Internet-in-a-Box Project

Resources for the unconnected world

Presented by

Braddock Gaskill

23 February 2014

SCaLE 12x

Mission

Make Internet content available to the unconnected world.

What is an Internet-in-a-Box?

What is an Internet-in-a-Box?

- a small, inexpensive device ($70 - $250)
- essential Internet resources without any Internet connection.
- a local copy of almost a terabyte of the world's Free information.
- a web interface

Resources

Wikipedia: 37 languages

Maps: world-wide to street level

E-books: 40,000 books in many languages

Software: Open Source. Linux OS with all software package repositories. Source code.

Video: 500+ hours of instruction

For Who?

For schools and communities in the developing world.

Why?

- Internet access is still expensive and difficult in the developing world
- Inexpensive media now exists that can hold vast offline libraries of information
- Large sources of content are available
- Inexpensive reader devices now exist which can read libraries on media

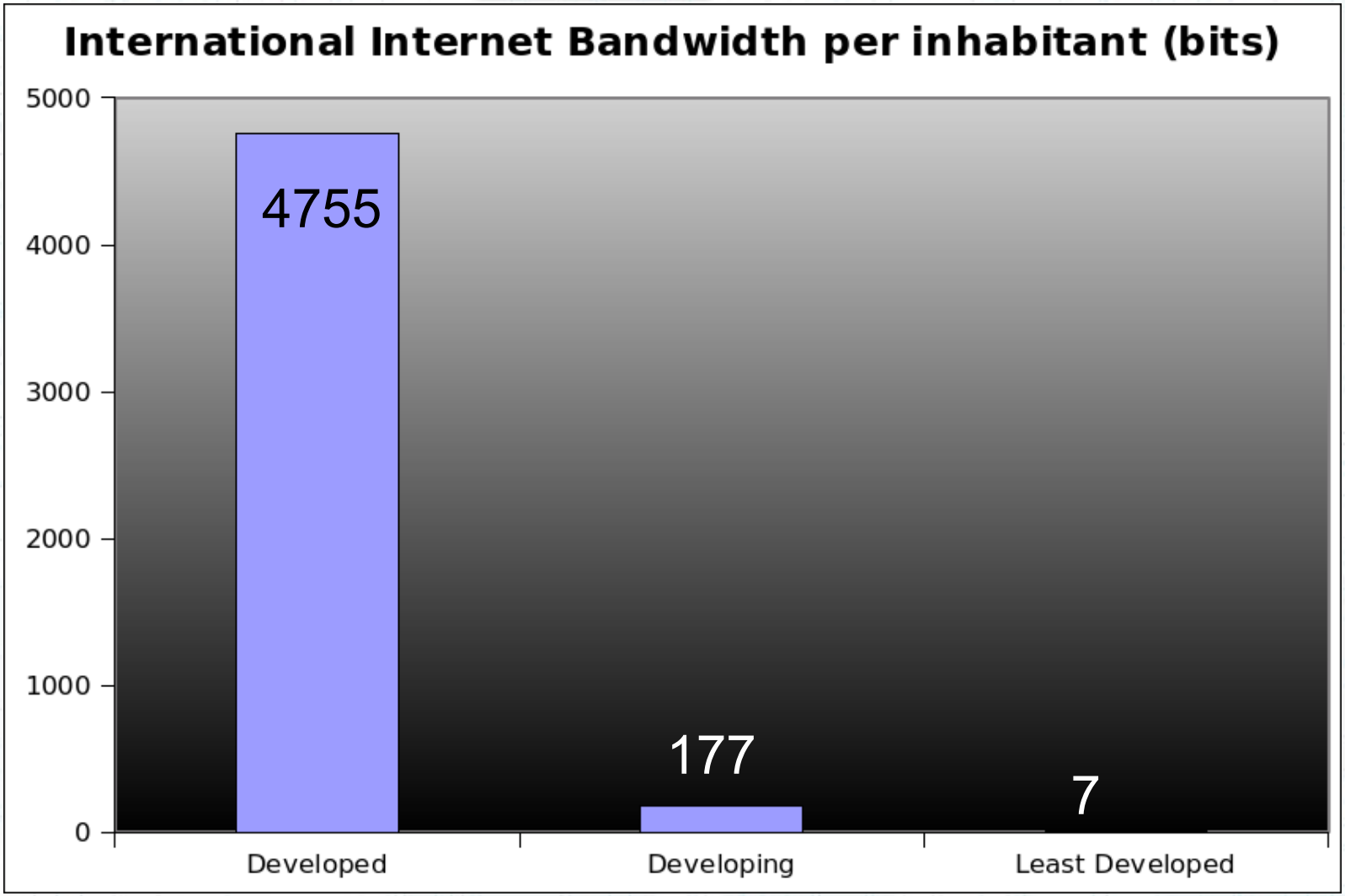
Internet Penetration

- **70%** use internet in ”**developed**” countries
- Only **24%** use internet in ”**developing**” countries*

* 2013, Napoli & Obar

Internet Capacity

- Deficit of internet infrastructure



Global Information Society: A Statistical View 2008

We Have The Technology

- **Half** of the **US Library of Congress** Printed Collection would fit on **ONE hard drive** (text only)

The Law

You are **NOT** allowed to share most information

What can we share?

- Open Source

  -Explicitly licensed for sharing

- Public Domain
  - Generally, pre-1923 is Free
  - Congress often retro-actively extending.
    New material from 1923 starting in 2019
    IF nothing changes.
  - Some exceptions, it's complicated

User Devices

One Laptop Per Child
2.5 Million laptops

Tablets
$50 in India

Phones
with wifi

Wired and Wireless Appliances

Wireless

- Wifi Hotspot
- Battery

Wired

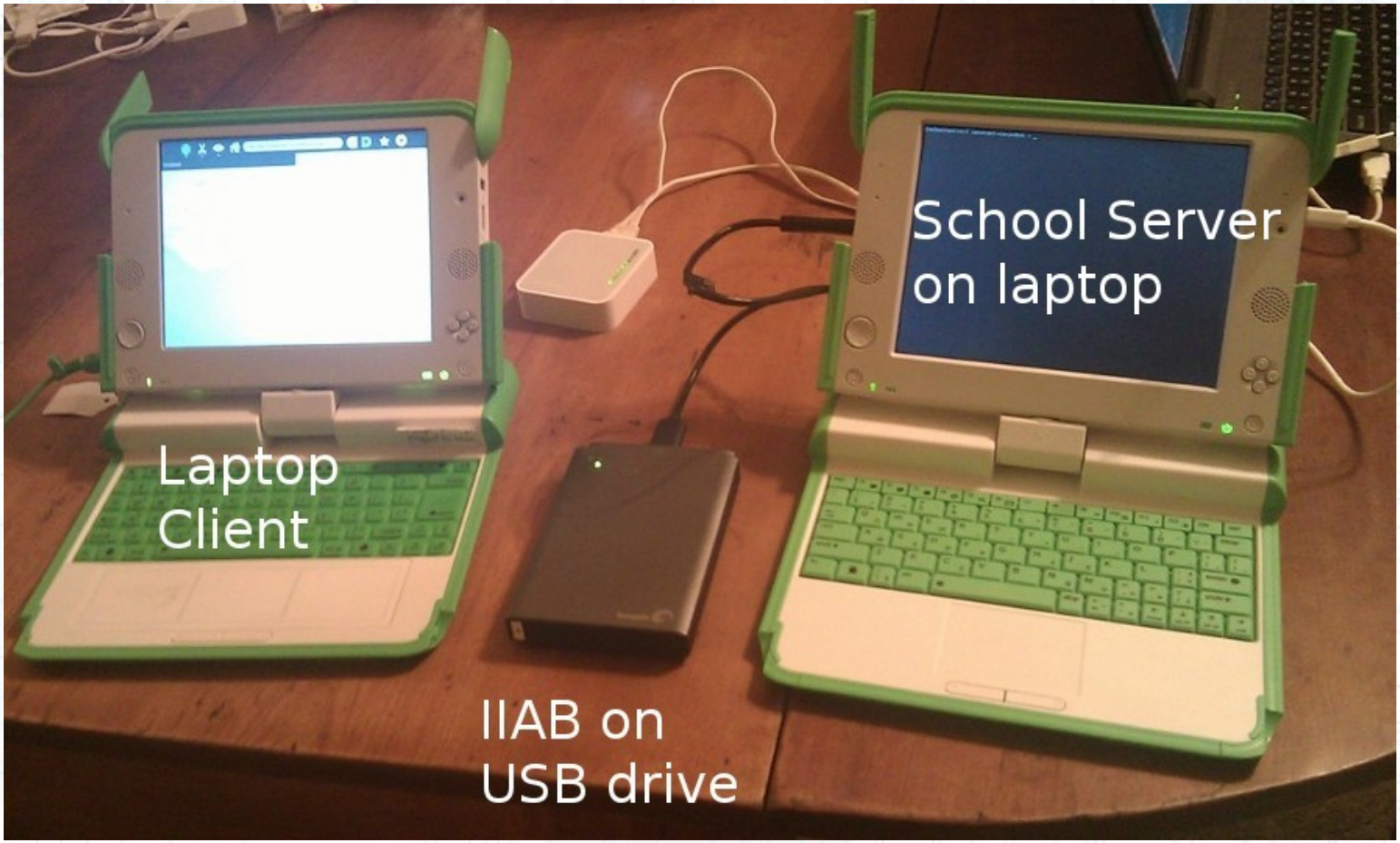
- Connect to existing network
- Network appliance

Co-deployment with School Servers

- One Laptop Per Child Community
  - several Linux-based ”School Server” distributions to serve OLPC laptop deployments
  - provide services to LAN including content and tools to keep laptops updated and running smoothly.

