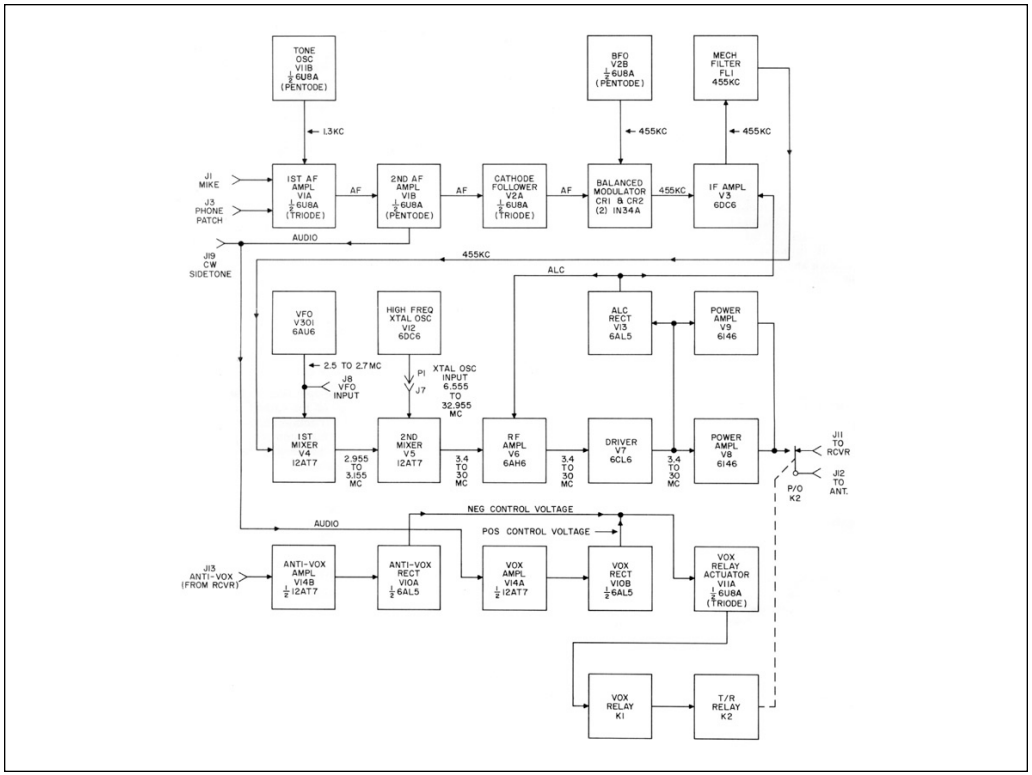
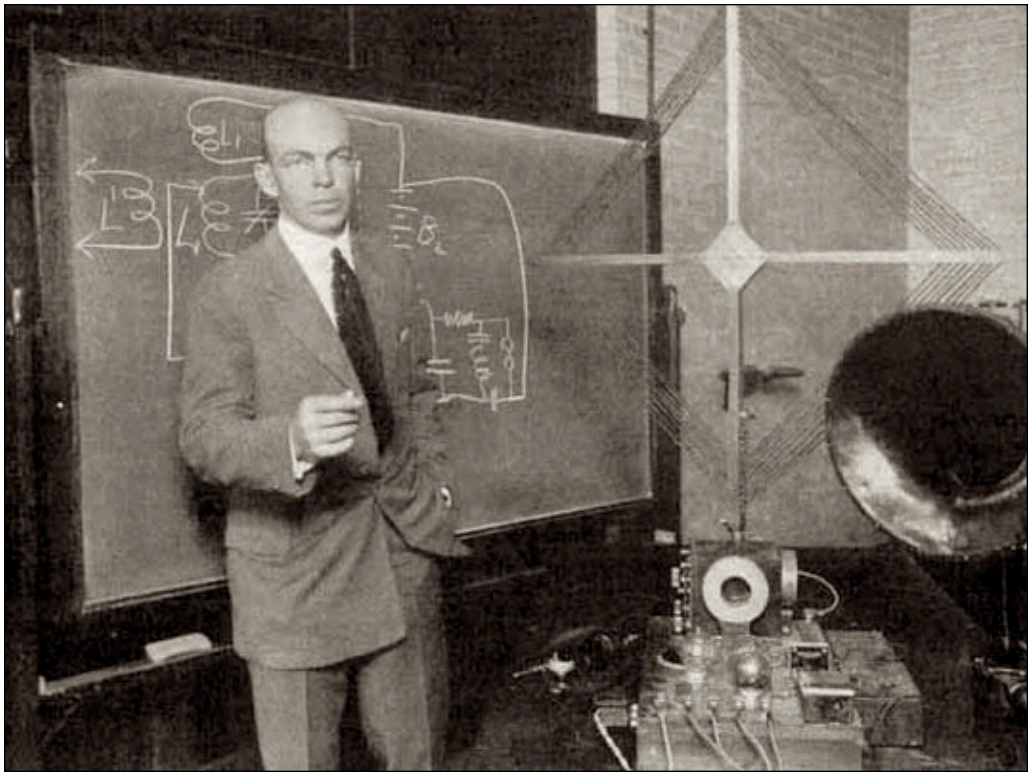
amateur radio at Purdue
beautiful machine
every knob important



information processor block diagram



revolution led by erwin armstrong
signal transformation overcoming noise
network possible but not permitted
killed himself

satellite operators in control
bill thomas tracking doppler

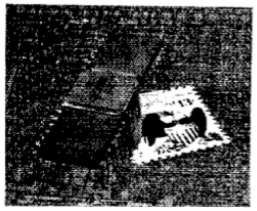
Meet the Microprocessor

Part 1: The first of a three-part series designed to introduce QST readers to microprocessors.

By William L. Thomas,* WB6FGR/9 and Stephen E. Belter,** WN9SGP

QST AUG 1976

What? You haven't heard about microprocessors and microcomputers? If you have, then you probably know already that these small computers have become commonplace in just the last two years, in everything from calculators and cash registers to electric stoves and sewing machines. In the very near future, they will be found controlling everything, from the heat in your house to the rig in your shack! The impact of the microprocessor on our way of life is just beginning to be felt. A data-processing unit on a single integrated circuit, with its peripheral devices, altogether called a microcomputer, will influence our surroundings in many ways still to be determined. At the present, microprocessors are generating



The microprocessor chip and the package it is mounted in. An idea of their size can be gained from the U.S. postage stamp shown here. (*Motorola Semiconductor Products photo*)

getting an amateur license seemed an impossible goal to most of us!

Amateur Radio Applications

There are a myriad of amateur radio applications for microprocessors. Some possible uses are mentioned below, but the surface has just been scratched in developing applications. The microprocessor is very appropriate for small-scale control systems. This could include repeater-control operations such as changing modes, i-d-ing, and phone-patch operations. Antenna tracking for either EME or Oscar operation seems another likely application. Microcomputers could simplify the design, minimize the hardware, and improve the reliability of remote-controlled stations.

bill and steve explain computers to amateurs

A Fully Automatic Morse Code Teaching Machine

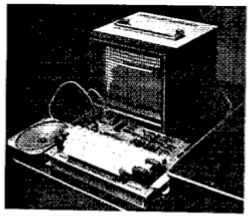
How would you teach Morse code to a person? Probably you'd divide the characters into groups and send the same few signals repeatedly until learned — sending "missed" characters more frequently. A microcomputer can provide the same individualized introduction to Morse code.

By Howard Cunningham,* WA9VRU

QST MAY 1977

There are many ways to learn the Morse code, most of which will work if given enough time and effort by the student. However, some techniques have been shown to streamline the learning process.[1] These include sound recognition and postponed discrimination. With the aid of both techniques, most students can reach proficiency at 5 wpm after six to eight one-hour sessions.

Sound recognition is perhaps the single most important instruction technique. Since the code is copied by ear, it must be learned by ear. Further, characters should be learned at a speed fast enough (approx. 15 wpm) to hear each character as a single sound rather than a sequence of dots and dashes.



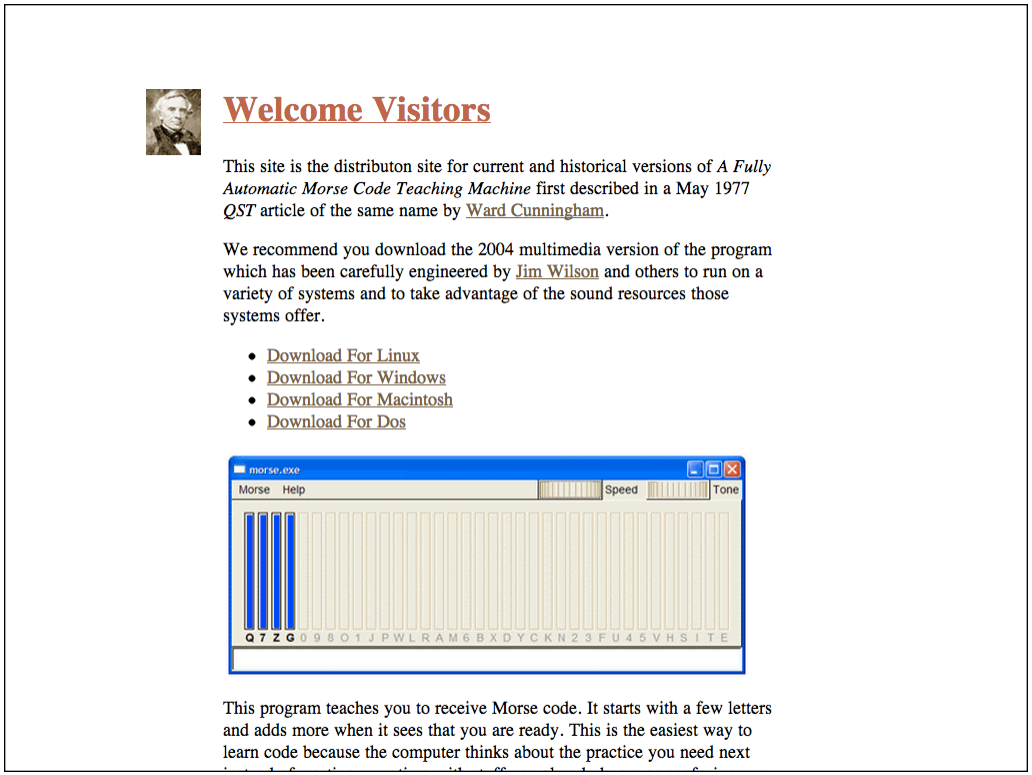
The HAL Communications Corp. MCEM-8080 microcomputer, all set to go for the continuation of a practice session on learning the code. No knowledge of computer operation or programming is required of the student; all he

mechanical my technique had become. While watching each student carefully, I would look for troublesome letters, concentrate on them until the student gained proficiency, then throw in some old letters for practice. If he could still copy satisfactorily, I would introduce some new letters. Then I realized this technique was a natural application for a microprocessor.

