

6.1040 · software studio · fall 2023

**what innovation
looks like:
four great concepts**

Daniel Jackson & Arvind Satyanarayan

some inspiration for your projects from 4 classic designs

great innovations **start off simple**

often **just one concept** with a **small** but significant novelty

actually delivering the concept **can be hard**

... and leads to additional **complexities**

A complex system that works is invariably found to have evolved from a simple system that worked. A complex system designed from scratch never works and cannot be patched up to make it work. You have to start over with a working simple system.

John Gall, *Systemantics*

story #1:

Apple's Song Library

(2001)

what was novel about the iPod?



Apple iPod
(Jony Ive, 2001)



Braun Pocket Radio T3
(Dieter Rams, 1958)



Toshiba 5GB drive

concept MusicLibrary

purpose store and listen to your entire music collection

principle you install a song, select it, then you can play it

state

library: **set** Song

playing: **opt** Song

file: Song -> **one** File

title: Song -> **one** String

idea #2: songs, not albums (and not MP3 or AAC files)

actions

install (f: File, title: String, **out** s: Song)

select (s: Song)

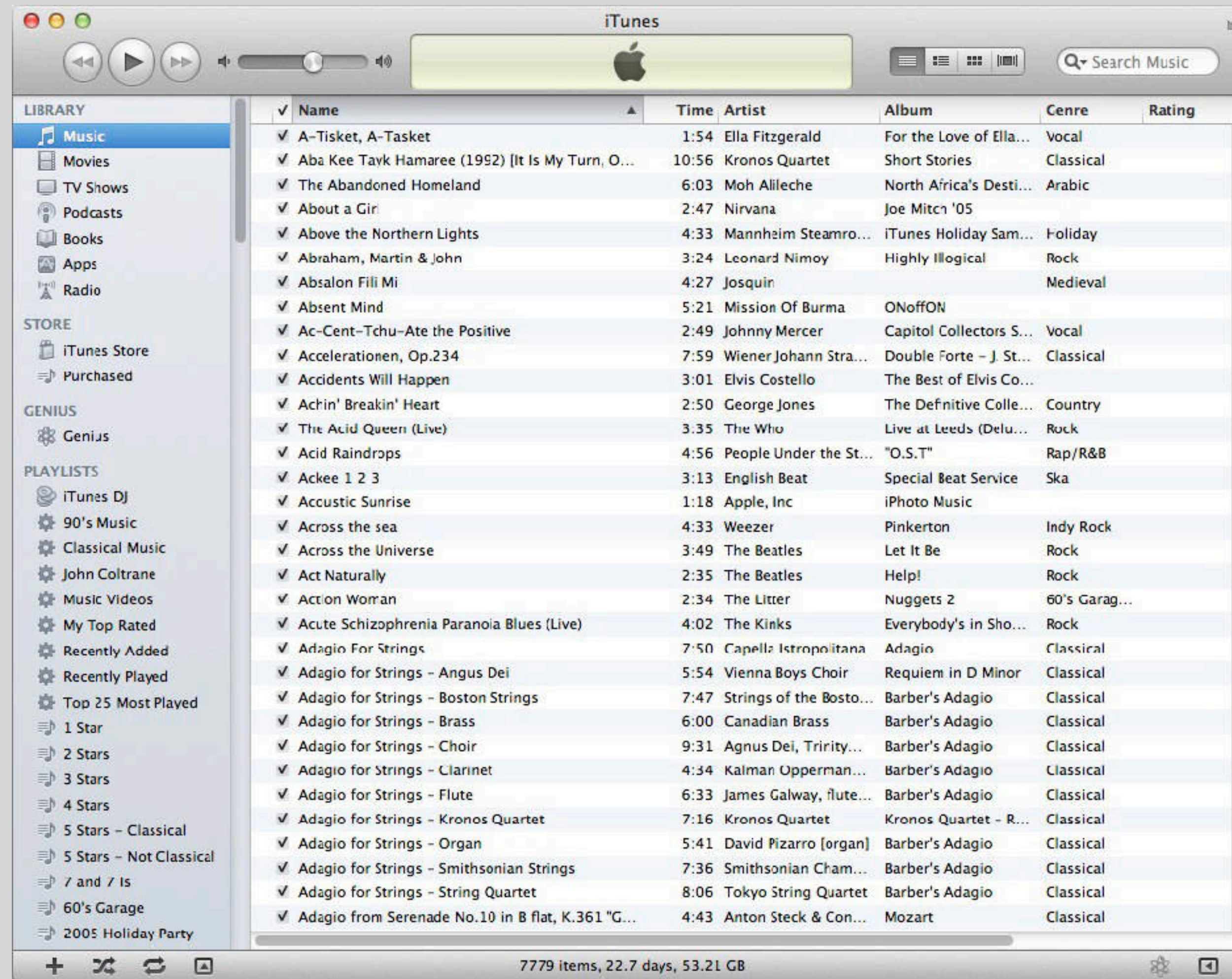
play ()

