teams, which is exciting for her, as she is able to bring t...

[Read More](#)

Content Syndication

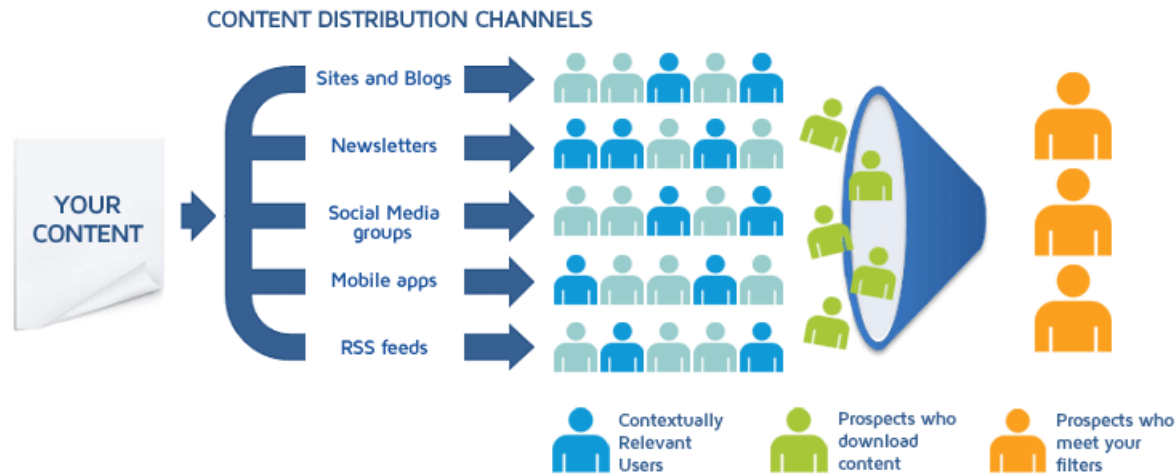


Image:

<https://blog.izooto.com/best-content-syndication-tools/>

- Blog posts and comments were the core of CCK08
 - gRSShopper – <http://grsshopper.downes.ca>
- FeedPress - <https://wordpress.org/plugins/feedpress/>
- FeedBurner - <https://feedburner.google.com>

Scrapy

Terminal

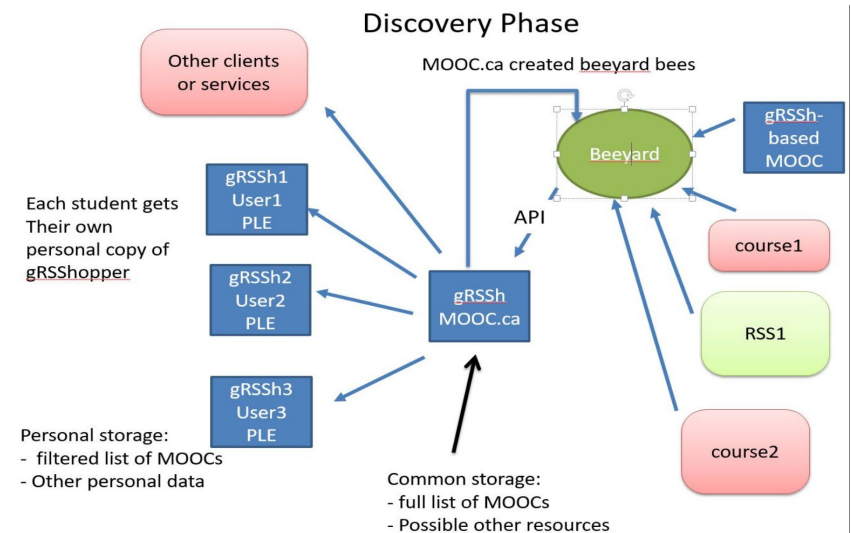
```
$ pip install scrapy
$ cat > myspider.py <<EOF
import scrapy

class BlogSpider(scrapy.Spider):
    name = 'blogspider'
    start_urls = ['https://blog.scrapinghub.com']

    def parse(self, response):
        for title in response.css('h2.entry-title'):
            yield {'title': title.css('a ::text').extract_first()}

        for next_page in response.css('div.prev-post > a'):
            yield response.follow(next_page, self.parse)
EOF
$ scrapy runspider myspider.py
```

- Python framework to aggregate and store content in RSS feeds and web sites
- Forms the core of the NRC-developed 'Beeyard' application