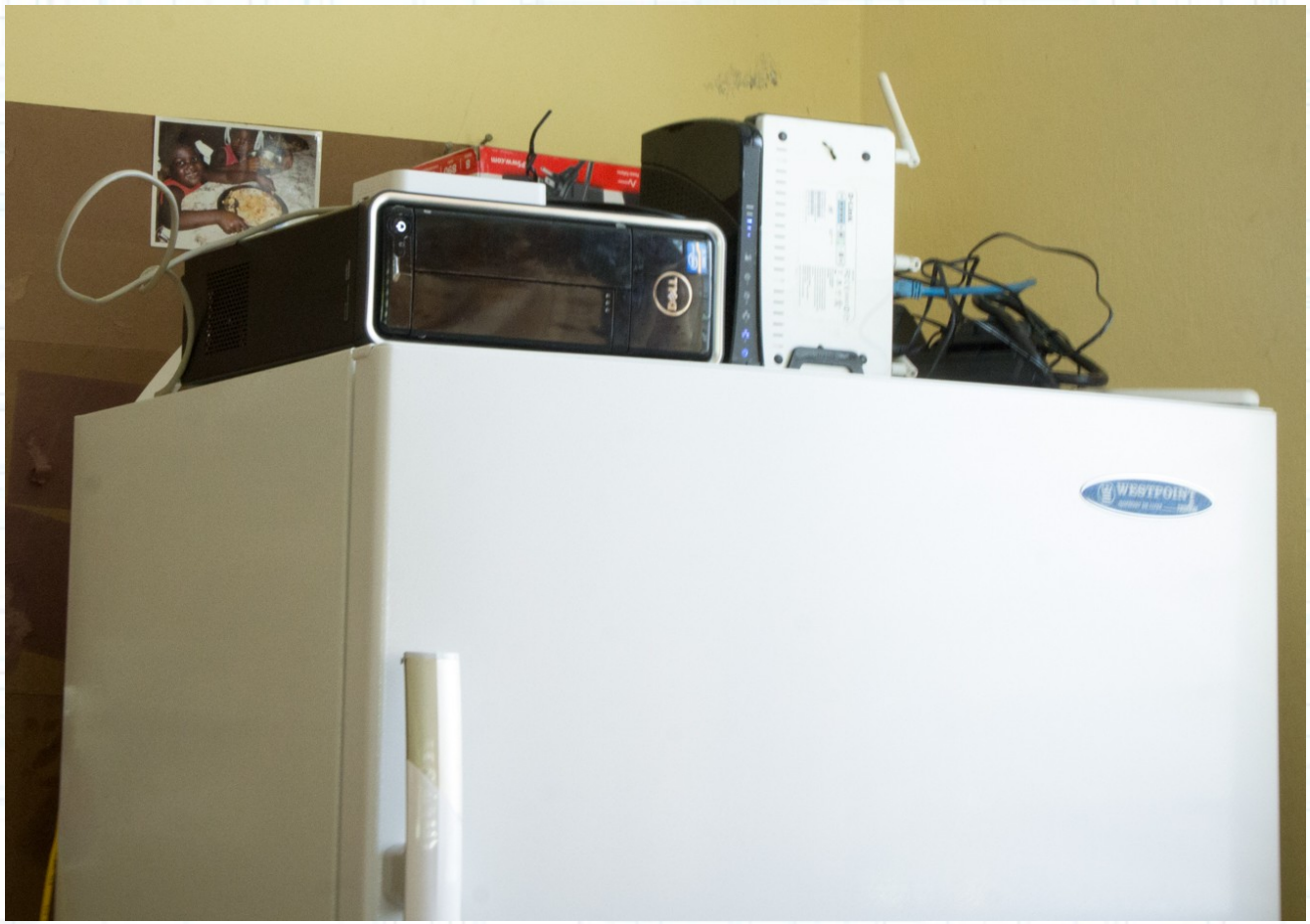
Co-deployment with School Servers

Example: IIAB as USB drive add-on for XSCE School Server



Co-deployment with School Servers

School Server with IIAB in Haiti

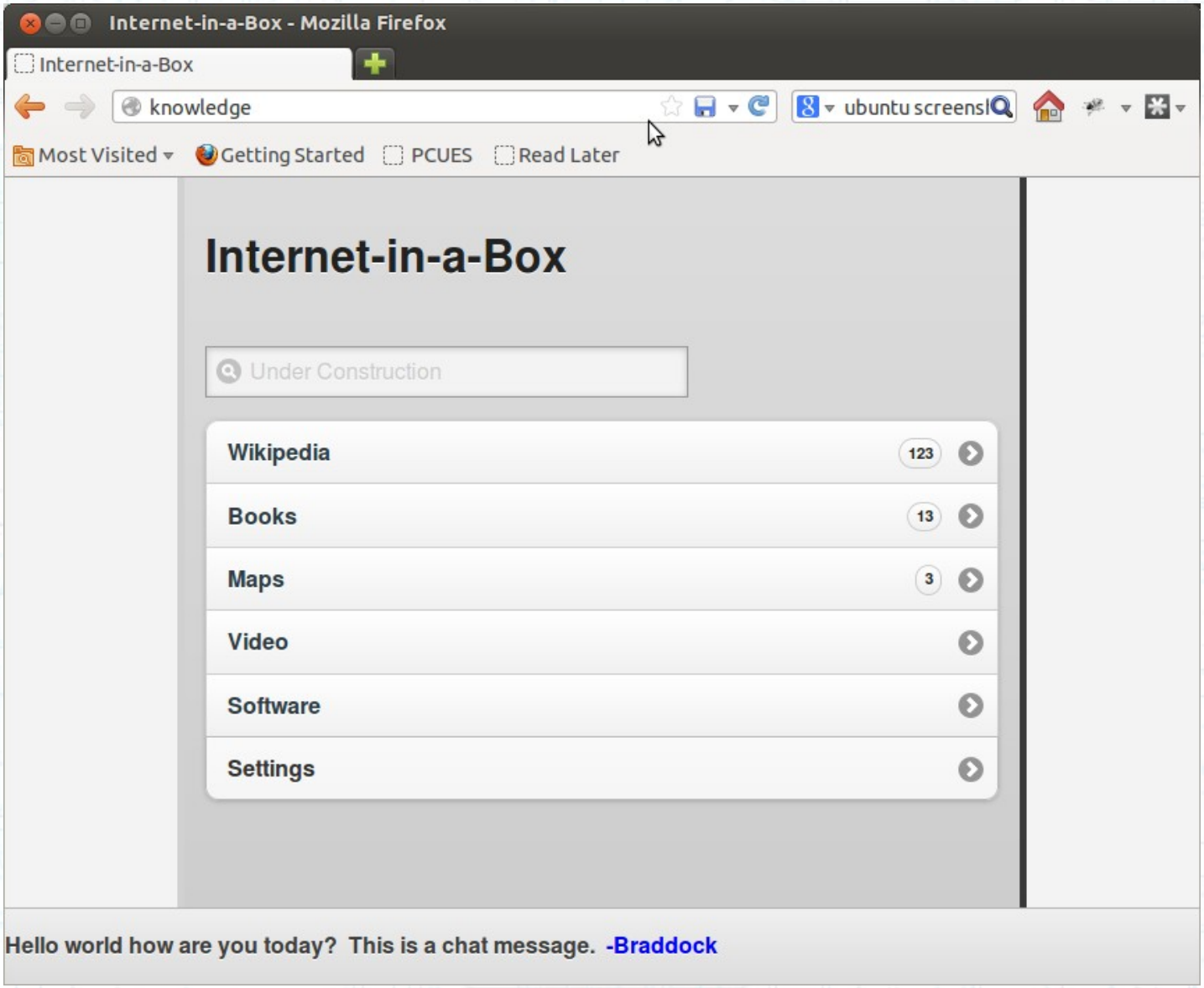


Project Bernie

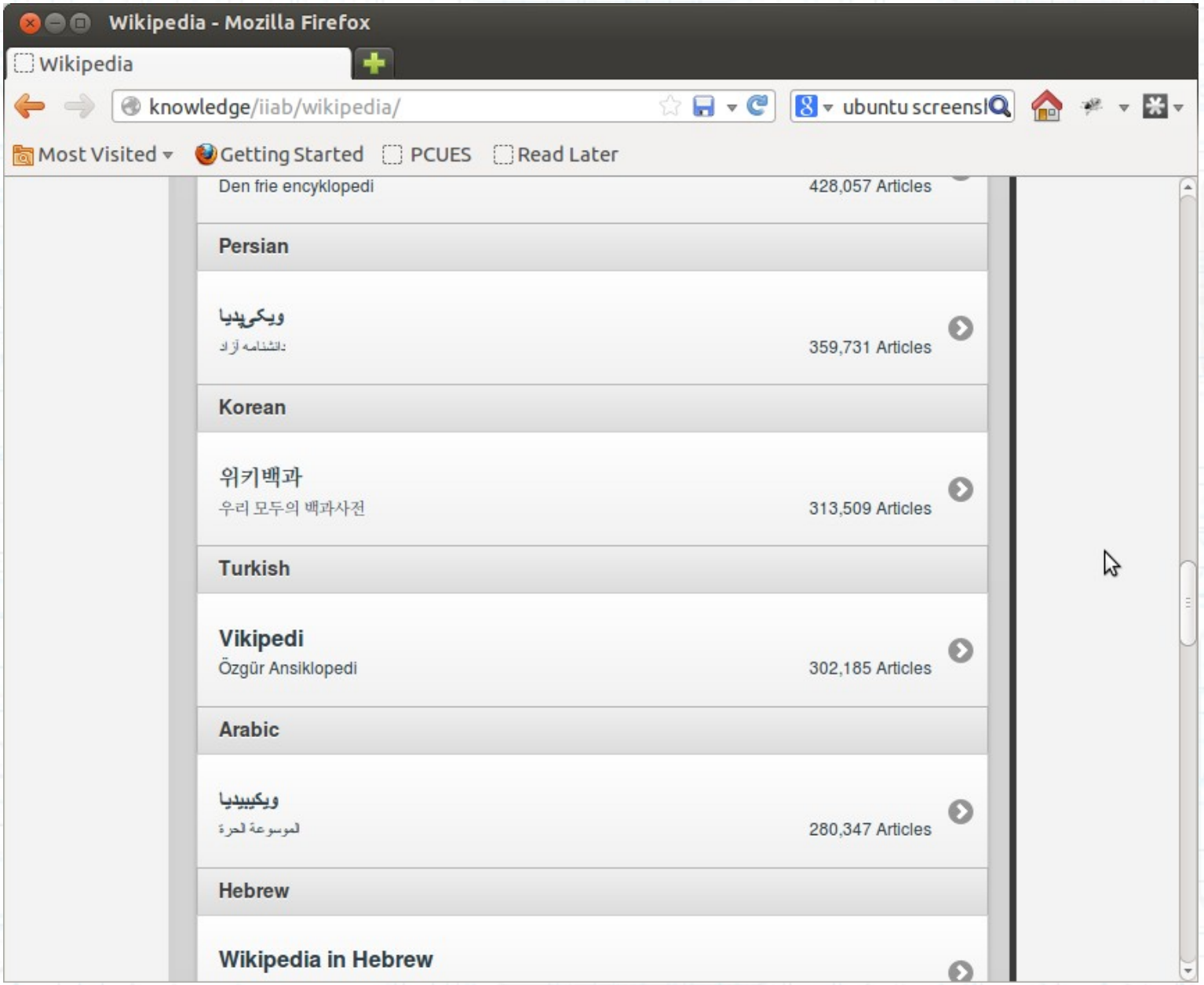
- Internet-in-a-Box installation **PLUS**
  - English learning curriculum
  - OLE Nepal 600 children books grades 2-6
  - Old Time Radio shows
  - Classical Music collection
  - OLPC Laptop software collection

Demo

Main Menu


Internet-in-a-Box - Mozilla Firefox
Internet-in-a-Box
knowledge
ubuntu screensl
Most Visited
Getting Started
PCUES
Read Later
Internet-in-a-Box
Under Construction
Wikipedia 123
Books 13
Maps 3
Video
Software
Settings
Hello world how are you today? This is a chat message. -Braddock

Wikipedia


Wikipedia - Mozilla Firefox
Wikipedia
knowledge/iiab/wikipedia/
ubuntu screensl
Most Visited
Getting Started
PCUES
Read Later