pause ()

end ()

idea #1: all your music


supporting cast



iTunes Media Player (2001); iTunes Music Store (2003)

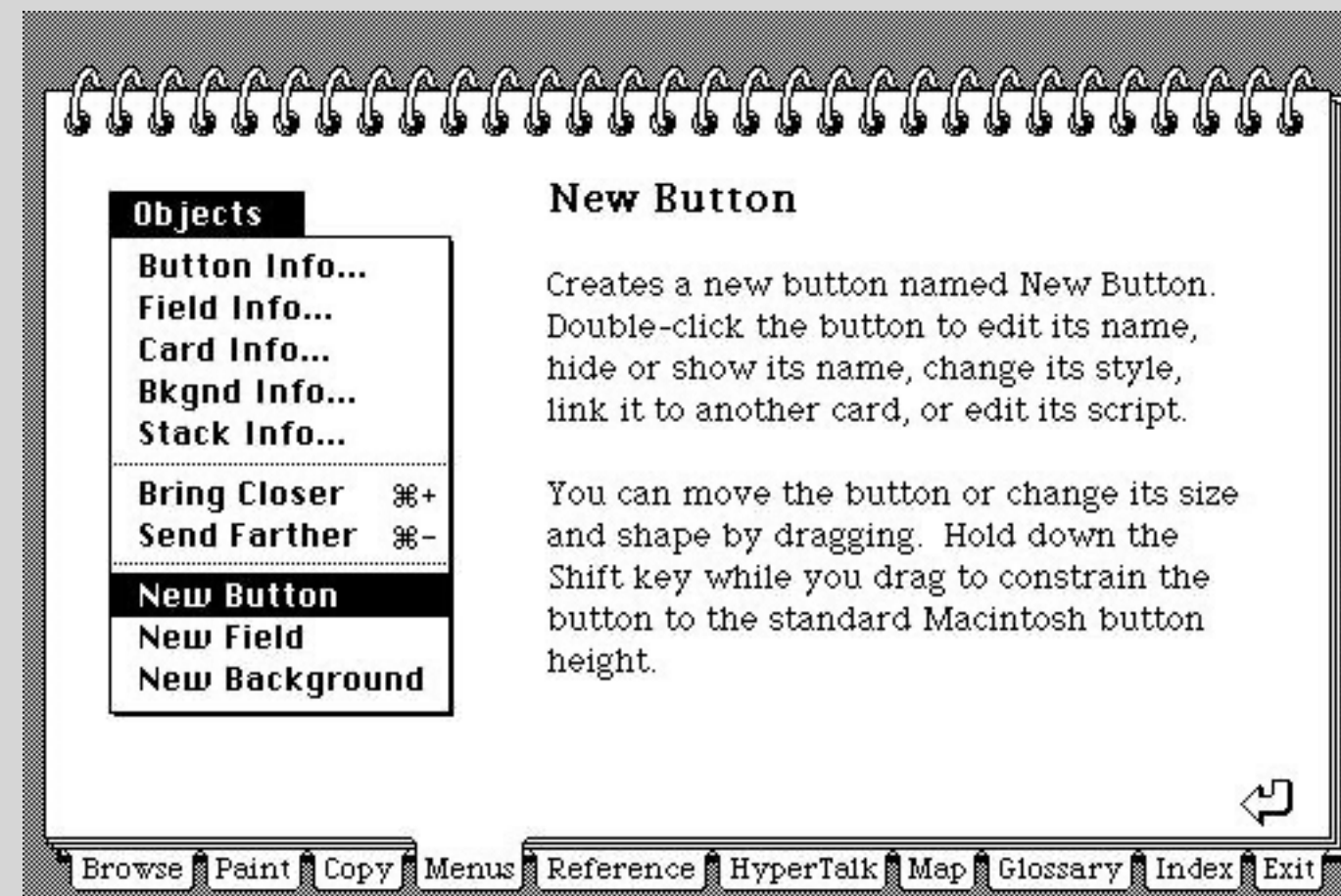