MOOC.ca and gRSShopper

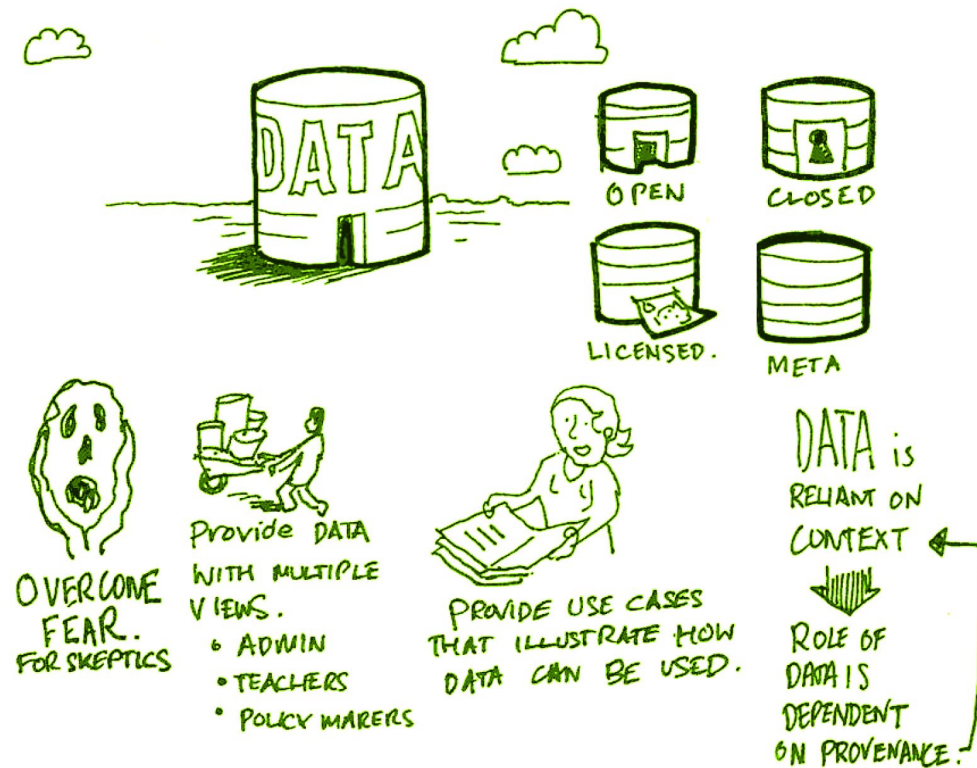


The screenshot shows a web browser window with the URL www.mooc.ca. The page displays search results for 'Quantum Cryptography'. The search results are sorted by 'Recent' and show 10 results. The first result is 'Lighting Tips and Tricks for Better Pictures and Video'. The second result is '光学 (自主模式)' (Optics (Autonomous Mode)) from the provider 'xuetangx.com'. The course description is in Chinese and English, discussing the wave nature of light and its applications. The course content includes: 1. What is 'light'?, 2. Maxwell equations, 3. Propagation of light in isotropic media, 4. Geometric Optics, 5. Superposition of waves, 6. Interference, 7. Diffraction, 8. Polarization of light. The page was retrieved on Aug 17, 2017.



www.mooc.ca is an aggregator of MOOC course offerings (and is planned to aggregate OERs as well) using gRSShopper and Beeyard

Open Data as OERs



- Civic engagement in Italy
- Into programming assignments
- Article-level metrics
- Geodata and Land Walks in Wales
- Open data for sustainable development

Atenas, J., & Havemann, L. (Eds.). (2015). Open Data as Open Educational Resources: Case studies of emerging practice. London: Open Knowledge, Open Education Working Group. <http://dx.doi.org/10.6084/m9.figshare.1590031>
Also: Leo Havemann, slides http://eprints.bbk.ac.uk/14750/1/Leo_ODasOER_UCL_4March16.pdf

CodePen

10 stunning hover effects with scss
A PEN BY Renan C. Araujo

Run Fork Settings Change View Log In Sign Up

HTML

```
1 <section class="head">
2   <a href="" data-bf="10 Stunning" data-af="with
  scss">HOVER EFFECTS</a>
3 </section>
4
5 <section class="p10">
6   <a href="">camera</a>
7 </section>
8 <section class="p11">
9   <a href="">
10     ROAD
11   </a>
12
13 </section>
14 <section class="p12">
```

CSS (SCSS)

```
1 @import "bourbon";
2
3 @import url(https://fonts.googleapis.com/css?
  family=Montserrat:200,300,400,800,900);
4
5 $image1: '//caraujo_pens.surge.sh/images/uZlR2bB.jpg';
6 $image2: '//caraujo_pens.surge.sh/images/OfpVvOs.jpg';
7 $image3: '//caraujo_pens.surge.sh/images/QYS0sMB.jpg';
8 $image4: '//caraujo_pens.surge.sh/images/qXJds9L.jpg';
9 $image5: '//caraujo_pens.surge.sh/images/0CRoXDg.jpg';
10 $image6: '//caraujo_pens.surge.sh/images/TC4rvkU.jpg';
11 $image7: '//caraujo_pens.surge.sh/images/KBh0YIr.jpg';
12 $image8: '//caraujo_pens.surge.sh/images/cNmoLmL.jpg';
13 $image9: '//caraujo_pens.surge.sh/images/onQye0q.jpg';
14 $image10:
```