Programming the microcomputer to send code was no problem; Thomas and Belter discuss a code-practice oscillator program in their introduction to microprocessors.[2] The challenge was having the computer adjust to the student's ability.

The student would be required to

mechanically adaptive software
nothing to adjust, if figures you out
sought donations from pioneering vendors



algorithms still good today

alan turning
the system block diagram is just information
a sufficient machine can do the work of any other machine
killed himself

Automating a Traffic Network - by Howard Cunningham

Amateur radio communication capabilities cover a broad spectrum of speed, range, capacity and convienience. However, just try to get a short note to a friend across the continent. Repeaters won't reach, twenty meters requires a prearranged contact (and good conditions) and the National Traffic System (NTS) is just too slow and unreliable. So what's left? a long distance phone call.

But, the communication in question, a short note, perhaps a paragraph, does not merit the call. A voice grade, bi-directional path for three minutes is far more than is required. This overkill is reflected in the price of the call. An alternative is within reach of amateur radio operators: the TV terminals and microprocessors flourishing in the hobby computer market can be combined with existing radio teletype (RTTY) and VHF repeater technology to produce a nationwide, high speed, high reliability, 24 hour a day traffic network.

The basic unit of the network is a microcomputer connected to a VHF RTTY transceiver located on the top of the largest building in town. This unit (called a network node or station) is in direct communication with similar nodes in nearby towns using a single, nationally standardized frequency.

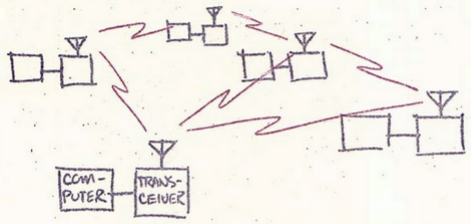
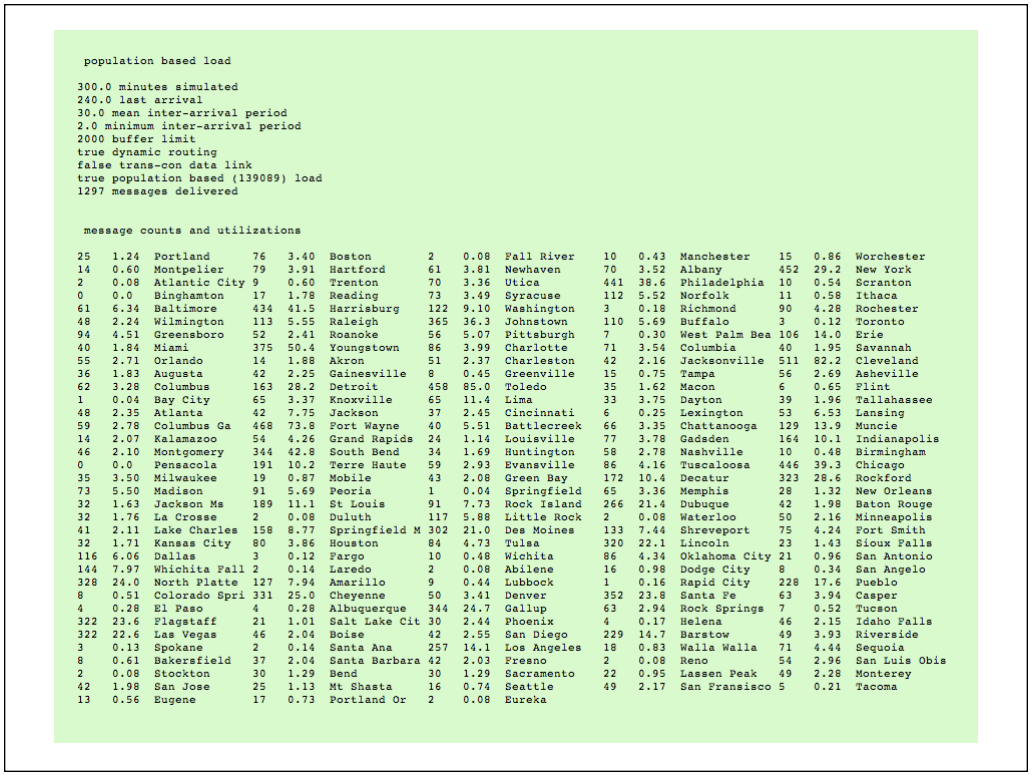


Figure 1. Computers communicate directly with neighbors and through relays with the remainder of the network.

June 1977

computer as better operator
reliable and universal
armstrong and turning



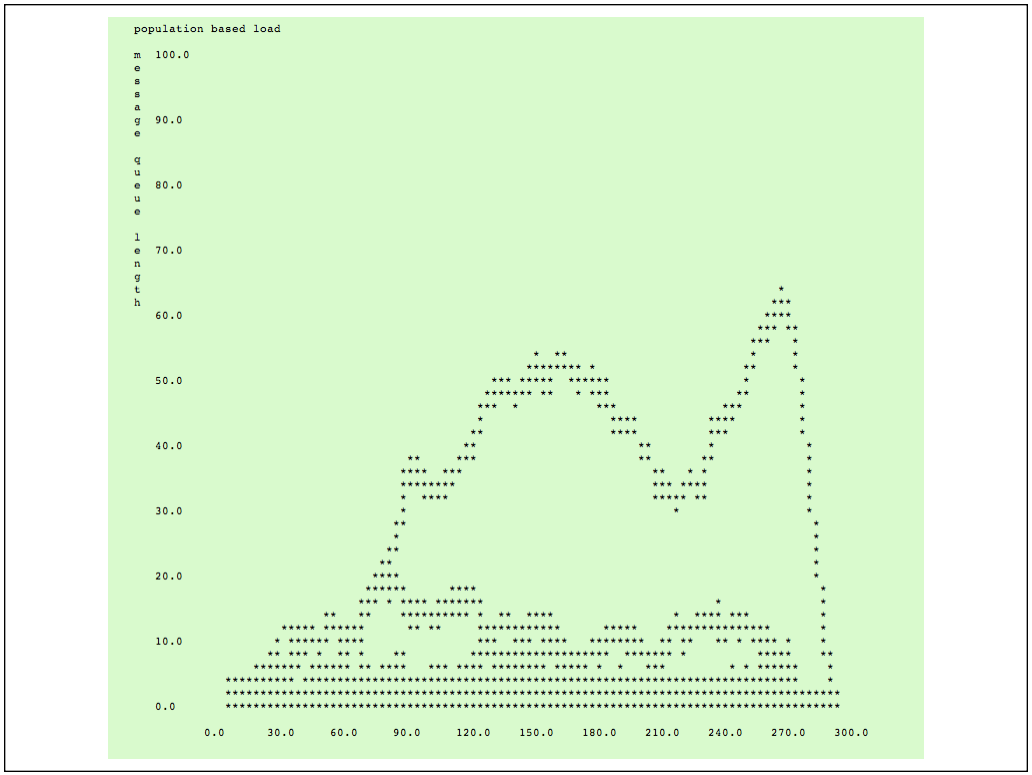
```
 population based load

300.0 minutes simulated
240.0 last arrival
30.0 mean inter-arrival period
2.0 minimum inter-arrival period
2000 buffer limit
true dynamic routing
false trans-con data link
true population based (139089) load
1297 messages delivered


 message counts and utilizations

25   1.24  Portland      76   3.40  Boston        2    0.08  Fall River    10   0.43  Manchester    15   0.86  Worchester
14   0.60  Montpelier    79   3.91  Hartford      61   3.81  Newhaven      70   3.52  Albany        452  29.2  New York
2    0.08  Atlantic City 9    0.60  Trenton       70   3.36  Utica         441  38.6  Philadelphia  10   0.54  Scranton
0    0.0   Binghamton    17   1.78  Reading       73   3.49  Syracuse      112  5.52  Norfolk       11   0.58  Ithaca
61   6.34  Baltimore     434  41.5  Harrisburg    122  9.10  Washington    3    0.18  Richmond      90   4.28  Rochester
48   2.24  Wilmington    113  5.55  Raleigh       365  36.3  Johnstown     110  5.69  Buffalo       3    0.12  Toronto
94   4.51  Greensboro    52   2.41  Roanoke       56   5.07  Pittsburgh    7    0.30  West Palm Bea 106  14.0  Erie
40   1.84  Miami         375  50.4  Youngstown    86   3.99  Charlotte     71   3.54  Columbia      40   1.95  Savannah
55   2.71  Orlando       14   1.88  Akron         51   2.37  Charleston    42   2.16  Jacksonville  511  82.2  Cleveland
36   1.83  Augusta       42   2.25  Gainesville   8    0.45  Greenville    15   0.75  Tampa         56   2.69  Asheville
62   3.28  Columbus      163  28.2  Detroit       458  85.0  Toledo        35   1.62  Macon         6    0.65  Flint
1    0.04  Bay City      65   3.37  Knoxville     65   11.4  Lima          33   3.75  Dayton        39   1.96  Tallahassee
48   2.35  Atlanta       42   7.75  Jackson       37   2.45  Cincinnati    6    0.25  Lexington     53   6.53  Lansing
59   2.78  Columbus Ga   468  73.8  Fort Wayne    40   5.51  Battlecreek   66   3.35  Chattanooga   129  13.9  Muncie
14   2.07  Kalamazoo     54   4.26  Grand Rapids  24   1.14  Louisville    77   3.78  Gadsden       164  10.1  Indianapolis
46   2.10  Montgomery    344  42.8  South Bend    34   1.69  Huntington    58   2.78  Nashville     10   0.48  Birmingham
0    0.0   Pensacola     191  10.2  Terre Haute   59   2.93  Evansville    86   4.16  Tuscaloosa    446  39.3  Chicago
35   3.50  Milwaukee     19   0.87  Mobile        43   2.08  Green Bay     172  10.4  Decatur       323  28.6  Rockford
73   5.50  Madison       91   5.69  Peoria        1    0.04  Springfield   65   3.36  Memphis       28   1.32  New Orleans
32   1.63  Jackson Ms    189  11.1  St Louis      91   7.73  Rock Island   266  21.4  Dubuque       42   1.98  Baton Rouge
32   1.76  La Crosse     2    0.08  Duluth        117  5.88  Little Rock   2    0.08  Waterloo      50   2.16  Minneapolis
41   2.11  Lake Charles  158  8.77  Springfield M 302  21.0  Des Moines    133  7.44  Shreveport    75   4.24  Fort Smith
32   1.71  Kansas City   80   3.86  Houston       84   4.73  Tulsa         320  22.1  Lincoln       23   1.43  Sioux Falls
116  6.06  Dallas        3    0.12  Fargo         10   0.48  Wichita       86   4.34  Oklahoma City 21   0.96  San Antonio
144  7.97  Whichita Fall 2    0.14  Laredo        2    0.08  Abilene       16   0.98  Dodge City    8    0.34  San Angelo
328  24.0  North Platte  127  7.94  Amarillo      9    0.44  Lubbock       1    0.16  Rapid City    228  17.6  Pueblo
8    0.51  Colorado Spri 331  25.0  Cheyenne      50   3.41  Denver        352  23.8  Santa Fe      63   3.94  Casper
4    0.28  El Paso       4    0.28  Albuquerque   344  24.7  Gallup        63   2.94  Rock Springs  7    0.52  Tucson
322  23.6  Flagstaff     21   1.01  Salt Lake Cit 30   2.44  Phoenix       4    0.17  Helena        46   2.15  Idaho Falls
322  22.6  Las Vegas     46   2.04  Boise         42   2.55  San Diego     229  14.7  Barstow       49   3.93  Riverside
3    0.13  Spokane       2    0.14  Santa Ana     257  14.1  Los Angeles   18   0.83  Walla Walla   71   4.44  Sequoia
8    0.61  Bakersfield   37   2.04  Santa Barbara 42   2.03  Fresno        2    0.08  Reno          54   2.96  San Luis Obis
2    0.08  Stockton      30   1.29  Bend          30   1.29  Sacramento    22   0.95  Lassen Peak   49   2.28  Monterey
42   1.98  San Jose      25   1.13  Mt Shasta     16   0.74  Seattle       49   2.17  San Fransisco 5    0.21  Tacoma
13   0.56  Eugene        17   0.73  Portland Or   2    0.08  Eureka
```