RIP 2d gen iPod Shuffle

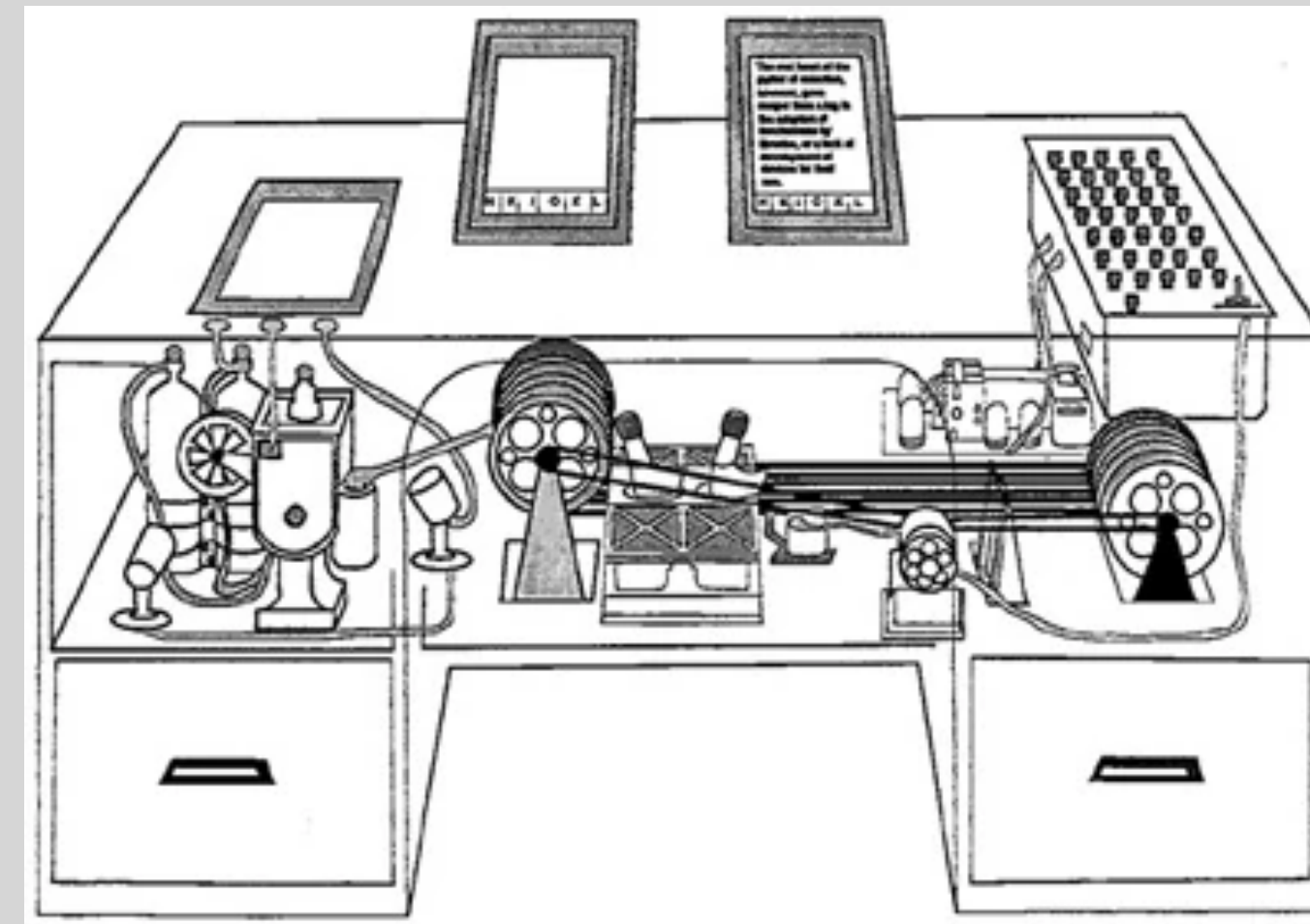
Put some music on.
Built-in clip. 240 songs. Up to 12-hour battery. Just \$79. One size fits all.  iPod shuffle