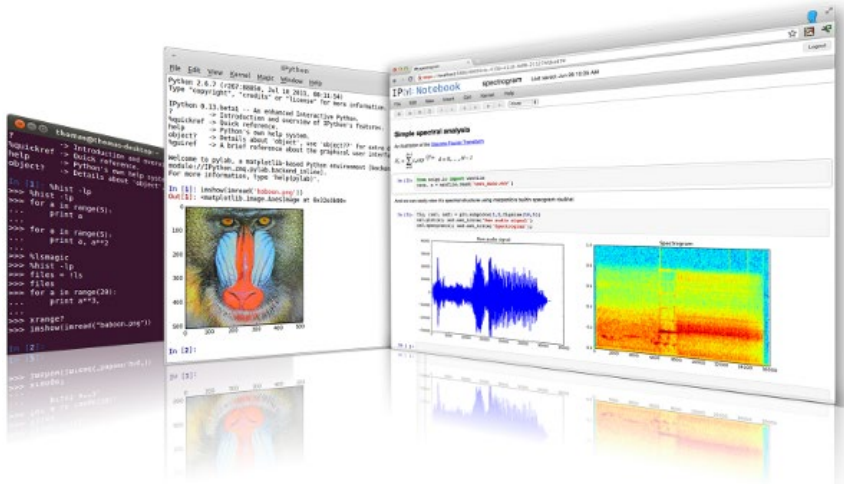
JS

```
1 //all images by unsplash.com
2 //Chicago by Blaise Sewell:
  https://thenounproject.com/term/chicago-skyline/76262/
```

Console Assets Comments Shortcuts Share Export Embed

<https://codepen.io/caraujo/pen/LVPzxO>

iPython and Jupyter



- iPython is an interactive programming shell for the Python programming language <https://ipython.org/>



- The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code... <http://jupyter.org/>

A gallery of interesting Jupyter Notebooks

```
In [4]: my @svg = split ' ', q[
https://upload.wikimedia.org/wikipedia/commons/f/fd/G
https://upload.wikimedia.org/wikipedia/commons/f/f9/L
];
IPerl->display( IPerl->svg( $_ , width => "200" ) ) for @svg;

$png_display;
```



<https://github.com/jupyter/jupyter/wiki/A-gallery-of-interesting-Jupyter-Notebooks#machine-learning-statistics-and-probability>

noise, rotational and glacial seismology, and more.

Linguistics and Text Mining

- [Workshop on text analysis](#) by Neal Caren.
- [Detecting Algorithmically Generated Domains](#), part of the [Data Hacking](#) collection on security-oriented data analysis with IPython & friends.
- [Mining the Social Web \(2nd Edition\)](#). A complete collection of notebooks accompanying Matthew Russel's book by O'Reilly.

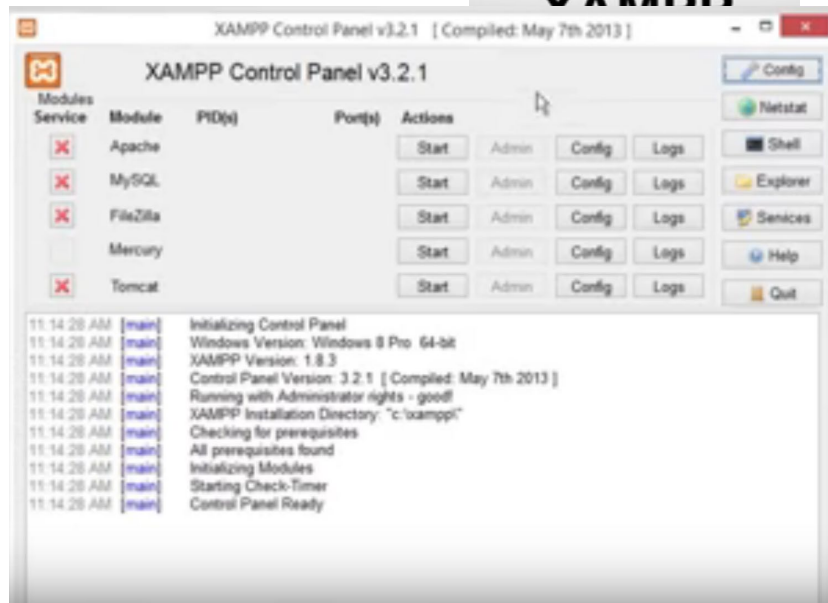
Signal Processing

- [Sound Analysis with the Fourier Transform](#). A set of IPython Notebooks by Caleb Madrigal to explain what the Fourier Transform is and how to use it for basic audio processing applications.
- [An introduction to Compressed Sensing](#), part of [Python for Signal Processing](#): an entire book (and [blog](#)) on the subject by Jose Unpingco. `ādasd`
- [Kalman and Bayesian Filters in Python](#). A textbook and accompanying filtering library on the topic of Kalman filtering and other related Bayesian filtering techniques.
- [Classify human movements using Dynamic Time Warping & K Nearest Neighbors](#): Signals from a smart phone gyroscope and accelerometer are used to classify if the person is running, walking, sitting standing etc. This IPython notebook contains a python implementation of DTW and KNN algorithms along with explanations and a practical application.
- [Digital Signal Processing](#) A collection of notebooks that accompanies a masters course on the topic.
- [An introduction to openCV](#) An introduction course into using openCV for computer vision in python

Engineering Education

- [Introduction to Chemical Engineering Analysis](#) by Jeff Kantor. A collection of IPython notebooks illustrating topics in introductory chemical engineering analysis, including

XAMPP



“XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use.”