Den frie encyklopedi
428,057 Articles
Persian
ویکی‌پدیا
دانشنامه آزاد
359,731 Articles
Korean
위키백과
우리 모두의 백과사전
313,509 Articles
Turkish
Vikipedi
Özgür Ansiklopedi
302,185 Articles
Arabic
ويكيبيديا
الموسوعة الحرة
280,347 Articles
Hebrew
Wikipedia in Hebrew

Wikipedia Article

위키백과 - Mozilla Firefox

위키백과

192.168.1.113:25001/wikipedia_ko_all_10_2012/

ubuntu screens

Most Visited | Getting Started | PCUES | Read Later

Library | Home | Search

위키백과

위키백과(듣기 (도움말·정보), Wiki百科, 영어: Wikipedia 위키피디어[*] 듣기 (도움말·정보)) 혹은 **위키피디아**는 모두가 함께 만들어 가며 누구나 자유롭게 쓸 수 있는 다언어판 인터넷 백과사전이다. 대표적인 집단 지성의 사례로 평가받고 있다. 배타적인 저작권을 가지고 있지 않기 때문에 사용에 제약을 받지 않는다.

위키백과의 공식 로고

2001년 1월 15일에 시작된 위키백과는 비영리 단체인 위키미디어 재단에서 운영하고 있다. 2012년 3월 현재 영어판 388만여 개, 한국어판 20만여 개를 비롯하여 280여 언어판을 합하면 2100만여개의 글이 수록되어 있으며 꾸준히 성장하고 있다.

위키백과 영어판은 전문가들이 작성했던 백과사전인 누피디어(지금은 없어짐)를 보완하여 2001년 1월 15일에 만들어졌다. 지미 웨일스와 래리 생거는 2001년에 위키백과의 공동창업자로 인정받았다.

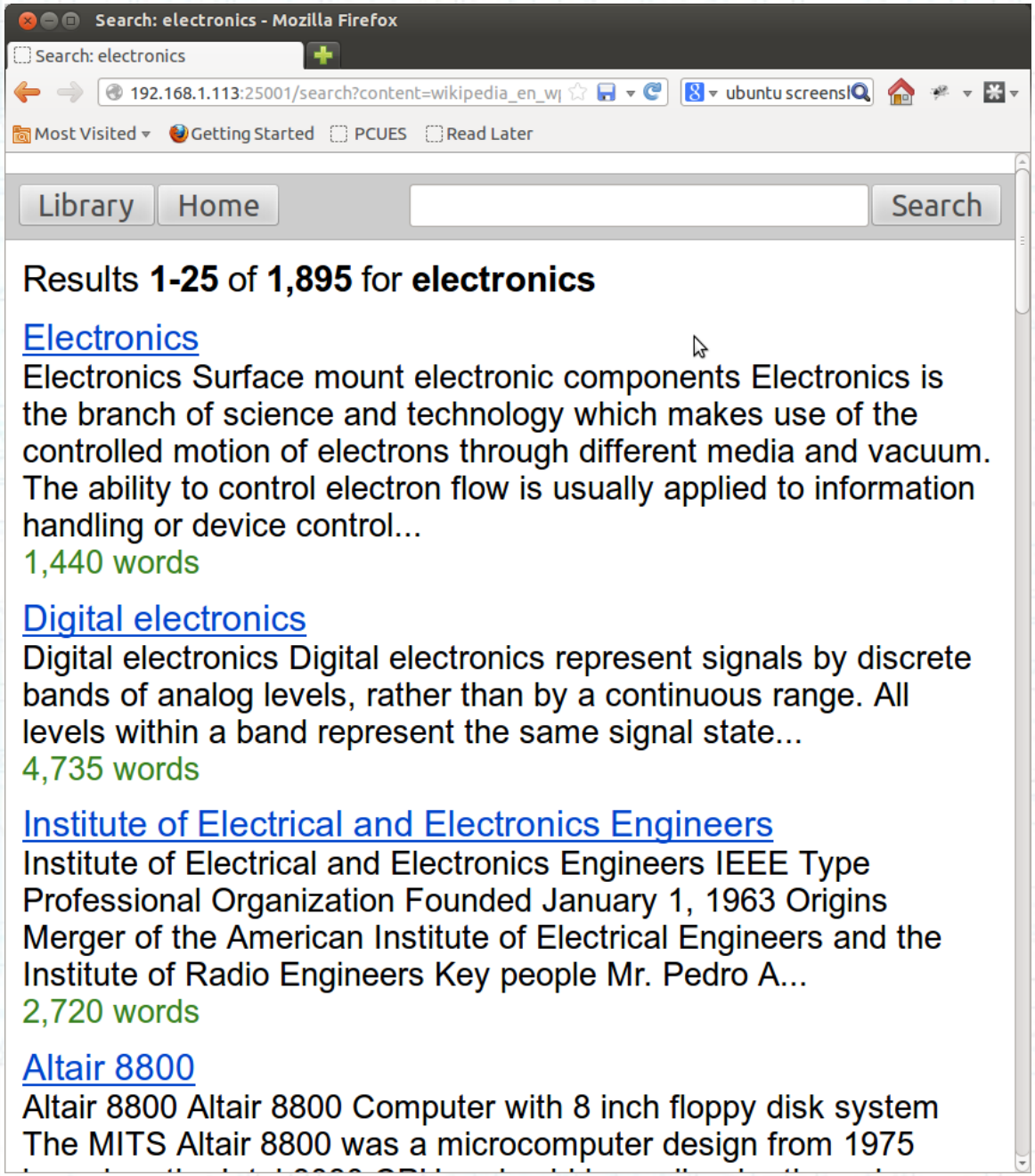
목차 [숨기기]