story #2:
TBL's Web
(1989)

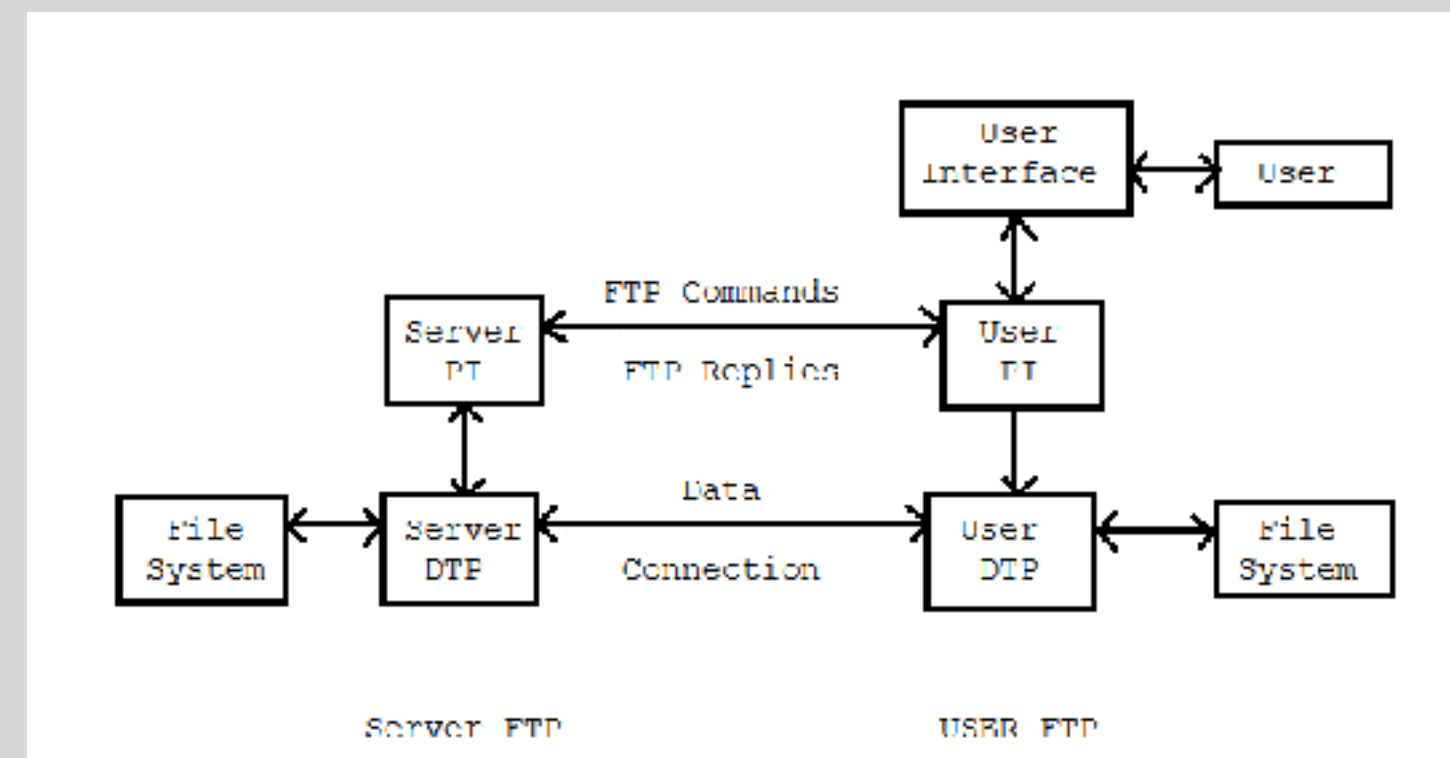
what was novel about the web?