XAMPP on a USB Stick

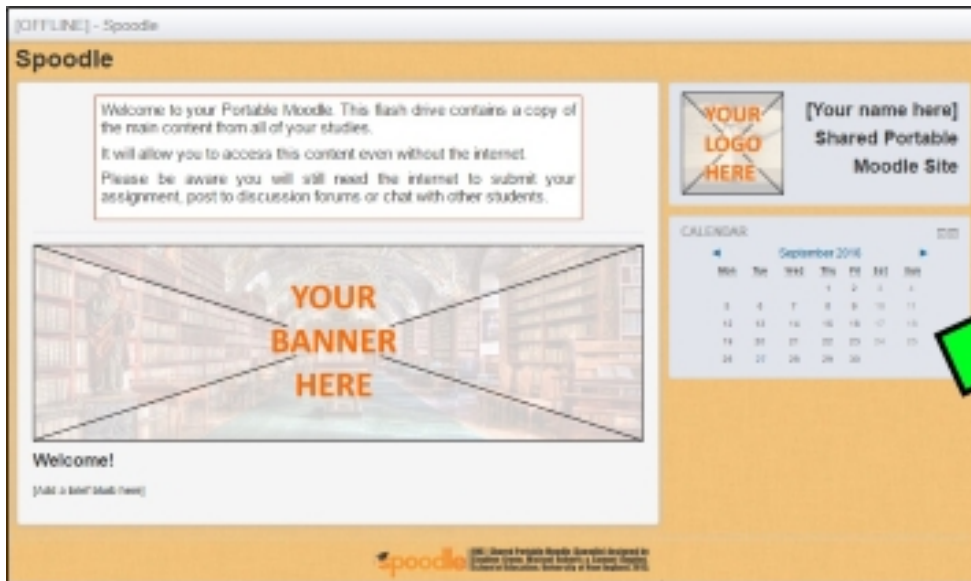
<https://portableapps.com/apps/development/xampp>

<https://willtan.com/installing-xampp-on-usb-flash-drive/>

<https://www.apachefriends.org/index.html>

Moodle on a Stick

“Spoodle is an up to date portable moodle / ‘moodle on a stick’ solution for learners to access Moodle courses without requiring constant internet access.”



<https://moodle.org/mod/forum/discuss.php?d=342367>

<https://www.youtube.com/watch?v=EsHEgSYKr4A>

Embedding Applications in Other Applications

- gRSShopper as a Firefox Sidebar

The image is a collage of three screenshots related to the gRSShopper Firefox sidebar. The top right screenshot shows the Firefox Add-ons search page for "sidebar", displaying 2,054 results. The middle left screenshot shows the Firefox Add-ons page with the "gRSShopper as a Sidebar" extension highlighted. The bottom right screenshot shows the gRSShopper application interface, which includes a navigation menu and a main content area displaying a grid of links.

Firefox Add-ons Search Results for "sidebar":

Extension Name	Description	Users
Gmail Mail Sidebar	Gmail Mail Sidebar brings Gmail right into your Firefox Sidebar.	4,539 users
Yandex.Bar	Advanced toolbar for Firefox	548,439 users
Sidebar for Facebook™	Right into your Firefox. Get notifications, instantly.	2,028 users

gRSShopper as a Sidebar:

This WebExtension has a temporary ID. [Learn more](#)

Location: C:/Users/steph/Cod
Extension ID: f7330c45cc5fa4b9b
Internal UUID: 1bc5ed30-a1f3-45f5

Extensions:

- Activity Stream

gRSShopper Application Interface:

Yes this is my start page

Downes	Audio	Photos	Social	MLB	Video	NRC
NewPost	Google Music	Upload	Google Plus	Games	Live - Watch	Wiki-ICT
ListPosts	CBC Radio	Albums	Medium	Scores	Live-Create	Wiki-LPSS
Presentation	Jamendo	Camera Roll	Twitter	Standings	My Channel	Zone
Pages	SoundCloud	OneDrive Photos	Twitter Activity	Blue Jays	YouTube	SAP
Admin	Ed Radio	Let's Make Art	Mastodon	Banter	Netflix	Service
Downes.ca				Jays Journal	Crave	GCoollab
Services	Travel	News	Email	Slides	Blog	Intellexir
Bank	Expedia	Weather	OWA Email	Slideshare	Half an Hour	FedScience Library