wrote as graduate student
earned A's in simulation and networking
minutes of supercomputer charges

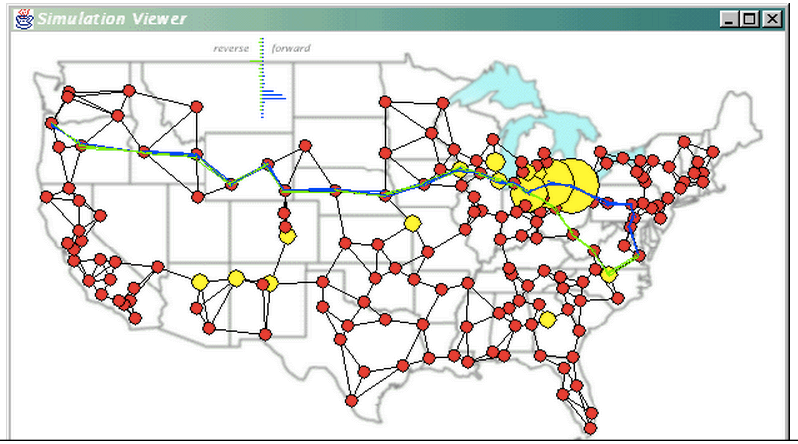


a few pages of pascal
exhibits complex behavior

Animating a Network Simulation

Ward Cunningham
2002

I've converted an old pascal program that I wrote in college to java and have now refactored it using Intellij. The project started out as just practice with Intellij but has turned out to be a lot more fun than that. The program is a simulation of a nation-wide radio network. The simulation works as I remember, only much much faster. So fast, in fact, that I've added a real-time animation of the traffic flowing through the network, including a graphic traceroute to/from where ever I wave the mouse. Here is a screen shot of this operation in progress.

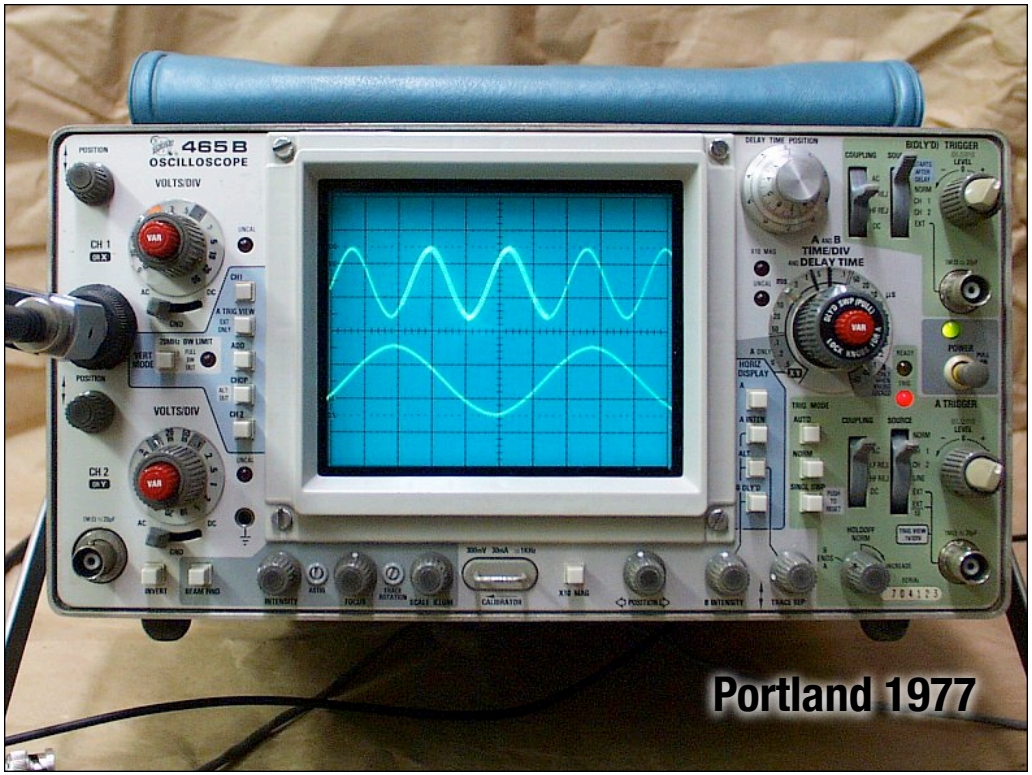


good time for a demo

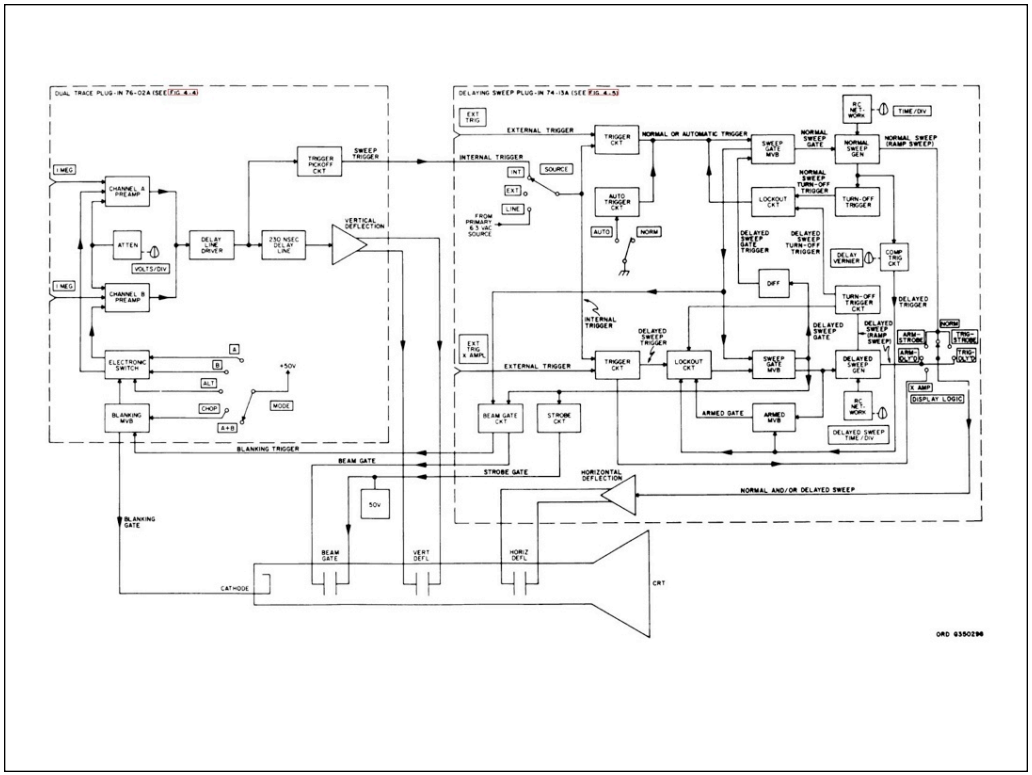
took my charts and graphs to dayton
met the (then young) k1zz
huge interest, nothing happened