Apple HyperCard
(Bill Atkinson, 1987)



Memex
(Vannevar Bush, 1945)



File Transfer Protocol
(Abhay Bhushan, 1971)

```
<!DOCTYPE motd [ <!E
<motd>
<!-- created: 2003-12-12-->
<sentence>Do not throw
out the <keep>baby</>
with the
<refuse>dirty</>,
<refuse>stinky</>,
<refuse>bathwater</>.
</>
<!-- finish this later-->
</motd>
```

SGML

SGML
(Charles Goldfarb, 1986)

concept Web

purpose find and access remote resources

principle you can create a page p1 with a URL u; someone else can create a page p2 and add to it a link l for u; then following l in p2 returns p1

state

links: Page -> **set** Link

url: Link -> **one** URL

page: URL -> **one** Page

host: URL -> **one** Host

path: URL -> **one** Path

idea: name includes host

actions

create (h: Host, p: Path, **out** p: Page, **out** u: URL)

add (u: URL, p: Page, **out** l: Link)

follow (l: Link, **out** to: Page)

owner of host creates URL

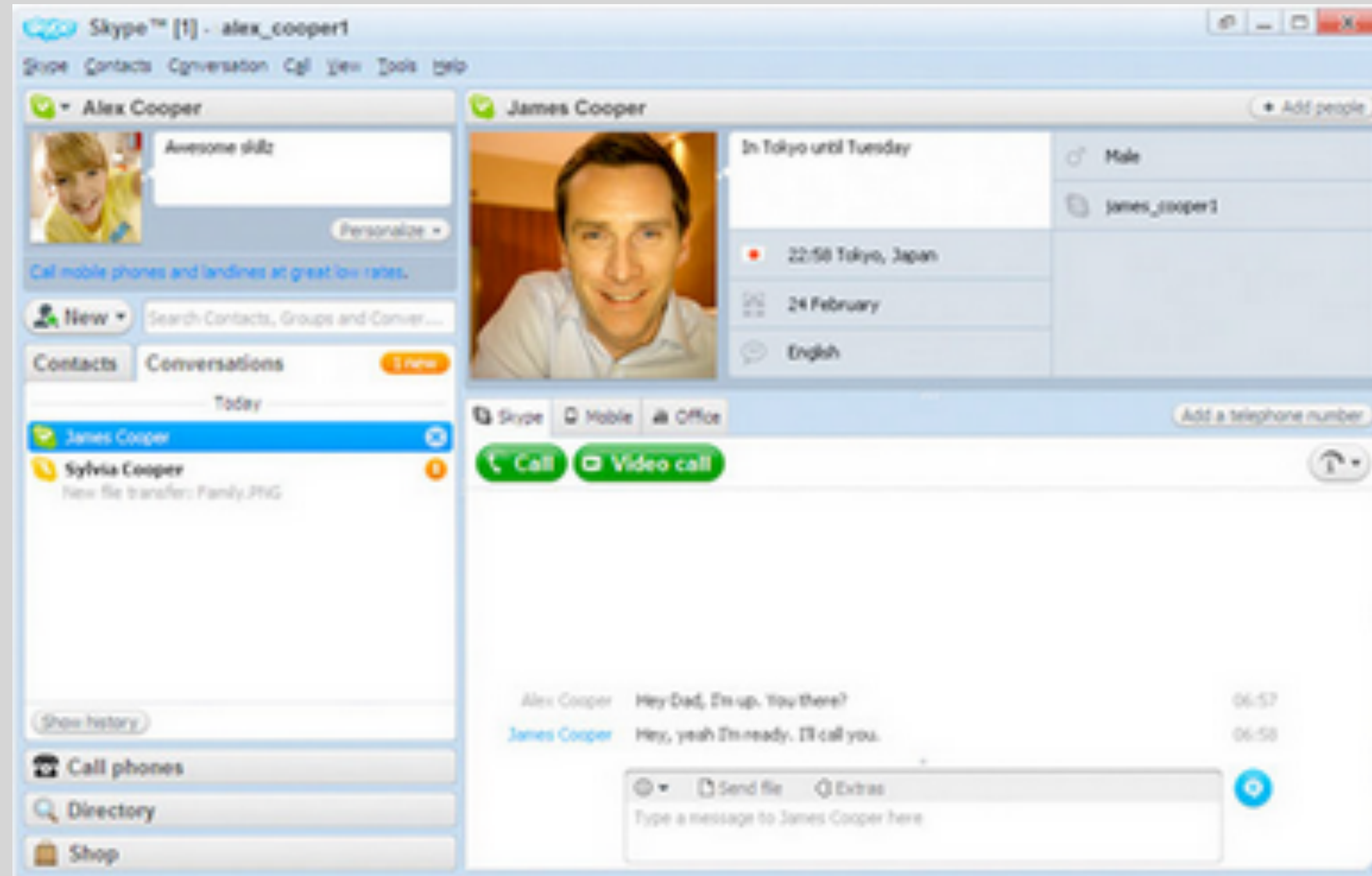
“decentralized naming”