<https://addons.mozilla.org/en-US/firefox/search/?q=sidebar&platform=WINNT&appver=58.0>

Embedding Applications in Other Applications

- gRSShopper in Vivaldi

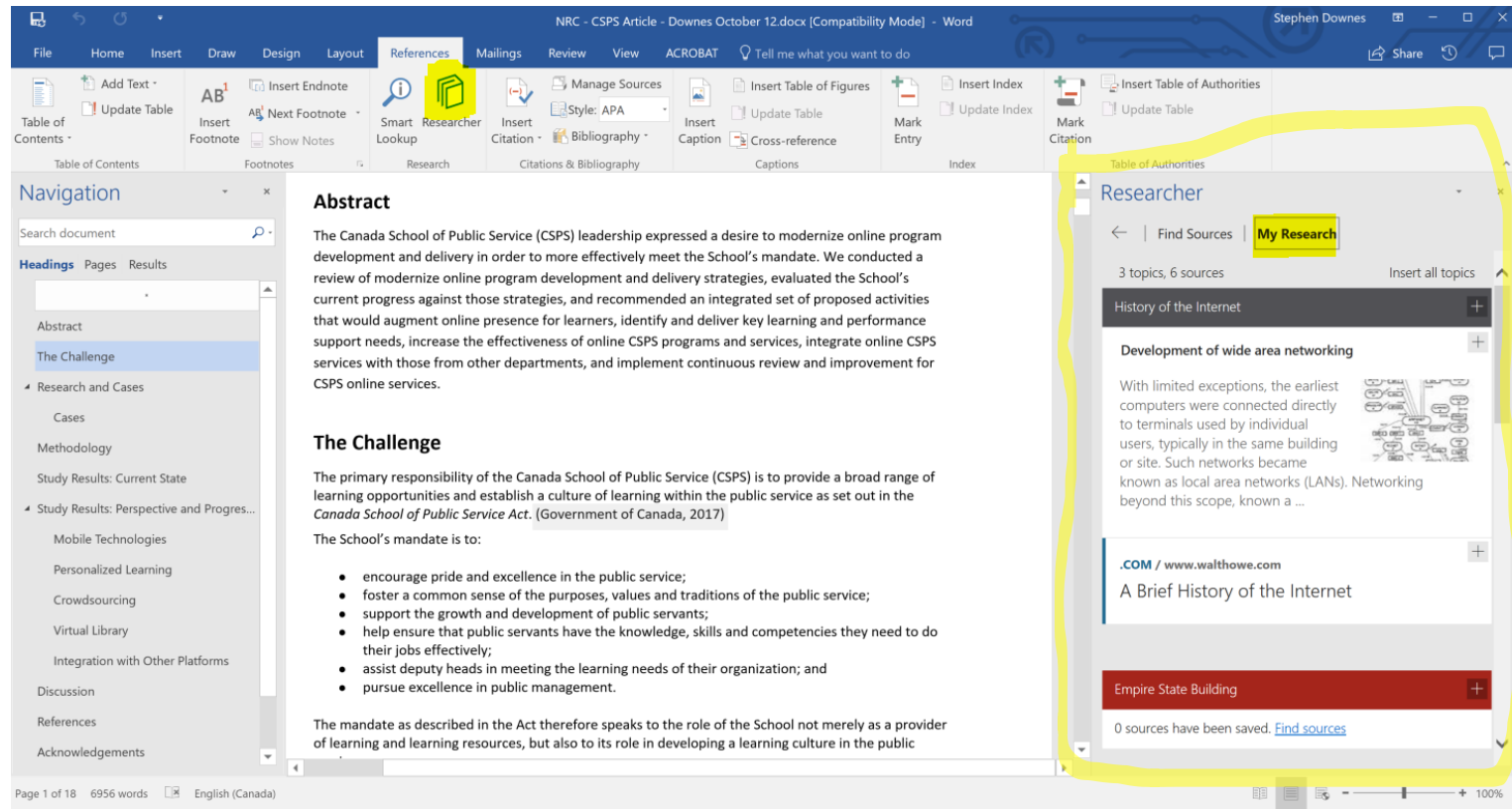
The image shows a Vivaldi browser window with two tabs. The left tab is a YouTube video titled "The Twins" by Discovery Education, featuring a young boy named Lucas. The right tab is a CogDogBlog post titled "On Transformations" by Alan Levine. The blog post content includes a paragraph about a Twitter micropost and a paragraph about the International Specialised Skills Institute Fellowship Awards Ceremony.

YouTube Video: The video shows a young boy with a large afro hairstyle wearing a blue t-shirt with the name "LUCAS" on it. The video title is "The Twins" and it has 1,400 views. It was published by Discovery Education on May 1, 2017.