1 역사

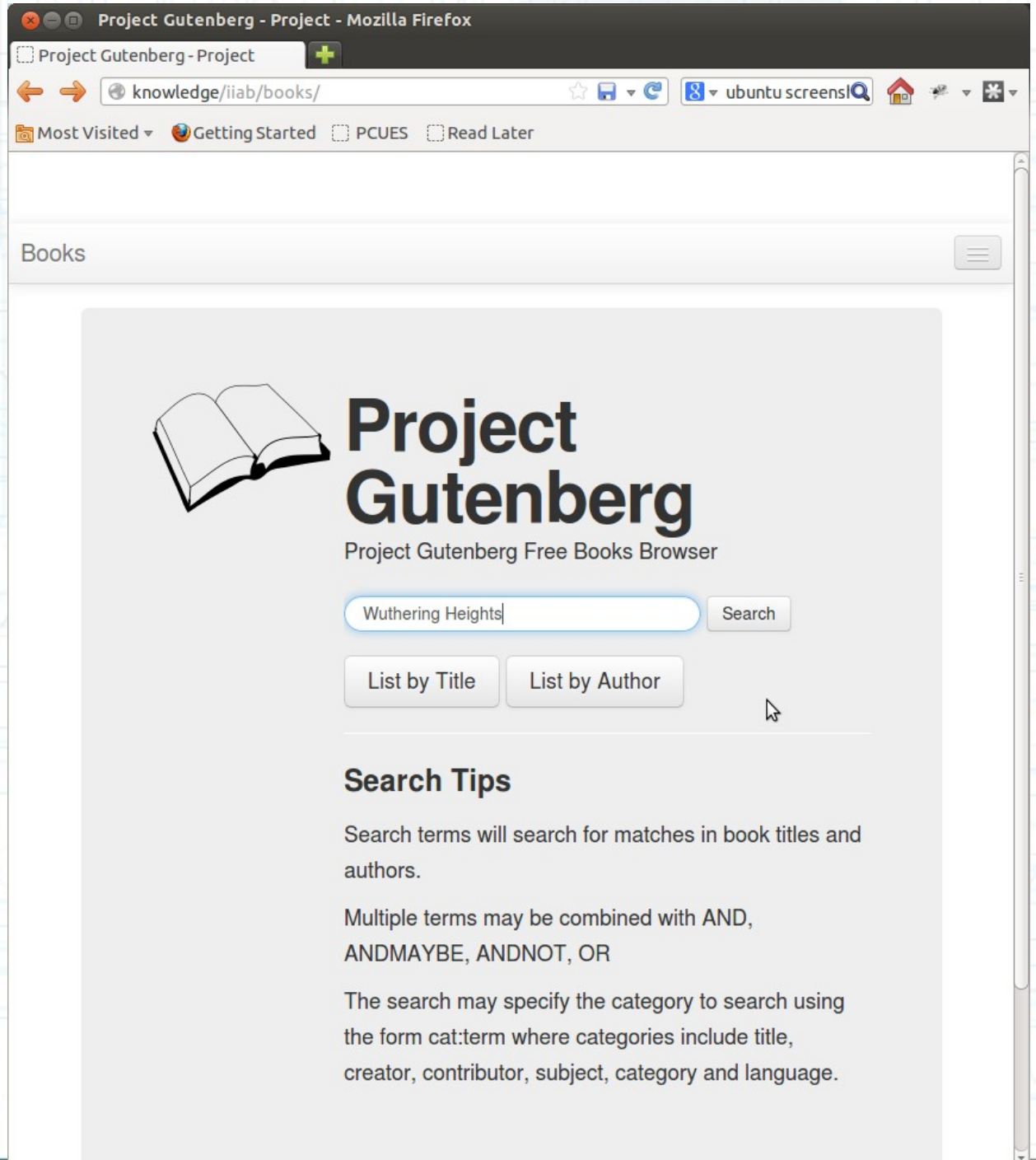
2 운영

2.1 위키미디어 재단과 위키아

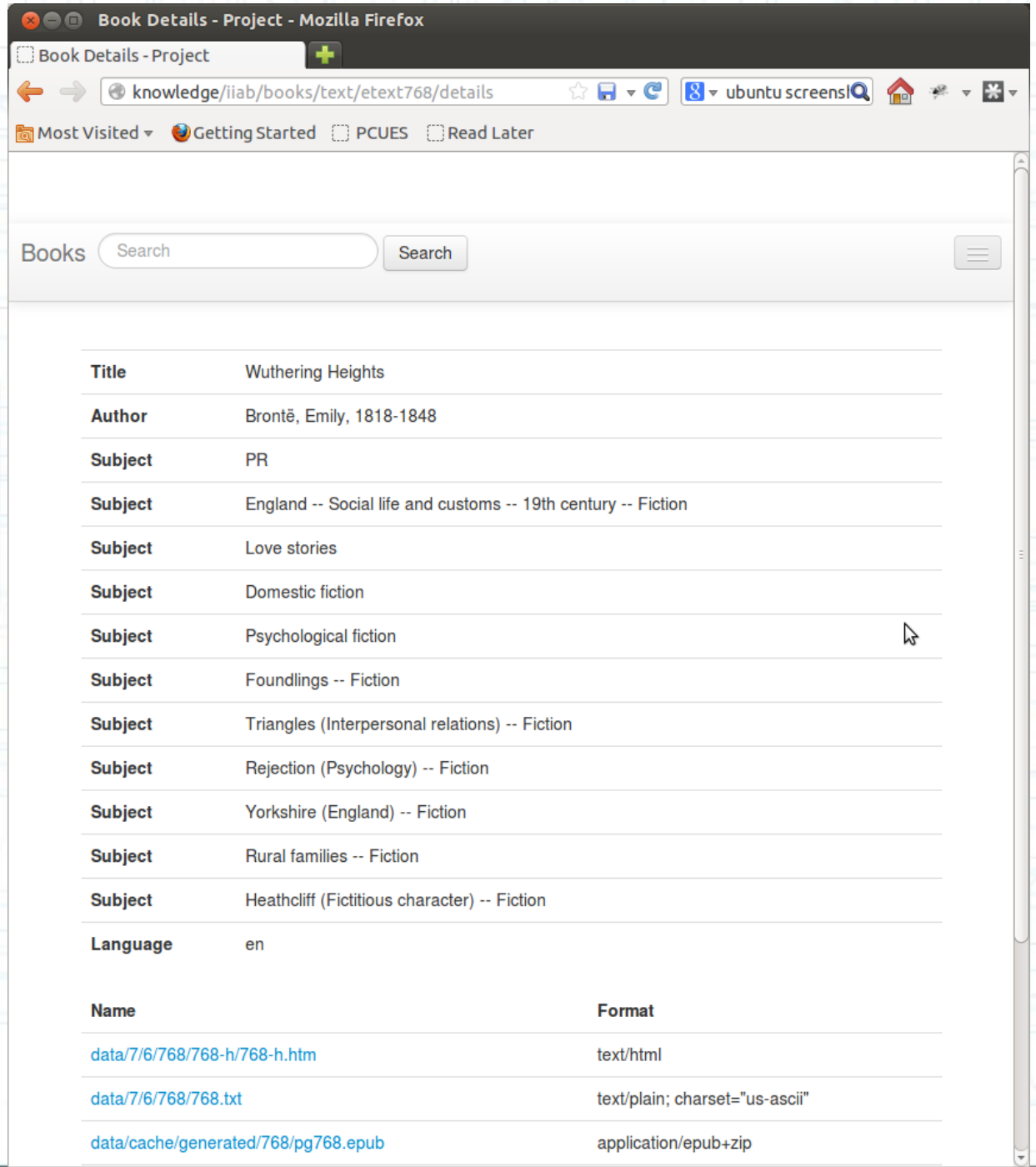
Wikipedia Search



Books


Project Gutenberg - Project - Mozilla Firefox
Project Gutenberg - Project
knowledge/iiab/books/
ubuntu screens
Most Visited
Getting Started
PCUES
Read Later
Books
Project Gutenberg
Project Gutenberg Free Books Browser
Wuthering Heights
Search
List by Title
List by Author
Search Tips
Search terms will search for matches in book titles and authors.
Multiple terms may be combined with AND, ANDMAYBE, ANDNOT, OR
The search may specify the category to search using the form cat:term where categories include title, creator, contributor, subject, category and language.