story #3

Zoom's Meeting

(2013)

what was novel about zoom?



Skype
(2009)

concept VideoMeeting [Party]

purpose easily set up person to person video connection

principle one party can create a meeting obtaining an id,
and then another party can use the id to join the meeting

state

id: Meeting -> **one** Id

participants: Meeting -> **set** Party

host: Meeting -> **one** Party

actions

create (host: Party, **out** m: Meeting, **out** id: Id)

join (p: Party, id: Id, **out** m: Meeting)

leave (p: Party, m: Meeting)

idea: create/join are async

tracing zoom's meeting concept



Skype
initially P2P (2003)
Microsoft (2013)



FaceTime
Apple (2010)



Google Hangouts
in Google+ (2011)
own product (2013)
Duo replaces (2016)



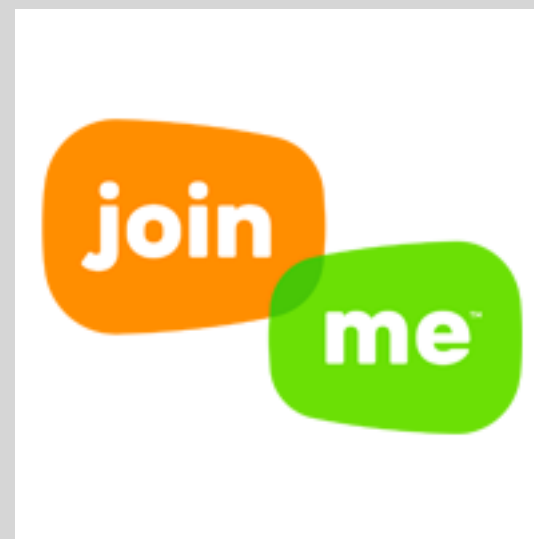
Zoom
Eric Yuan (2013)



Google Meet
launched (2017)
absorbs Duo (2022)



Microsoft Teams
launched (2017)



Join.me
LogMeIn (2010)

meeting ids &
no downloads

meeting ids
added to Teams
June 2022?

zoom: making installs easy & being end-to-end (or not)



FEDERAL TRADE COMMISSION
PROTECTING AMERICA'S CONSUMERS

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For Your Information

FTC Gives Final Approval to Settlement with Zoom over Allegations the Company Misled Consumers about Its Data Security Practices

February 1, 2021



Tags: [Consumer Protection](#) | [Bureau of Consumer Protection](#) | [deceptive/misleading conduct](#) | [Coronavirus \(COVID-19\)](#) | [Privacy and Security](#) | [Consumer Privacy](#) | [Data Security](#) | [Tech](#)

The Federal Trade Commission finalized a settlement with Zoom Video Communications, Inc., over [allegations it misled consumers](#) about the level of security it provided for its Zoom meetings and compromised the security of some Mac users.