CogDogBlog Post: The post is titled "On Transformations" and is by Alan Levine. The content includes a paragraph about a Twitter micropost and a paragraph about the International Specialised Skills Institute Fellowship Awards Ceremony.

Embedding Applications in Other Applications

Research and References in an MS-Word Plugin



Server Virtualization

- Parallels
- VMWare
- Virtual Box
- Hyper-V

Virtualization Platforms - Vagrant

Loading and Running Vagrant Boxes

- Scotch Box

- <https://box.scotch.io/> -- <http://192.168.33.10/>
- WPDistillery - <https://wpdistillery.org/> - for WordPress

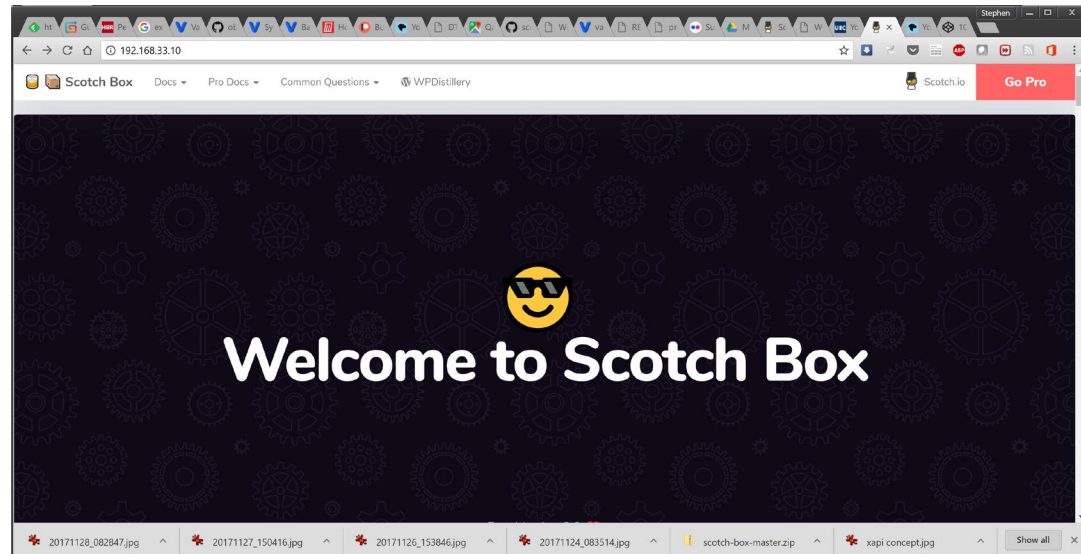
- Homestead

- Instructions - <https://laravel.com/docs/5.5/homestead#first-steps>

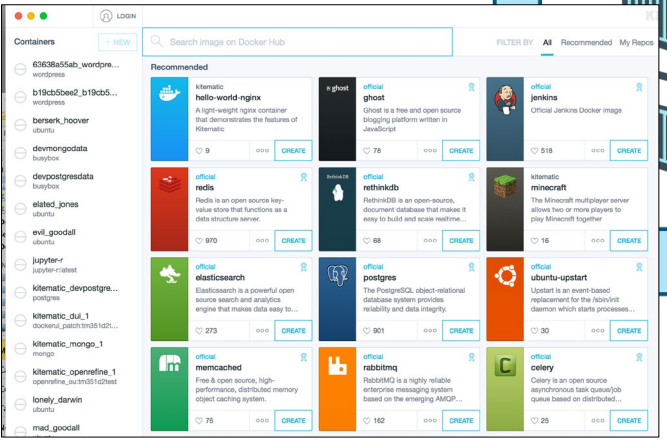
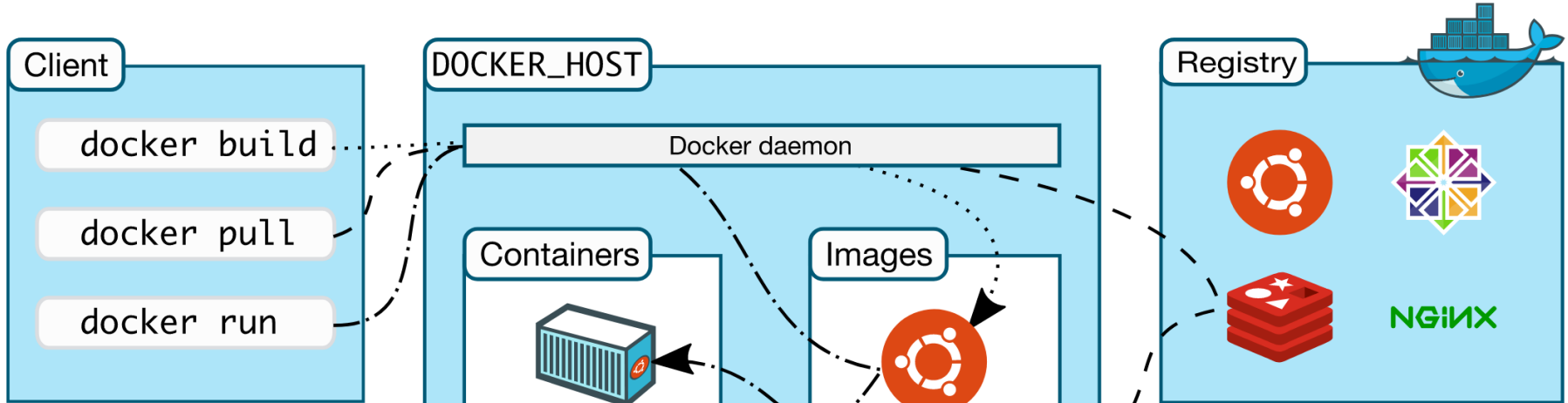
```
Command Prompt
Directory of C:\Users\steph\CodeProjects\Vagrant\lamp
11/27/2017 04:17 PM <DIR>      .
11/27/2017 04:17 PM <DIR>      ..
11/27/2017 04:17 PM <DIR>      .vagrant
11/27/2017 04:17 PM          3,089 Vagrantfile
1 File(s)              3,089 bytes
3 Dir(s) 628,750,442,496 bytes free