Dayton 1977

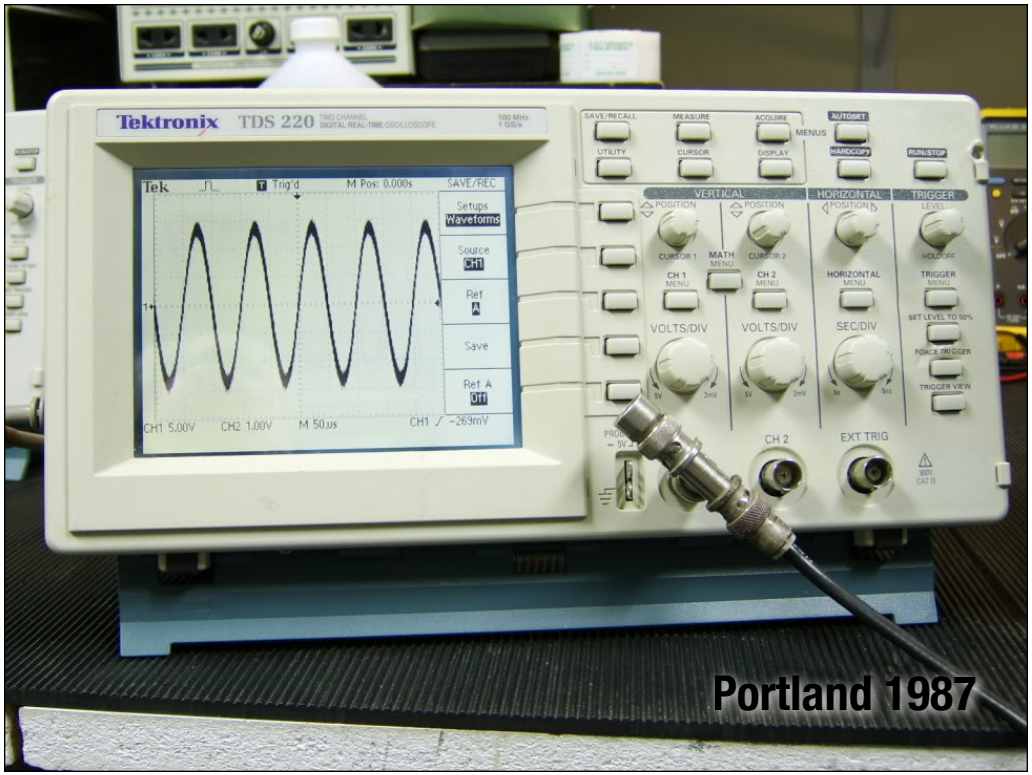
arrl and fcc frustrate network
friends from vendor suggest mexico



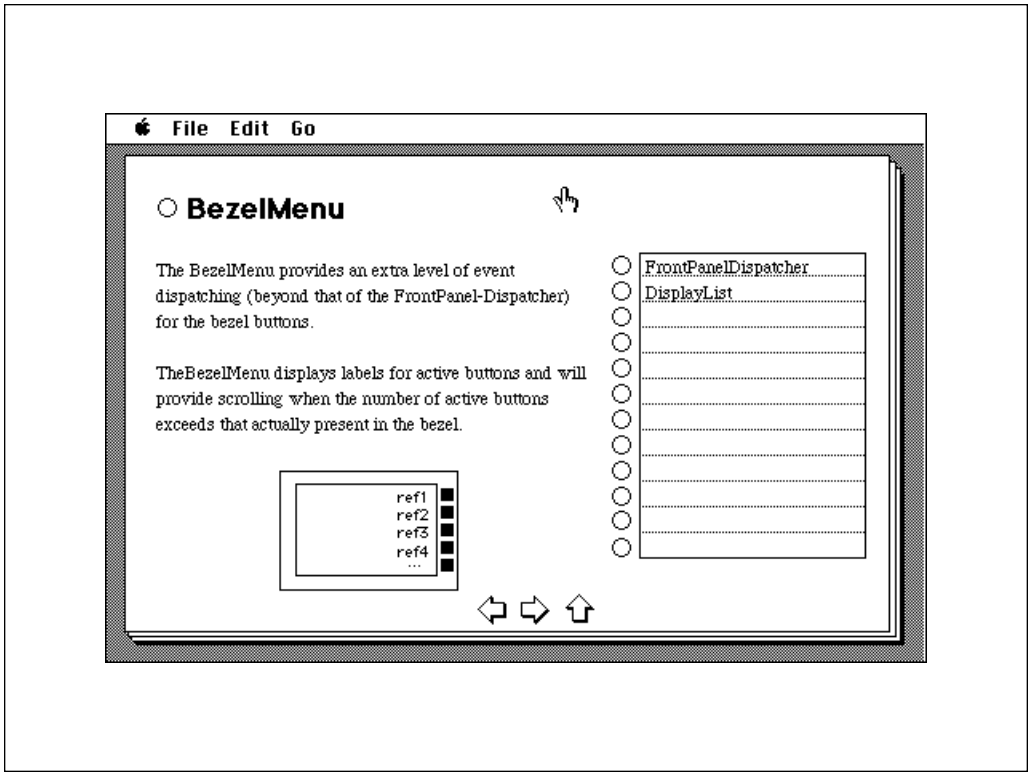
I move to beaverton
continue operating system with knobs



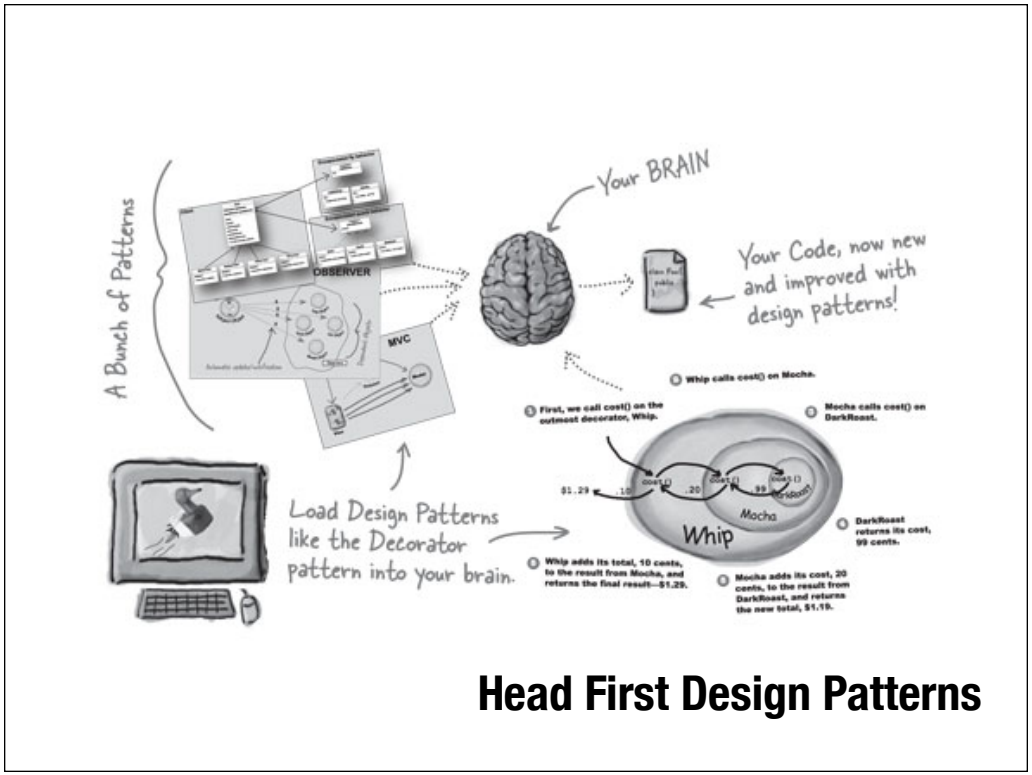
looks a lot like a radio
knobs on the block diagram
computerize to be reliable and universal



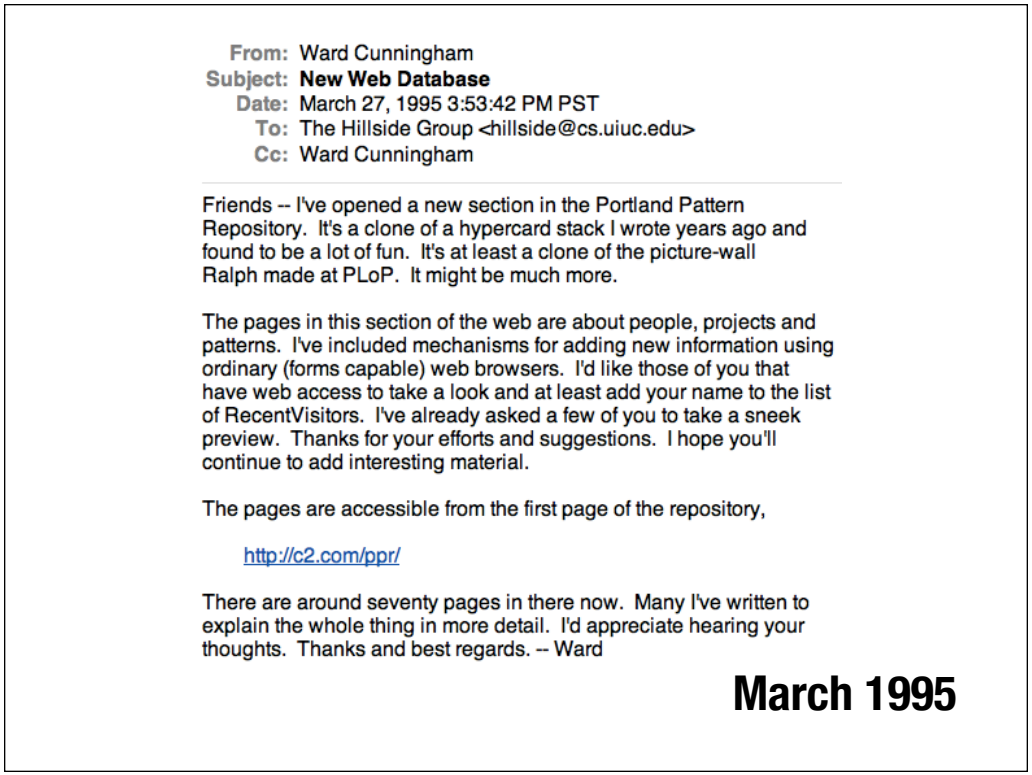
software defined oscilloscope
struggle to overcome social problems



hypertext as block diagram
how to think about computer



how the best programmers think
hypertext to concentrate the best thinking
thinking like the network



From: Ward Cunningham
Subject: **New Web Database**
Date: March 27, 1995 3:53:42 PM PST
To: The Hillside Group <hillside@cs.uiuc.edu>
Cc: Ward Cunningham

Friends -- I've opened a new section in the Portland Pattern Repository. It's a clone of a hypercard stack I wrote years ago and found to be a lot of fun. It's at least a clone of the picture-wall Ralph made at PLoP. It might be much more.