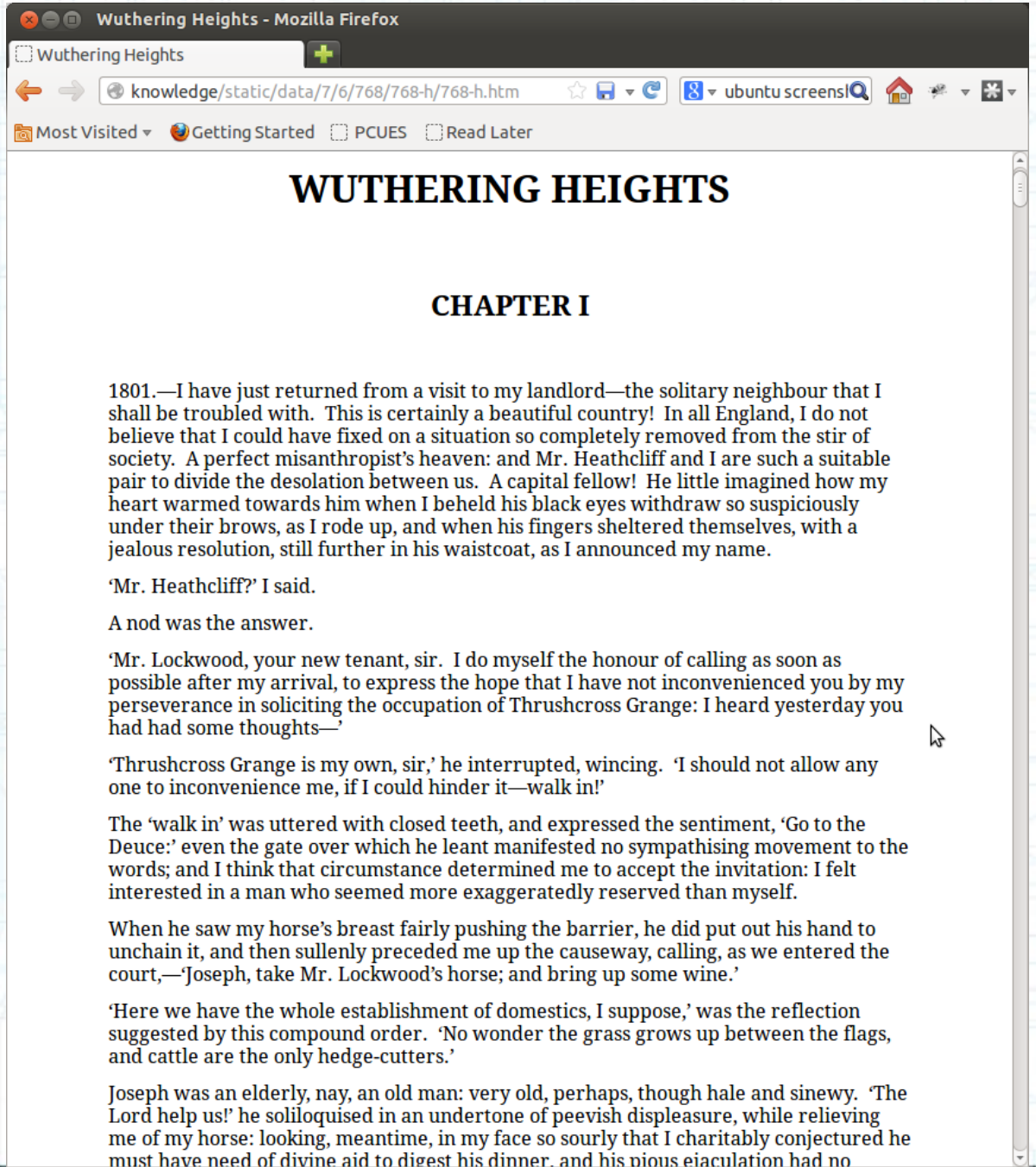
Books



Title	Wuthering Heights
Author	Brontë, Emily, 1818-1848
Subject	PR
Subject	England -- Social life and customs -- 19th century -- Fiction
Subject	Love stories
Subject	Domestic fiction
Subject	Psychological fiction
Subject	Foundlings -- Fiction
Subject	Triangles (Interpersonal relations) -- Fiction
Subject	Rejection (Psychology) -- Fiction
Subject	Yorkshire (England) -- Fiction
Subject	Rural families -- Fiction
Subject	Heathcliff (Fictitious character) -- Fiction
Language	en

Name	**Format**
data/7/6/768/768-h/768-h.htm	text/html
data/7/6/768/768.txt	text/plain; charset="us-ascii"
data/cache/generated/768/pg768.epub	application/epub+zip

Read



WUTHERING HEIGHTS

CHAPTER I

1801.—I have just returned from a visit to my landlord—the solitary neighbour that I shall be troubled with. This is certainly a beautiful country! In all England, I do not believe that I could have fixed on a situation so completely removed from the stir of society. A perfect misanthropist's heaven: and Mr. Heathcliff and I are such a suitable pair to divide the desolation between us. A capital fellow! He little imagined how my heart warmed towards him when I beheld his black eyes withdraw so suspiciously under their brows, as I rode up, and when his fingers sheltered themselves, with a jealous resolution, still further in his waistcoat, as I announced my name.

'Mr. Heathcliff?' I said.

A nod was the answer.

'Mr. Lockwood, your new tenant, sir. I do myself the honour of calling as soon as possible after my arrival, to express the hope that I have not inconvenienced you by my perseverance in soliciting the occupation of Thrushcross Grange: I heard yesterday you had had some thoughts—'

'Thrushcross Grange is my own, sir,' he interrupted, wincing. 'I should not allow any one to inconvenience me, if I could hinder it—walk in!'

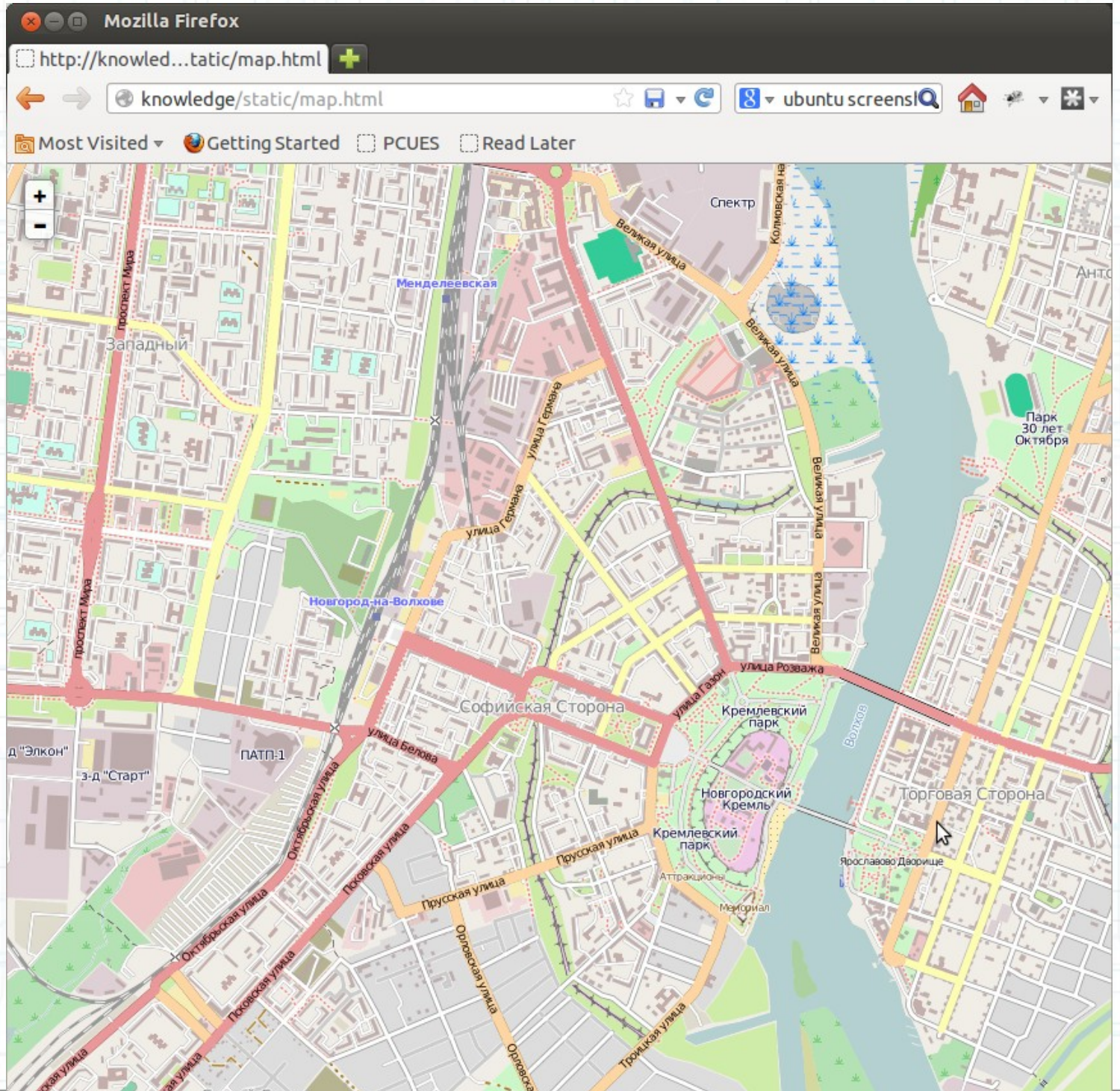
The 'walk in' was uttered with closed teeth, and expressed the sentiment, 'Go to the Deuce:' even the gate over which he leant manifested no sympathising movement to the words; and I think that circumstance determined me to accept the invitation: I felt interested in a man who seemed more exaggeratedly reserved than myself.