C:\Users\steph\CodeProjects\Vagrant\lamp>cd ../scotchbox

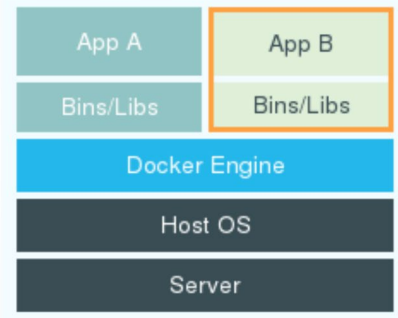
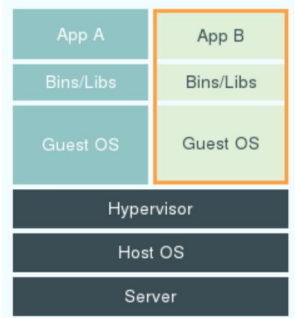
C:\Users\steph\CodeProjects\Vagrant\scotchbox>vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'scotch/box' could not be found. Attempting to find and install...
    default: Box Provider: virtualbox
    default: Box Version: >= 0
==> default: Loading metadata for box 'scotch/box'
    default: URL: https://vagrantcloud.com/scotch/box
==> default: Adding box 'scotch/box' (v3.0) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/scotch/boxes/box/versions/3.0/providers/virtualbox.box
    default:
==> default: Successfully added box 'scotch/box' (v3.0) for 'virtualbox'!
==> default: Importing base box 'scotch/box'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'scotch/box' is up to date...
==> default: Setting the name of the VM: scotchbox_default_1511952863136_42106
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
```



Docker



Containers vs VMs



Big Blue Button in Docker

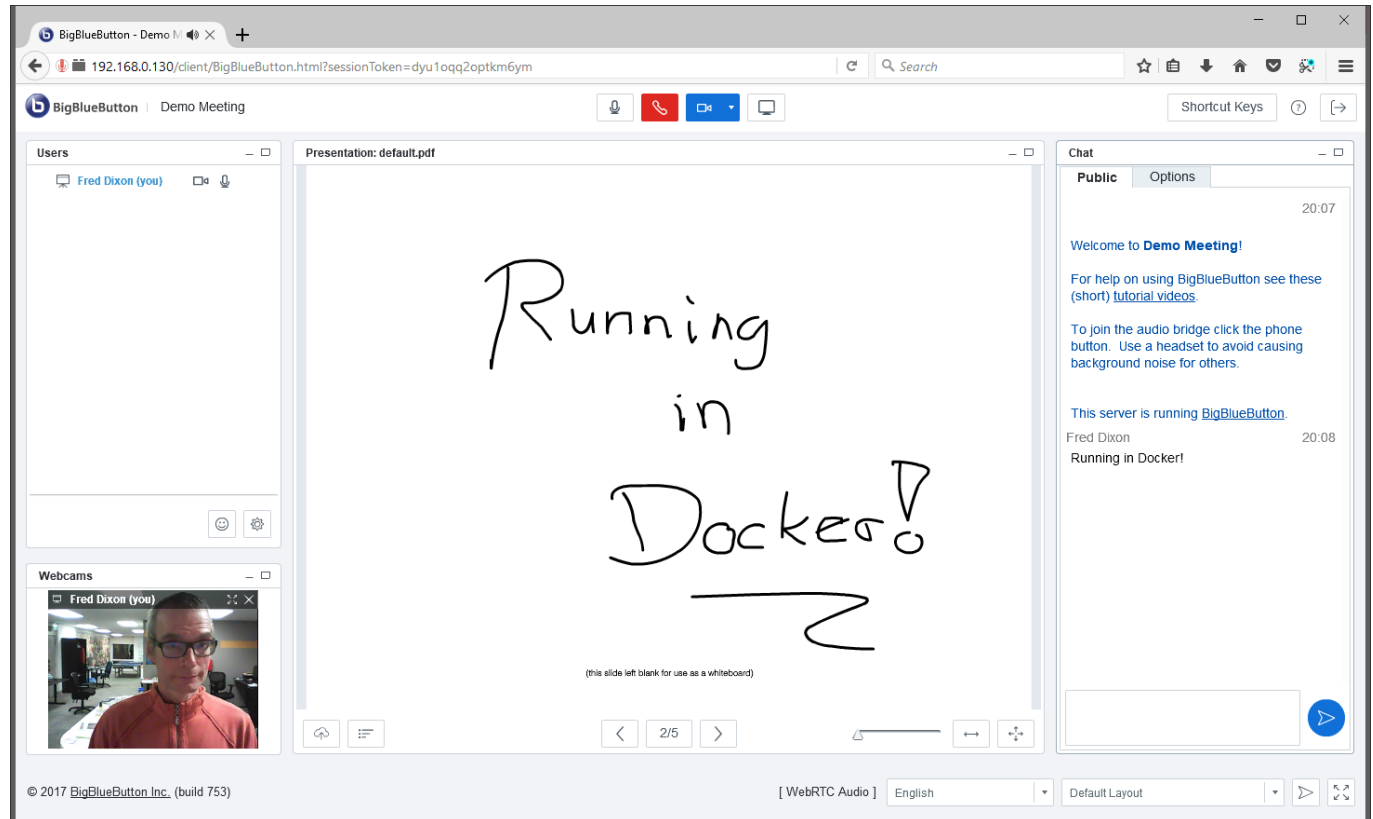
Docker Pull Command

```
docker pull bigbluebutton/bigbluebutton
```