The pages in this section of the web are about people, projects and patterns. I've included mechanisms for adding new information using ordinary (forms capable) web browsers. I'd like those of you that have web access to take a look and at least add your name to the list of RecentVisitors. I've already asked a few of you to take a sneek preview. Thanks for your efforts and suggestions. I hope you'll continue to add interesting material.

The pages are accessible from the first page of the repository,

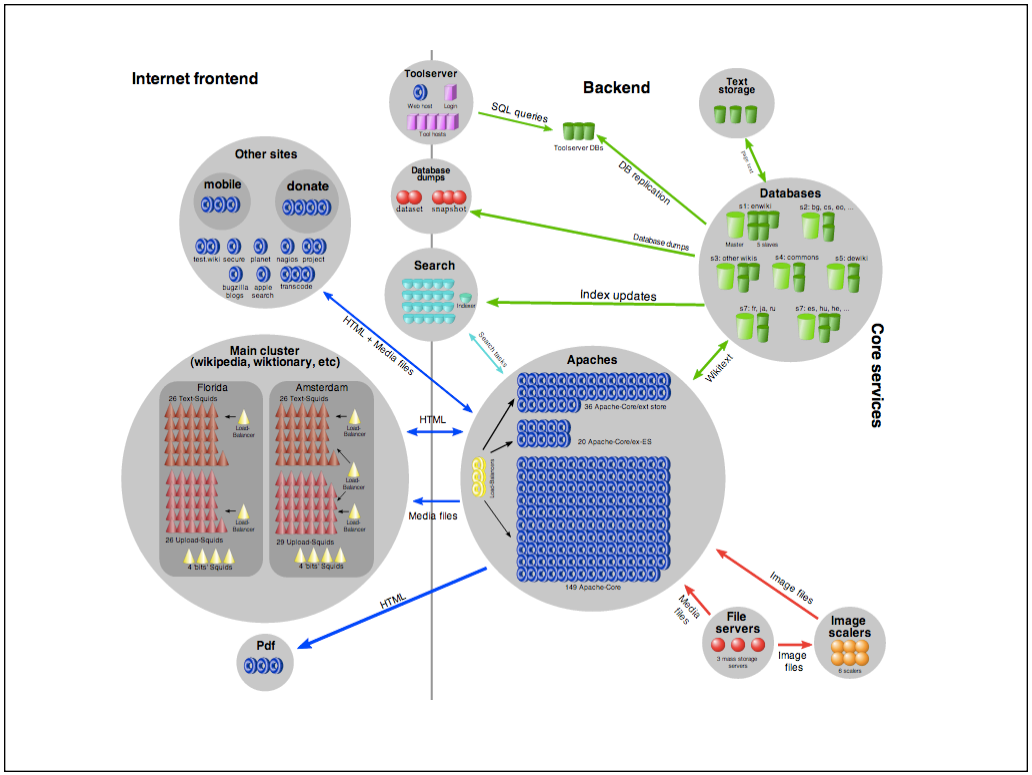
http://c2.com/ppr/

There are around seventy pages in there now. Many I've written to explain the whole thing in more detail. I'd appreciate hearing your thoughts. Thanks and best regards. -- Ward

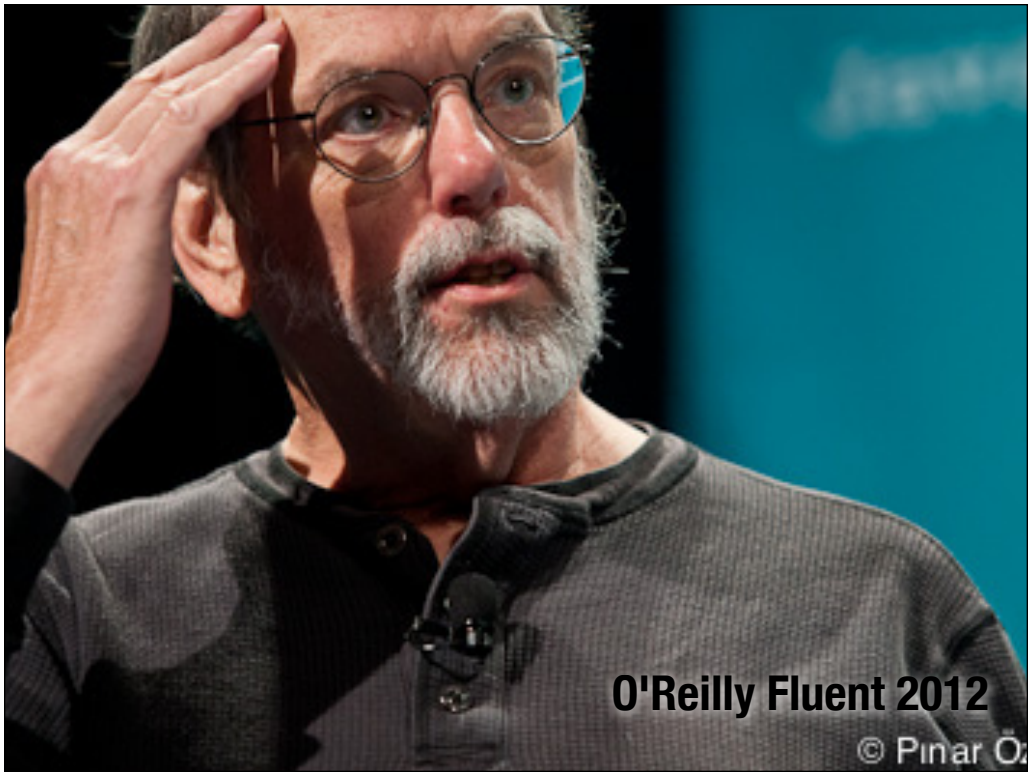
March 1995

wiki as a place for practical experts
outperforms the academic experts

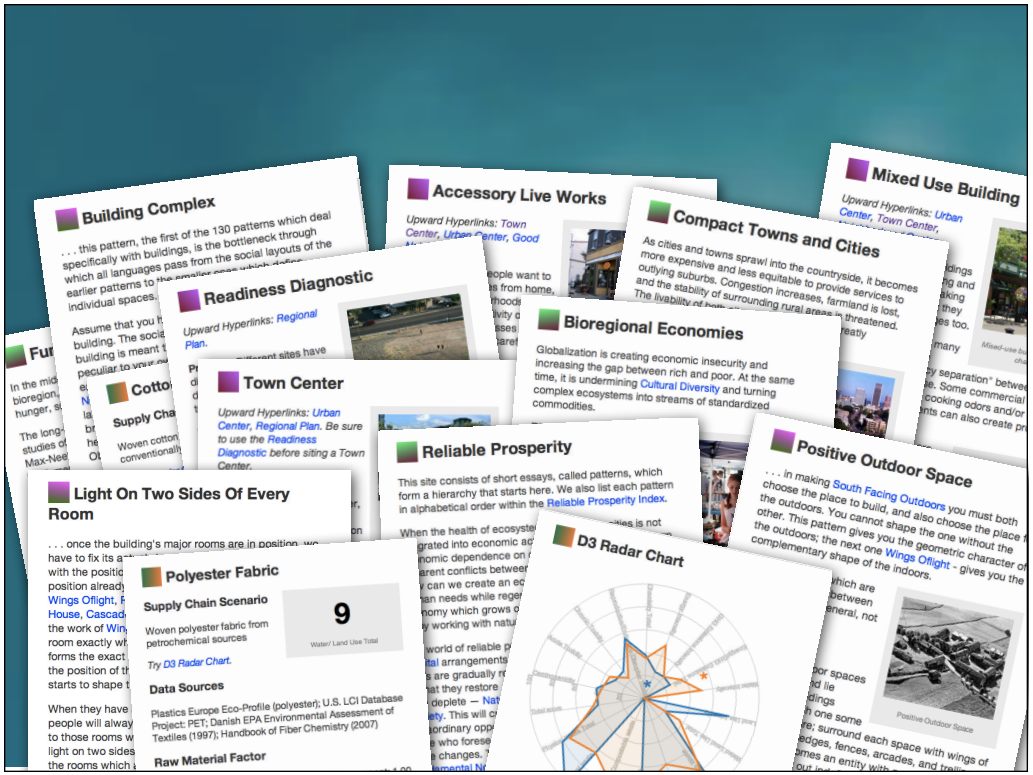
wikipedia understood by 10th anniversary
another simulation of the network
operated by 17 year-old boys