When he saw my horse's breast fairly pushing the barrier, he did put out his hand to unchain it, and then sullenly preceded me up the causeway, calling, as we entered the court,—'Joseph, take Mr. Lockwood's horse; and bring up some wine.'

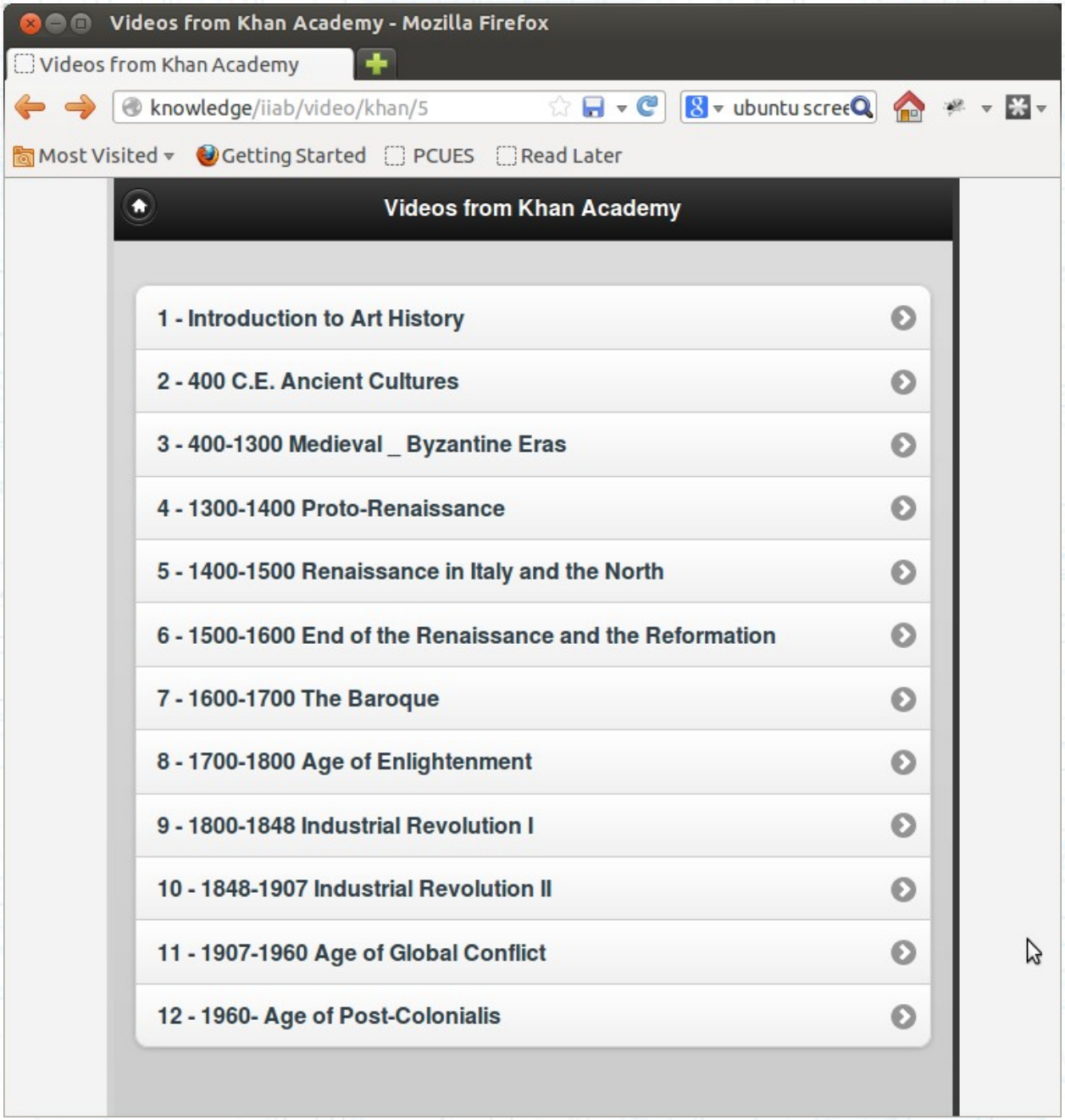
'Here we have the whole establishment of domestics, I suppose,' was the reflection suggested by this compound order. 'No wonder the grass grows up between the flags, and cattle are the only hedge-cutters.'

Joseph was an elderly, nay, an old man: very old, perhaps, though hale and sinewy. 'The Lord help us!' he soliloquised in an undertone of peevish displeasure, while relieving me of my horse: looking, meantime, in my face so sourly that I charitably conjectured he must have need of divine aid to digest his dinner, and his pious ejaculation had no

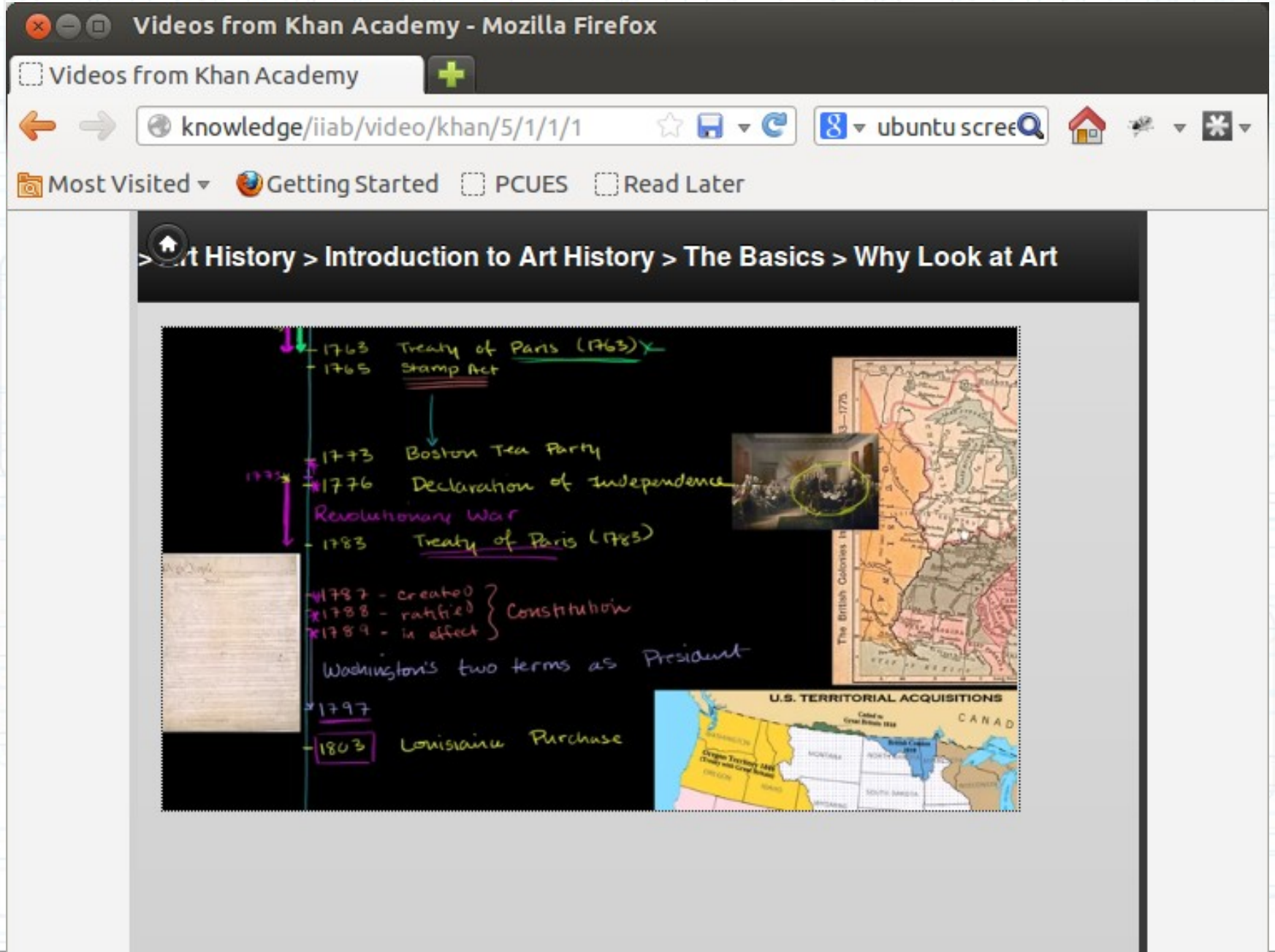
Maps


Mozilla Firefox
http://knowled...tatic/map.html
knowledge/static/map.html
ubuntu screensl
Most Visited
Getting Started
PCUES
Read Later
Спектр
Менделеевская
Западный
проспект Мира
проспект Мира
Новгород-на-Волхове
Софийская Сторона
улица Германа
улица Германа
улица Германа
Великая улица
Великая улица
Великая улица
Колмовская
Парк 30 лет Октября
улица Розважа
улица Газон
Кремлевский парк
Волхов
Торговая Сторона
Новгородский Кремль
Кремлевский парк
Ярославово Дворище
Аттракционы
Мемориал
ПАТП-1
д "Элкон"
з-д "Старт"
улица Белова
Октябрьская улица
Псковская улица
Прусская улица
Прусская улица
Орловская улица
Троицкая улица
Октябрьская улица
Псковская улица