Owner



bigbluebutton

A screenshot of a BigBlueButton meeting interface. The browser address bar shows the URL: 192.168.0.130/client/BigBlueButton.html?sessionToken=dyu1oqq2optkm6ym. The interface includes a 'Users' panel on the left with 'Fred Dixon (you)' listed. The main area is a 'Presentation: default.pdf' slide with the handwritten text 'Running in Docker!' and a squiggly line underneath. A 'Webcams' panel at the bottom left shows a video feed of 'Fred Dixon (you)'. A 'Chat' panel on the right contains a public message: 'Welcome to Demo Meeting!', followed by help text and a message from 'Fred Dixon' at 20:08: 'Running in Docker!'. The bottom status bar shows '© 2017 BigBlueButton Inc. (build 753)', '[WebRTC Audio]', 'English', and 'Default Layout'.

<http://docs.bigbluebutton.org/labs/docker.html>

<https://hub.docker.com/r/bigbluebutton/bigbluebutton/>

Moodle on Docker

docker-moodle No Maintenance Intended ✕

A Dockerfile that installs and runs the latest Moodle stable.

Installation

```
git clone https://github.com/jda/docker-moodle
cd docker-moodle
docker build -t moodle .
```

Usage

To spawn a new instance of Moodle:

```
docker run -d --name DB -p 3306:3306 -e MYSQL_D
docker run -d -P --name moodle --link DB:DB -e M
```

You can visit the following URL in a browser to get started:

<http://192.168.59.103:8080>

Activity module	Activities	Version	Hide/Show	Delete	Settings
Assignment	0	2007020200		Delete	Settings
Chat	0	2007020200		Delete	Settings
Choice	0	2007020200		Delete	
Database	0	2007022601		Delete	Settings
Forum	0	2007020202			Settings
Glossary	0	2007020200		Delete	Settings
Hot Potatoes Quiz	0	2007020202		Delete	Settings
Journal	0	2007020200		Delete	
LAMS	0	2007020200		Delete	Settings
Label	0	2007020200		Delete	
Lesson	0	2007020201		Delete	
Quiz	0	2007020200		Delete	Settings
Resource	0	2007020200		Delete	Settings
SCORM/AICC	0	2007070300		Delete	Settings
Survey	0	2007020200		Delete	
Wiki	0	2007020200		Delete	
Workshop	0	2007020200		Delete	

<https://hub.docker.com/r/jauer/moodle/>

Options



applications

cloud

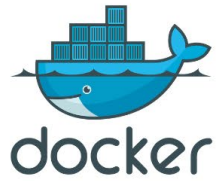
containers

kubernetes

enterprise

support

Launch Moodle now



[Launch Moodle using docker](#)

Recommended if you're getting started with using containers on your workstation or laptop.



[Launch Moodle using Kubernetes](#)

Recommended if you want to deploy your application on production infrastructure.

<https://bitnami.com/stack/moodle/containers>

Cloud Infrastructure Providers

- AWS
- Azure
- Bitnami

Happening Now...

- Docker images to build OER
 - <https://gitlab.com/oer/docker>