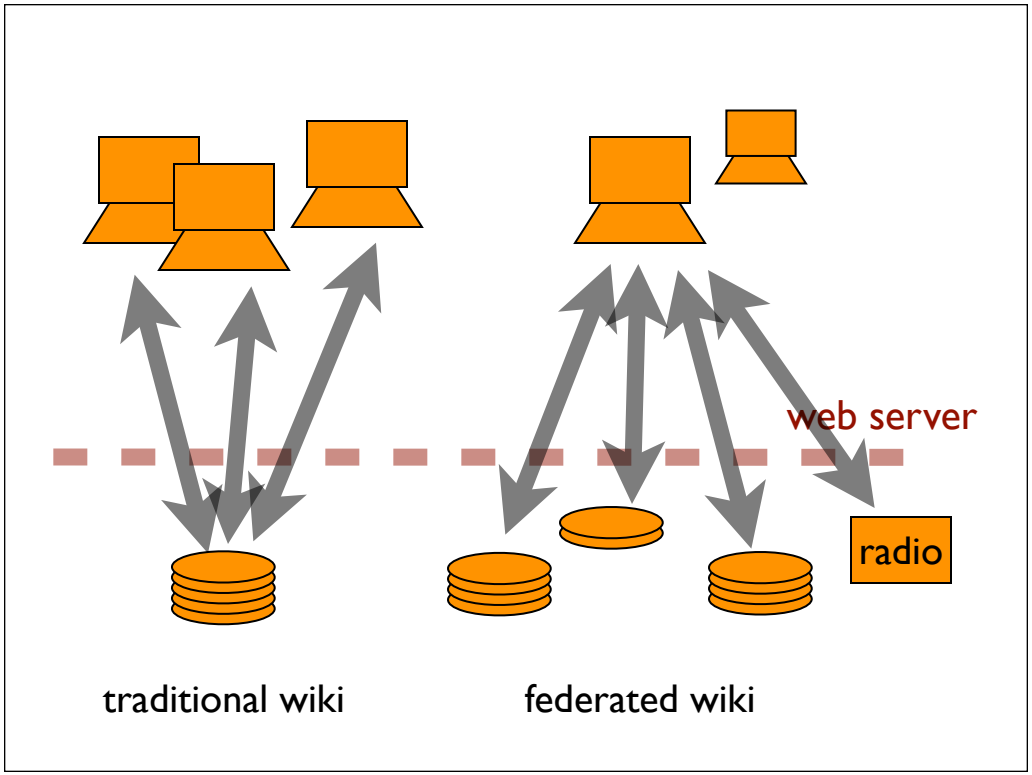
wikipedia block diagram
built by volunteers



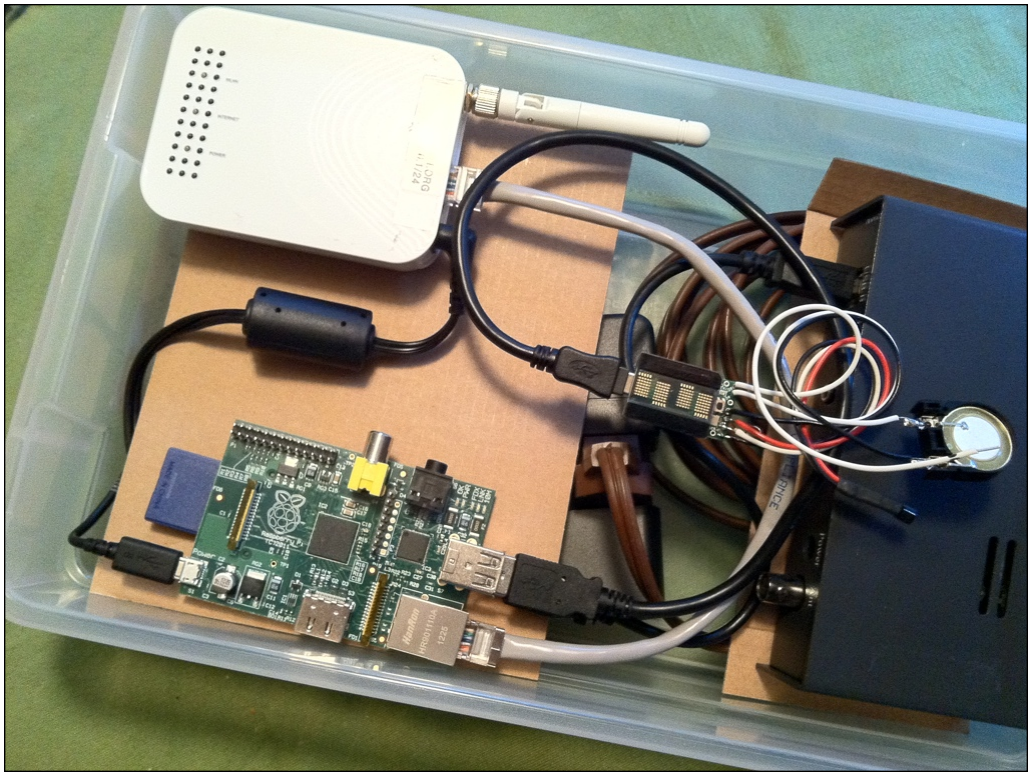
a simulation of the network gives up something
a federation of wikis is the network



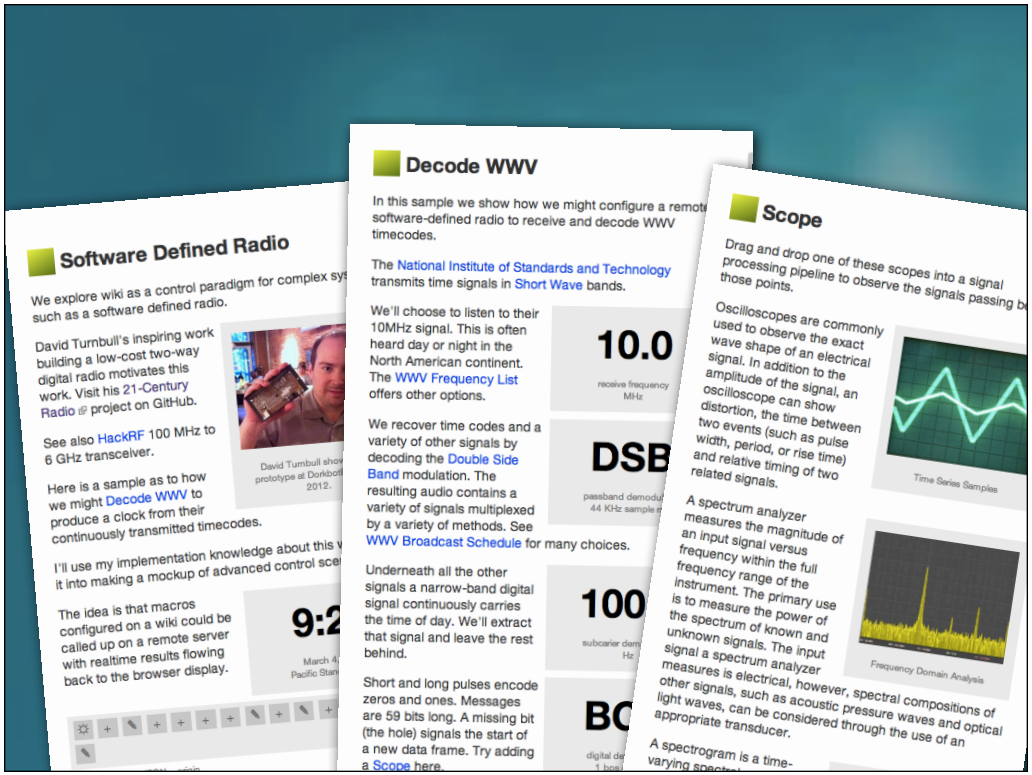
solved social problems I've seen throughout my career
room to be different
path to consensus



federated possible with today's technology
gives each site freedom
gives each user freedom too



how to think about radio wiki?



suggested wiki as block diagram
again reliable and universal, like armstrong and turing

we cooked this up just for you today
you can write-to and transmit-from your own wiki
all from this shoebox of stuff

I want you to understand this
so first lets look at a simpler system
a crystal-radio of sorts

native is within reach of amateur radio operators; the TV terminals and microprocessors flourishing in the hobby computer market can be combined with existing radio teletype (RTTY) and VHF repeater technology to produce a nationwide, high speed, high reliability, 24 hour a day traffic network.

The basic unit of the network is a microcomputer connected to a VHF RTTY transceiver located on the top of the largest building in town. This unit (called a network node or station) is in direct communication with similar nodes in nearby towns using a single, nationally standardized frequency.

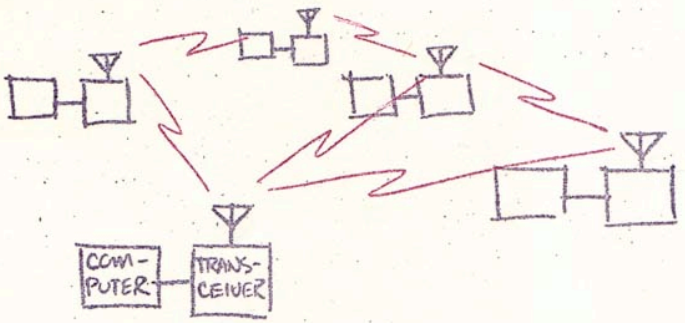
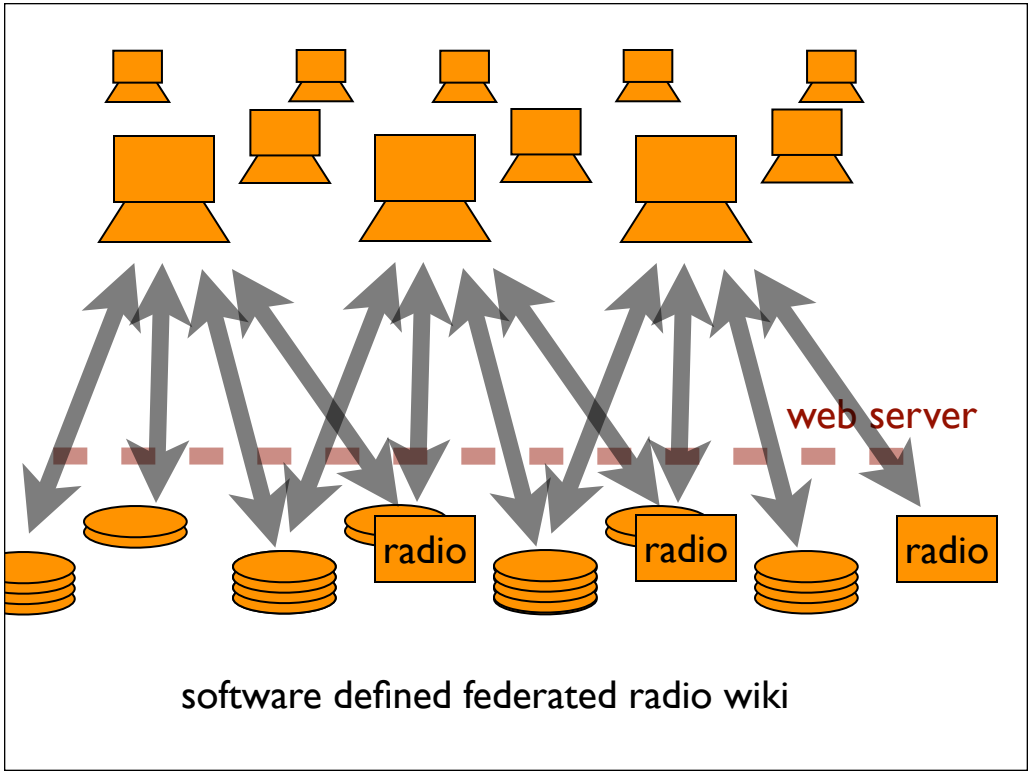