UNITED STATES OF AMERICA BEFORE THE FEDERAL TRADE COMMISSION

COMMISSIONERS: **Joseph J. Simons, Chairman**
 Noah Joshua Phillips
 Rohit Chopra
 Rebecca Kelly Slaughter
 Christine S. Wilson

In the Matter of

ZOOM VIDEO COMMUNICATIONS, INC.,
a corporation, d/b/a ZOOM.

FILE No. 192 3167

**AGREEMENT CONTAINING
CONSENT ORDER**

zoom: end-to-end really did matter

Zoom Executive Accused of Disrupting Calls at China's Behest

U.S. prosecutors have charged a company executive based in China with conspiring to terminate online meetings about the Tiananmen Square massacre.

Give this article



The federal case is a fresh black eye for a company that has seen demand for its services skyrocket during the pandemic. Mark Lennihan/Associated Press

By **Nicole Hong**

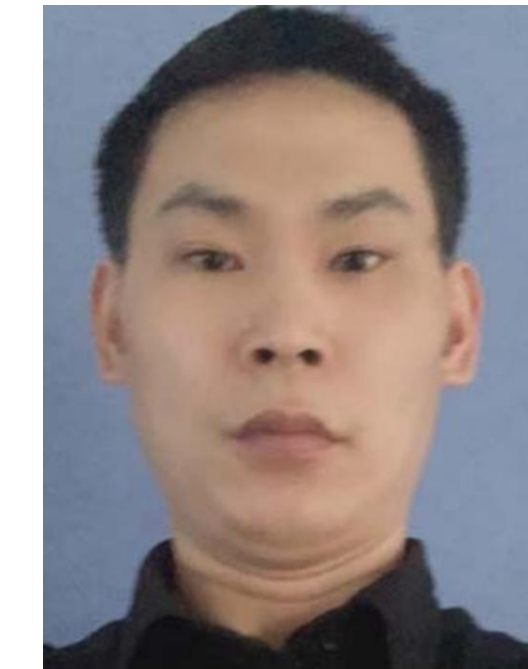
Published Dec. 18, 2020 Updated Feb. 26, 2021



WANTED BY THE FBI

XINJIANG JIN

Conspiracy to Commit Interstate Harassment; Unlawful Conspiracy to Transfer Means of Identification



DESCRIPTION

Aliases: Jin Xinjiang, Julien Jin	
Date(s) of Birth Used: January 1, 1981	Place of Birth: Hangzhou, Zhejiang Province, China
Hair: Black	Eyes: Brown
Build: Medium	Sex: Male
Race: Asian	Occupation: Software Engineer
Nationality: Chinese	Languages: Chinese

