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One Laptop per Child

Collaboration

Network Principles; Sync and Async

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Four steps

- Make our network sane (modularize)
- Asynchronous Collaboration: Journal
- Synchronous Collaboration:
MPX/VNC
- Make it better

Networking Manifesto

- No Assumption of Universal Connectivity
- Direct XO-to-XO serverless communication
- Human-readable unique identifiers for each XO
- Direct presence interrogation

No Assumption of Universal Connectivity

- Every one is an island (of some size)
- Best service possible within our walls

Direct XO-to-XO communication

- Servers may be used as aides or proxies, but are never necessary
- Sockets and IP, like Jon Postel gave us
- Firewalls are there for a reason
 - But we can provide tunnels where needed

Human-readable ids

- Sometime I can tell my non-XO using friend
 - cscott.1cc-cambridge-ma.us.xs.laptop.org ?
- Indirect, but globally unique.
- Maybe more than one name!

Direct presence interrogation

- Allow many discovery mechanisms
- Once discovered, direct means for presence
 - Rate and bandwidth limited
- More efficient alternates may augment

Brass Tacks

- The previous slides presented the principles
- Now let's consider an implementation
- You're welcome to suggest others!

DNS

- XOs are identified as:
`name.xxx.school.country.xs.laptop.org`
 - Name: encoding of XO nickname
 - Xxx: only used for serverless bootstrapping
 - school....laptop.org: filled in by registration

Resolving

- Standard dynamic DNS to school server/other
- Map to link-local IPv6 by hashing

My friends

- Standard XMPP scheme for adding friends:
 - `xmpp:xo@nickname.xxx.school.country.xs.laptop.org?roster;name=Full%20Name`
- Internally: 'user@domain' (usually `xo@domain`)
 - Add protocol?

Presence

- Lightweight XMPP server on the XO for basic IM presence
 - Using SD-DNS redirection on school server if present
- Additional XO specific info?
 - Xmpp extensions, separate service?
 - Should not interfere with IM/VOIP interop

Asynchronous Collaboration

- Publish from the journal
- Let's see a demo!
- (I'm skipping a lot of the tagging stuff here)

Embedding demo (Firefox)

The screenshot shows a Firefox browser window at the URL `http://wiki.laptop.org/go/Special:Upload`. The page title is "Upload file" and it contains instructions for uploading files. A "File Upload" dialog box is open, displaying a list of files:

Day	File Name	Source	Icon
Today	goodbye	X-SOURCE	✕
Today	hello-world	X-SOURCE	✕
Saturday	cscott	X-SOURCE	✕
Sunday, July 27	sam-painting	X-SOURCE	✕
Wednesday, June 25	dlo-small	X-SOURCE	✕

The dialog also includes a search bar, "More Actions" menu, and "Cancel" and "Open" buttons at the bottom.

Bitfrost security

- Because the journal “file chooser” is out-of-process, untrusted apps don't need full access to user files
- The journal displays files, and then arranges to make available *only the selected one*
- We're also in the loop for saving, and can add metadata, etc.

I love Amazon

- Well, A9 at least
 - It died and gave us OpenSearch
- Publish journal as an OpenSearch provider
 - Can add to Firefox search bar
- Export results both as XHTML and Atom: subscribe using your favorite feed reader (or Firefox Live Bookmarks)

Feed demo

C. Scott's Journal: dir:/ - Iceweasel

File Edit View History Bookmarks Tools Help

http://localhost:8000/search

C. Scott's Journal: dir:/

Shared items from the Journal of C. Scott Ananian
by [C. Scott Ananian](#).