Figure 1. Computers communicate directly with neighbors and through relays with the remainder of the network.



software defined federated radio wiki

Title 47 – Part 97

Subpart A—General Provisions

§ 97.1 Basis and purpose.

The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a **voluntary noncommercial communication** service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the **advancement of the radio art**.

(c) Encouragement and **improvement of the amateur service** through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the **existing reservoir** w[illegible] the amateur [illegible]io ser[illegible] of trained operators, technicians, and electron[illegible]s experts.

(e) Continuation and extension of the amateur's unique abi[illegible] **international goodwill**.

Getting Wikipedia to the people who need it most

Posted by Kul Wadhwa on February 22nd, 2013

This post has also been published on the blog of the Knight Foundation.

We're in the middle of an information revolution that's changing the way billions of people in developing countries obtain news and knowledge. With a $10 cell phone, a high school student in New Delhi or a cab driver in Dakar can access the Internet and — through Wikipedia and other websites — learn volumes about virtually any subject. If knowledge is power, then the developing world, with almost five billion cell-phone subscriptions, is poised to make amazing changes.

There's just one catch: An overwhelming percentage of new mobile users in India, Senegal and other developing countries can't afford data charges, so they're effectively excluded from sites like Wikipedia. It's a de facto blackout, a kind of information

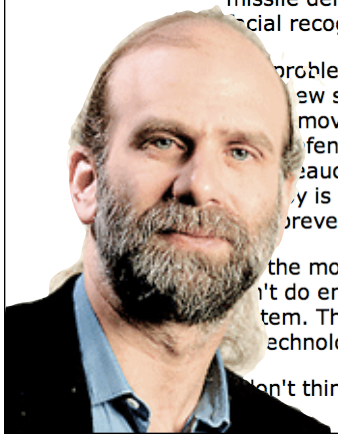

WIKIPEDIA
Imagine a World
Without Free Knowledge
For over a decade, we have spent millions of hours building the largest encyclopedia in human history. Right now, the U.S. Congress is considering legislation that could fatally damage the free and open Internet. For 24 hours, to raise awareness, we are blacking out Wikipedia. Learn more.
Contact your representatives.
Your ZIP code:
Look up


TO CONGRESS:
HE INTERNET
84,587
Sav
Inte

Our Security Models Will Never Work—No Matter What We Do

By Bruce Schneier
Wired
March 14, 2013

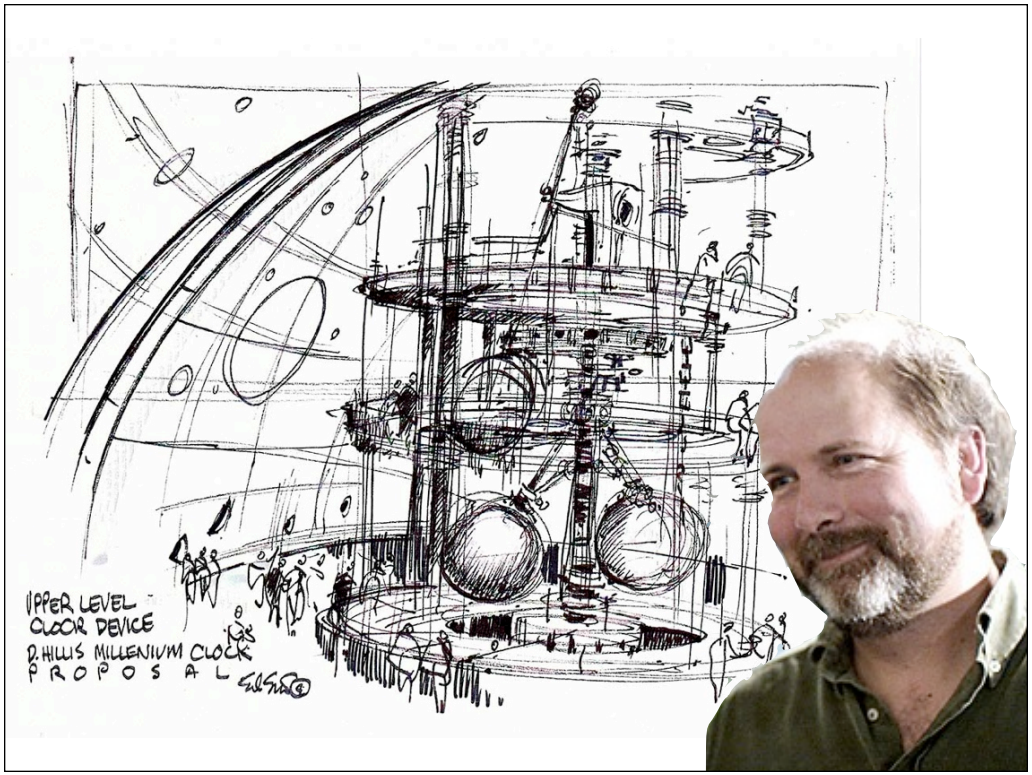
A core, not side, effect of technology is its ability to magnify power and multiply force—for both attackers and defenders. One side creates ceramic handguns, laser-guided missiles, and new-identity theft techniques, while the other side creates anti-missile defense systems, fingerprint databases, and automatic facial recognition systems.