story #4

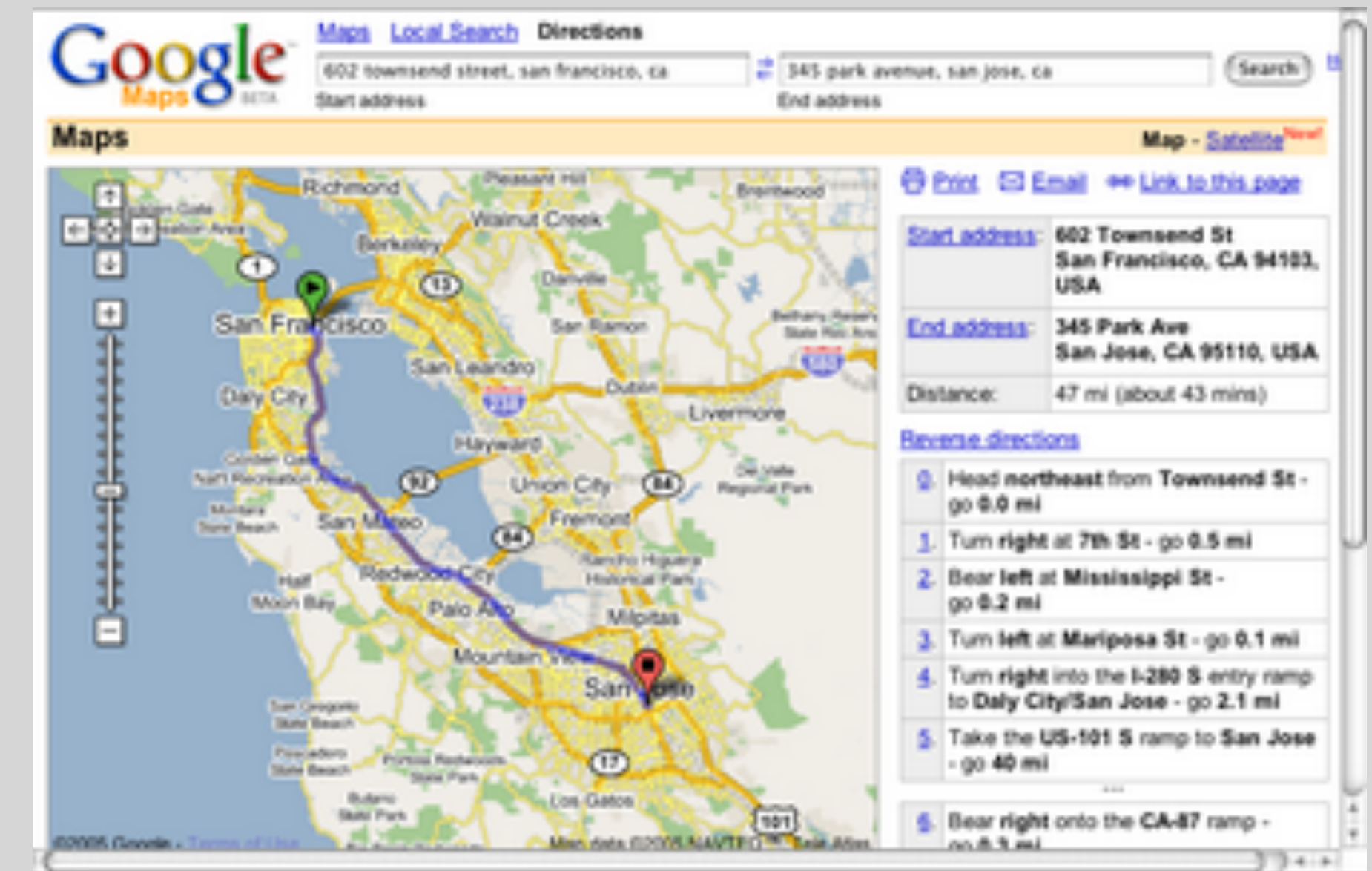
Waze's LiveMap

(2009)

what was novel about Waze?



TomTom Navigator
(introduced 2001)



Google Maps
(2005; mobile in 2007)

concept LiveMap

purpose provide directions that take account of traffic

principle as cars move, repeatedly update their locations (and flow on each segment of map) and then can get directions (using flow rates)

state

// street layout with one-way segments

from, to: Segment -> **one** Intersection

streetName: Segment -> **one** String

// locations and addresses

segment: Location -> **one** Segment

location: Address -> **one** Location

// last reported location of car

last: Car -> **one** Location

// flow rate measurement

flow: Segment -> **one** int

idea: crowdsourced flow

actions

updateLocation (c: Car, l: Location) // update last and flow

getDirections (c: Car, dest: Address, **out** dirs: **seq** String)

recipe for success =

next week is
about this!

authentic demand

all your music in
your pocket

+ simple design

install, select &
play songs

+ available technology

new Toshiba
5GB drive