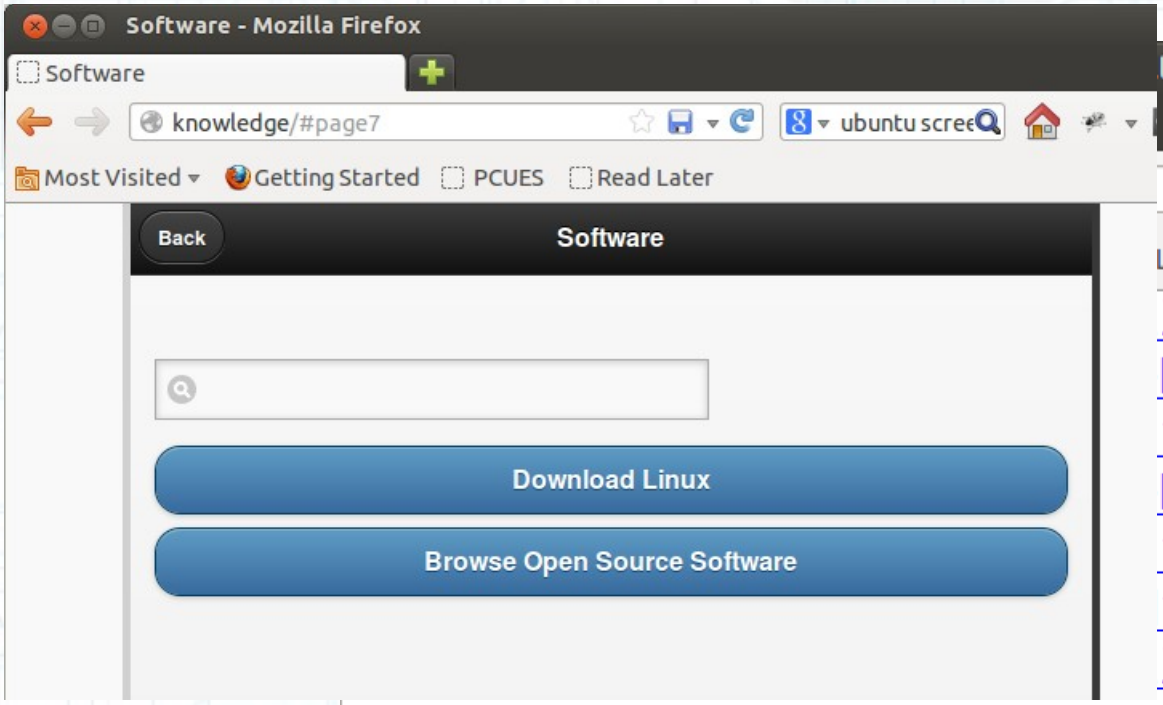
Video

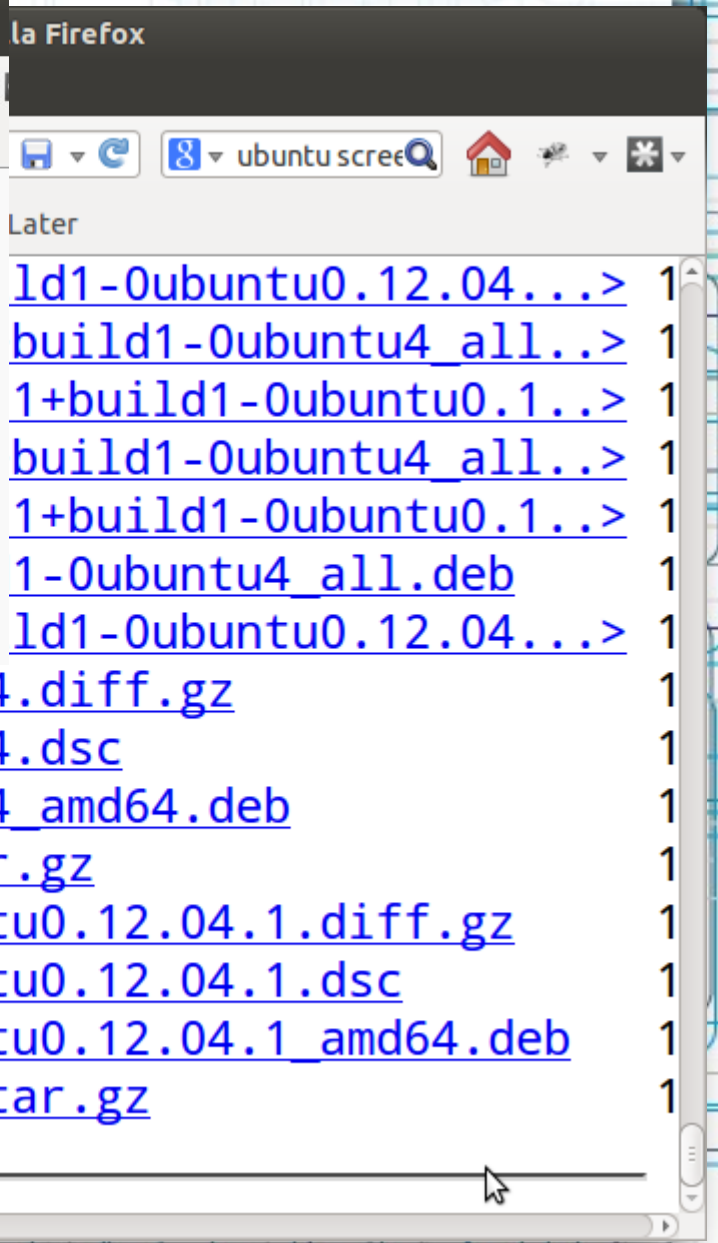

Videos from Khan Academy - Mozilla Firefox
Videos from Khan Academy
knowledge/iiab/video/khan/5
ubuntu scree
Most Visited
Getting Started
PCUES
Read Later
Videos from Khan Academy
1 - Introduction to Art History
2 - 400 C.E. Ancient Cultures
3 - 400-1300 Medieval _ Byzantine Eras
4 - 1300-1400 Proto-Renaissance
5 - 1400-1500 Renaissance in Italy and the North
6 - 1500-1600 End of the Renaissance and the Reformation
7 - 1600-1700 The Baroque
8 - 1700-1800 Age of Enlightenment
9 - 1800-1848 Industrial Revolution I
10 - 1848-1907 Industrial Revolution II
11 - 1907-1960 Age of Global Conflict
12 - 1960- Age of Post-Colonialis

Video


Videos from Khan Academy - Mozilla Firefox
Videos from Khan Academy
knowledge/iiab/video/khan/5/1/1/1
ubuntu scree
Most Visited
Getting Started
PCUES
Read Later
t History > Introduction to Art History > The Basics > Why Look at Art
1763 Treaty of Paris (1763)
1765 Stamp Act
1773 Boston Tea Party
1776 Declaration of Independence
Revolutionary War
1783 Treaty of Paris (1783)
1787 - created
1788 - ratified
1789 - in effect
Constitution
Washington's two terms as President
1797
1803 Louisiana Purchase
U.S. TERRITORIAL ACQUISITIONS
CANAD

Software


Software - Mozilla Firefox
Software
knowledge/#page7
ubuntu scree
Most Visited
Getting Started
PCUES
Read Later
Back
Software
Download Linux
Browse Open Source Software


la Firefox
ubuntu scree
Later
ld1-0ubuntu0.12.04...> 1
build1-0ubuntu4_all..> 1
1+build1-0ubuntu0.1..> 1
build1-0ubuntu4_all..> 1
1+build1-0ubuntu0.1..> 1
1-0ubuntu4_all.deb 1
ld1-0ubuntu0.12.04...> 1

firefox_11.0+build1-0ubuntu4.diff.gz 1
firefox_11.0+build1-0ubuntu4.dsc 1
firefox_11.0+build1-0ubuntu4_amd64.deb 1
firefox_11.0+build1.orig.tar.gz 1
firefox_14.0.1+build1-0ubuntu0.12.04.1.diff.gz 1
firefox_14.0.1+build1-0ubuntu0.12.04.1.dsc 1
firefox_14.0.1+build1-0ubuntu0.12.04.1_amd64.deb 1
firefox_14.0.1+build1.orig.tar.gz 1