Results 1 to 9 of 7,729

[One Laptop per Child](#) by [C. Scott Ananian](#):
one laptop per child the journal reloaded one laptop per child dr c scott ananian
title c scott ananian talk date 1 existing journal design action view one laptop per
child talk title c scott ananian talk date 2 existing journal design object view one
laptop per child
categories: [home/](#); [cananian/](#); [Projects/](#); [OLPC/](#); [git/](#); [journal2/](#); [X-SOURCE3](#);
localhost:8000/fetch/home/cananian/Projects/OLPC/git/journal2/journal2-talk.pdf

[peru-notes](#) by [C. Scott Ananian](#):
peru notes bt ed hernan deployment tech team head victor head teacher jose
antonio chang min ed university beta test team etc no laptops in luggage 50 spa
laptops 10 replace ones with hardware problems we want back 40 university tests
owned maintained 8.2.20 english us returns
categories: [home/](#); [cananian/](#); [Desktop/](#); [X-SOURCE1](#);
localhost:8000/fetch/home/cananian/Desktop/peru-notes.bt

[journal2-talk](#) by [C. Scott Ananian](#):
journal2 talk scott ananian one laptop per child the journal reloaded existing jour
design action view existing journal design object view what not to do a time trav
file manager a little story i&apos m old i use hierarchically structured paths
everywhere but i couldn&apos t convince the young

Done

C. Scott's Journal: dir:/ - Iceweasel

File Edit View History Bookmarks Tools Help

http://localhost:8000/search?format=atom

C. Scott's Journal: dir:/

Subscribe to this feed using [Live Bookmarks](#)

Always use Live Bookmarks to subscribe to feeds.

[Subscribe Now](#)

C. Scott's Journal: dir/

Shared items from the Journal of C. Scott Ananian

[screenshot-ff](#)
10/15/2008 05:36 PM
screenshot ff png

[One Laptop per Child](#)
10/15/2008 03:39 PM

one laptop per child the journal reloaded one laptop per child dr c scott
anian talk title c scott ananian talk date 1 existing journal design action
view one laptop per child talk title c scott ananian talk date 2 existing journal

Done

Brain-dead collaboration

- In Friends view, right click to “See Chris' shared files”
- Journal view, just like your own Journal
 - Results come via published Atom feed
 - If we're careful, results are offline cachable

Blogs

- Your published RSS feed is a very simple blog, readable from non-XOs, for free.
- For a little more control, tag some of your objects with the “blog” tag, and publish the search “in:blog” as your blog feed.

Network principles

- Hard part here is naming the remote XO
 - But that's what the first part of the talk was about!
- Blog url is:
<http://cscott.1cc.xs.laptop.org/>
- See:
http://wiki.laptop.org/go/Network_principles

Synchronous Collaboration

- Goal: **some** collaboration in **every** activity
- VNC does great, already exists
- “Launch activity in VNC session”
- MPX is the next step
 - Move my pointer on the other kid's screen

Do better

- Journal & MPX are not the **only** collaboration available
- Do better activity-by-activity
- Being able to directly represent buddies and directly connect is a great start

Next steps

- Emulate the existing Dbus-like Telepathy API
- Simple APIs for complex tasks (cf Ben Schwartz)

Bonus Slides

- Here be dragons; enter, wizards!

Depths of network jungle

- Tunnels
- Split DNS
- Security

Tunnels

- When I register with my school server (or xofriends.org) I might get back some tunnel information
- I can establish an IPv6 tunnel using this to bypass NAT and allow my class to collaborate
- School-to-school tunnels to allow penpals

Split DNS

- cscott.1cc.xs.laptop.org might resolve to one thing at school, and something else at home
- Allows school server to remain firewalled off from external networking, without requiring students to use new identity at home
- Also provide tunneling?

XO-to-XO security

- When I befriend mstone, I might obtain a public key from him
- Lookups of mstone.1cc.xs.laptop.org notice the keypair and lie to me
 - They give me a localhost IP address
- Now connections to mstone get proxied
 - Verify that mstone is authentic
 - Protect content of communication

Asynchronous web

- We want to cache web content for offline use
- But these will still trigger DNS lookups
 - One solution is to provide “offline DNS” server as well, or use explicit proxy
 - OR: School server can provide unique link-local IPv6 addresses in response to query
 - Server (or peer) answers connections to these and responds

Bonus: reinventing .xol

- Define structure for cached web content
- Most .xols have two parts:
 - Push some content in the offline cache
 - Indexing information: sidebar links, etc
- But why not just push this into the .xo format
 - And kill the .xol

Super bonus: requests

- Once we have a cache, there will be misses
- How do we collect the misses...
- ...and fulfill them next time we have connectivity
- ...or *our teacher* has connectivity