Deployments: the first year

Deployments

- Direct trials with IIAB Appliances
- Indirect deployments with OLPC School Server community

Sierra Leone

Sierra Leone

Haiti

Part 2: Behind the Data

Wikipedia

- Seventh highest ranked web site in the world
- Fully Open Source content

Source: Wikipedia

Wikipedia

- Using OpenZim files
- Zim files
  - A container file format designed FOR Wikipedia
  - Wikipedia pre-rendered to HTML, HTML stored in Zim file
  - Zim Torrents prepared by the Kiwix community

Wikipedia: The Data

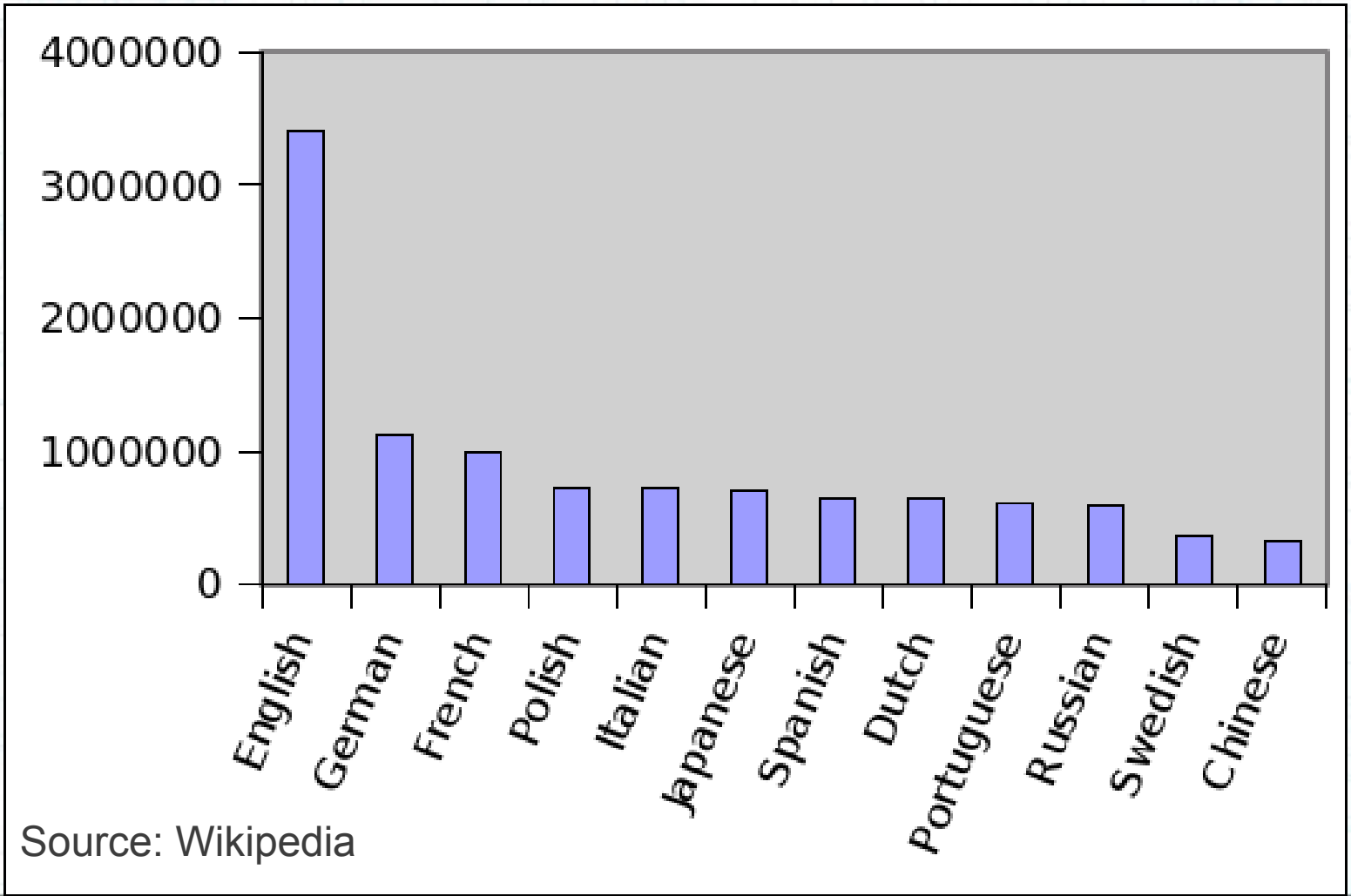
Zim community

- Provides pre-rendered Wikipedia ZIM torrents for 37 langauges
- Many include scaled images
- Some a few years stale

Wikipedia

- Not rich in all languages

  Number of articles for top languages



Maps

- Open Street Maps
  - Open Source effort to map the world
  - Merge data from many sources (government, donated, created)
  - Open Data Commons Open Database License (ODbL)
  - LeafletJS JavaScript app

Maps Process

1. Download ”Planet” File (**30GB** binary)
2. Import Planet into PostgreSQL DB
   - **350 GB** final DB size (!)
   - Import took 4 days
3. Render DB to image tiles (PNG)
   - 1 week with a couple machines clustered
4. Pack image tiles
   - **~100 GB**

Serving Maps

- Low end machines are too slow to render vector maps
- We pre-render EVERYTHING
- 4,096 PNG images per file
- Redundant tiles removed (many many!)
- Python back-end extracts and serves images

Books

- Project Gutenberg, founded 1971
- 40,000 e-books, mostly Public Domain
- Custom Web UI (Thanks Joel!)

Books Process

- Project Gutenberg Archive
  - PG Archive is a mess
  - Many formats, most redundant
  - Ex: archive contains ISOs of prior versions of the archive (!)
- Mirror
  - Rsync service slow (throttled?) and unreliable
  - **~1.5 weeks**
- Extract and convert all books to HTML and ePub

Video

- 4,000 Khan Academy Videos
- **Non-Commerical Use** Creative Commons License
- High demand for Spanish and French

Meet the Hardware

Seagate Wireless Plus

- $200
- Wireless Harddrive
- 1TB
- Argo Linux firmware
- Telnet root/goflex
- Uboot – working on Debian
- We run chroot debian

Meet the Hardware

Seagate GoFlex Home

- 1TB Low-end NAS
- $150
- Ethernet 1Gbps
- Debian Arm Linux installed

IIAB Volunteers

- **Joel Steres** – Gutenberg, map search
- **James McDuffie** – Wikipedia search, web site, mailing list
- **John Kim** – Testing and Release Manager
- **Lan Dang** – Maps, Outreach
- **UI Translations** – Pootle community
  - **Chris Leonard and his translation team**

Upstream Projects

- **Books** – Project Gutenberg
- **Wikipedia** – OpenZim Community
  - **Emmanuel Engelhart** (kiwix)
- **Maps** – Open Street Map
- **Video** – Khan Academy, Zurd torrent
- **Software** – Ubuntu, Linux community
- **Arm Hardware**
  - **Mike Brown** and **Jeff Doozan** (uboot)

Thanks to partners

- XSCE School Server Community
- Unleash Kids
- Project Bernie, Tony Anderson
- Wonderful field trial volunteers

Resources

Braddock Gaskill

Internet-in-a-Box Project Lead

braddock@braddock.com

http://internet-in-a-box.org

END

Meet the Hardware

Behind the scenes

- Job Server ”**Node-8**”
  - 8GB RAM, Quad Core 2.5GHz, 1TB HDD
- Job Server ”**Node-16-SSD**”
  - **16GB** RAM, **500GB SSD**, Quad Core 3GHz, 6TB HDD

Future: Open Source Textbooks

- Aka ”Open Educational Resources” (OER)
- Many models emerging
  - State-funded Model
    - California Open Source Textbook Project
    - State of California spends $400 million per year on textbooks
  - Volunteer-driven Model
    - South Africa – Free High School Science Texts (FHSST)
      - Math and Science high school curriculum
    - WikiBooks Project
      - 2,000+ books ”in progress”, few finished

Future: Open Source Textbooks

- Many models emerging
  - Publisher Model
    - Flat World Knowledge (Publisher)
    - 40+ Textbooks, all English
    - Publisher and author make money off print copies and formatted downloads
  - University-driven Model
    - MIT Open Courseware
    - College course material provided both for students and others

Humane Reader

Humane Reader

- Displays to television set
- Reads Micro-SD Card (2GB)
- Optional PS/2 Keyboard
- Wikipedia reader

- $20 in quantity

Humane Reader

- Minimalist design
  - Uses two 8-bit microcontrollers
  - Specs of a 1977 Apple II computer
- Cell phone standard micro-USB power
- Open Source Design
  - Effort to build community around platform
- Arduino expansion slots
- Can be used as simple 8-bit computer

Resources

Braddock Gaskill

Internet-in-a-Box Project Lead

braddock@braddock.com

http://internet-in-a-box.org