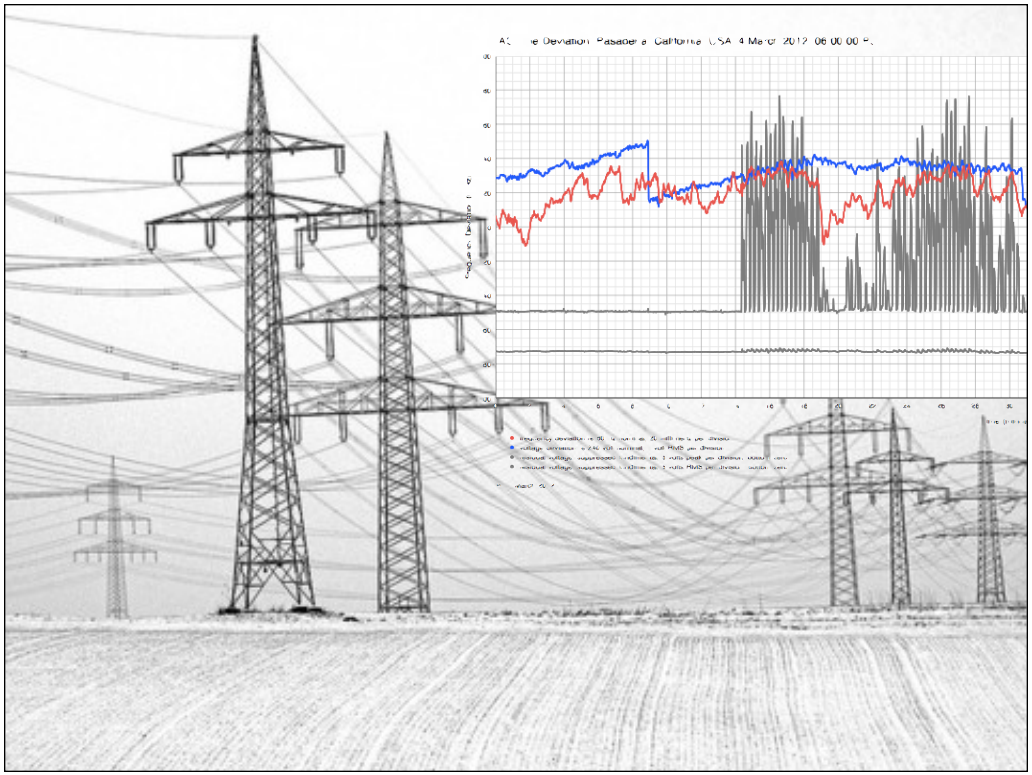


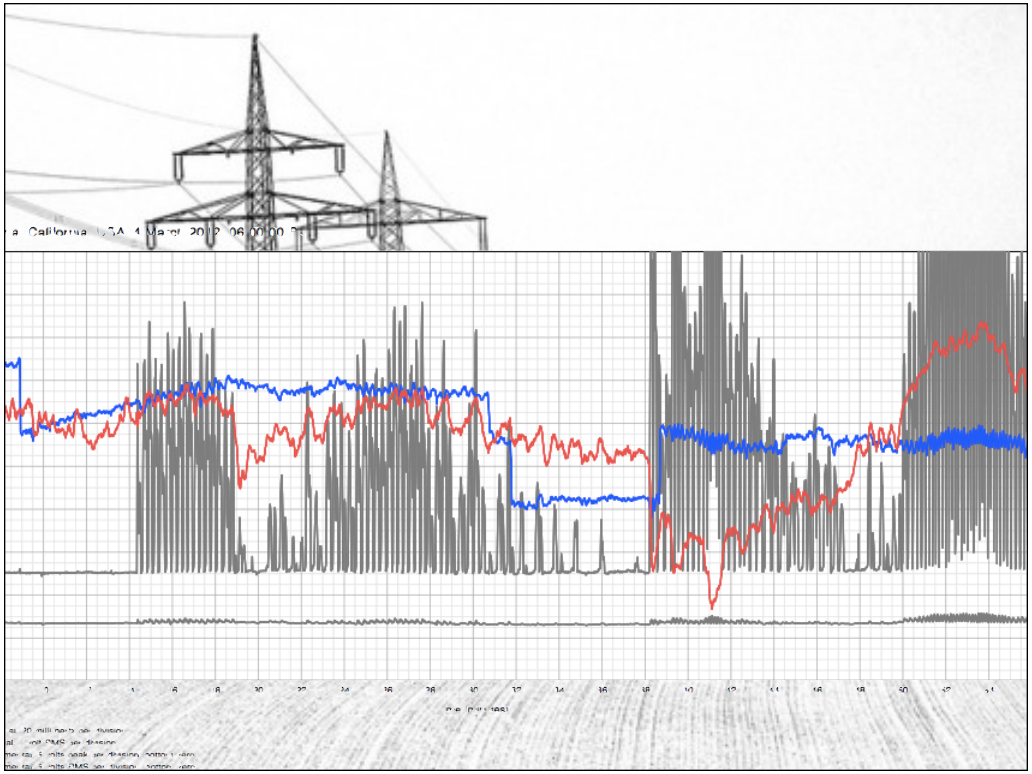
The problem is that it's not balanced: Attackers generally benefit from new security technologies before defenders do. They have first-mover advantage. They're more nimble and adaptable than defensive institutions like police forces. They're not limited by bureaucracy, laws, or ethics. They can evolve faster. And time is on their side—it's easier to destroy something than it is to prevent, defend against, or recover from that destruction.

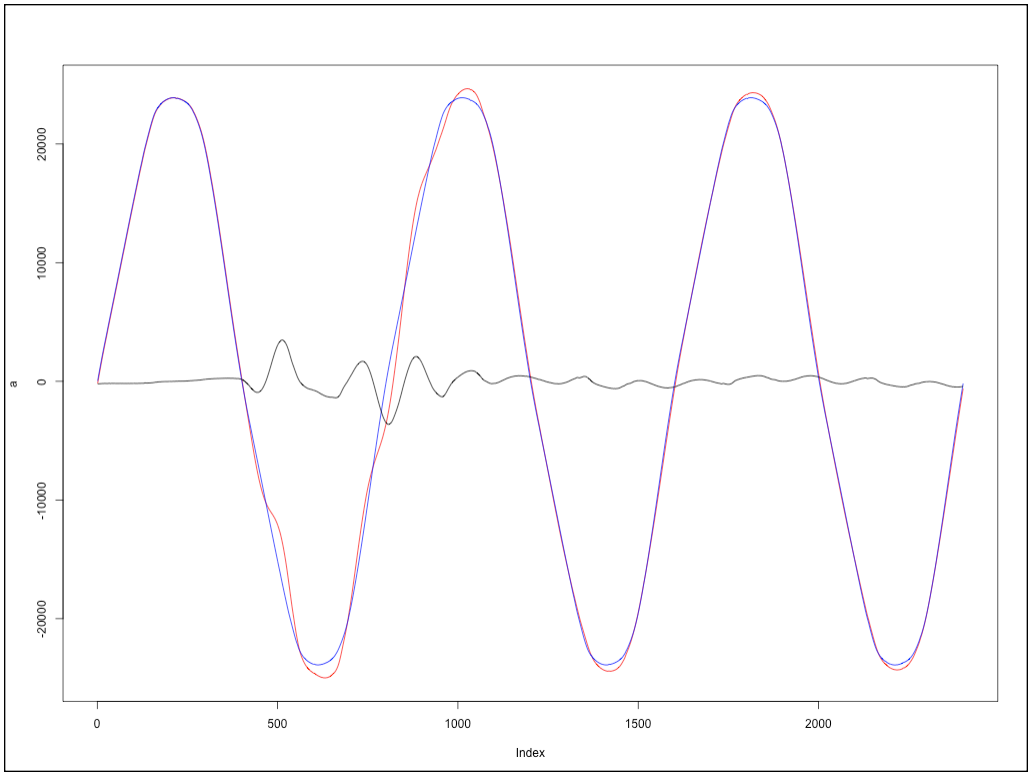
For the most part, though, society still wins. The bad guys simply don't do enough damage to destroy the underlying social system. The question for us is: can society still maintain security as technology becomes more advanced?

I don't think it can.


UPPER LEVEL
CLOCK DEVICE
D. HILLIS MILLENIUM CLOCK
PROPOSAL



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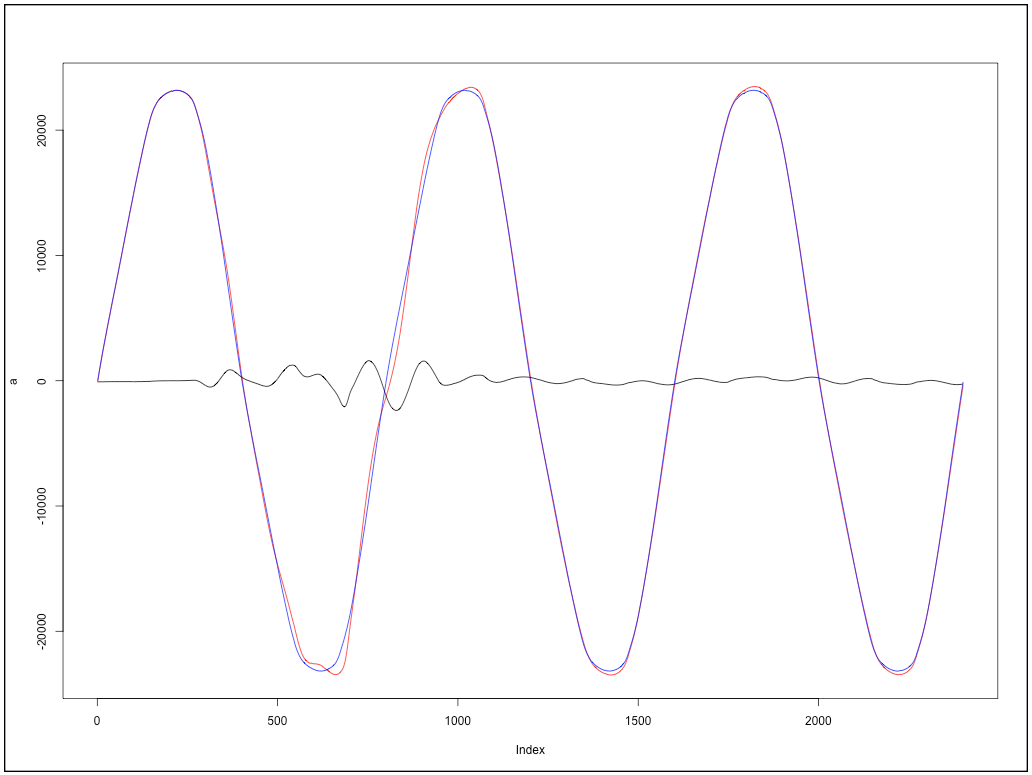
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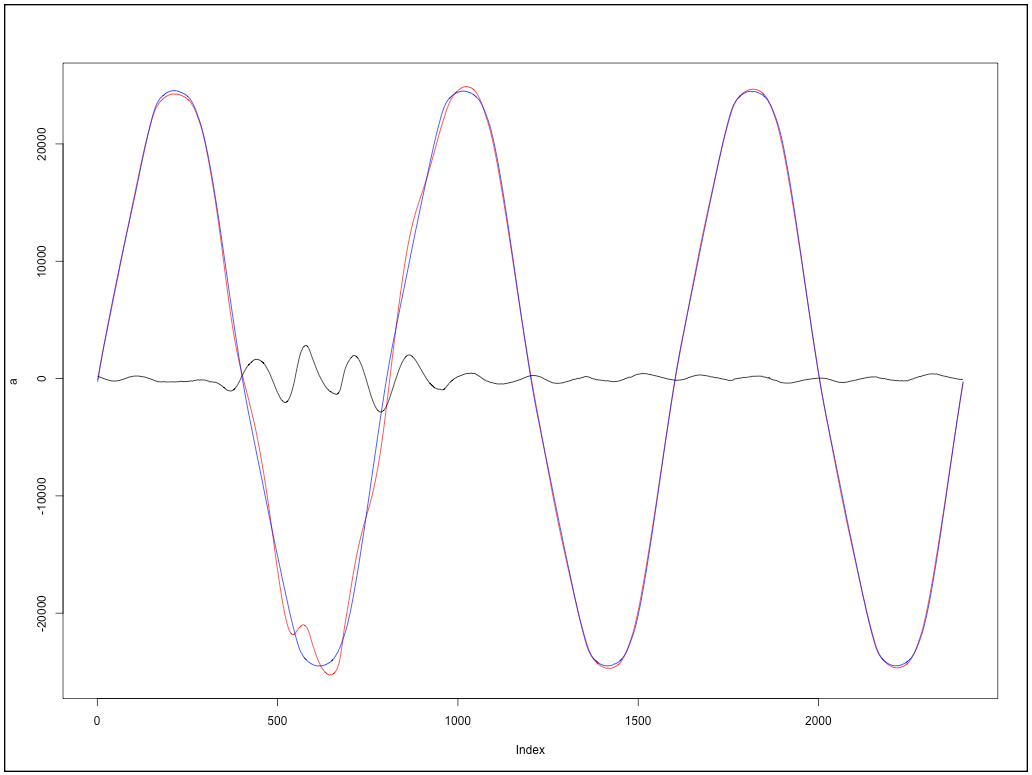
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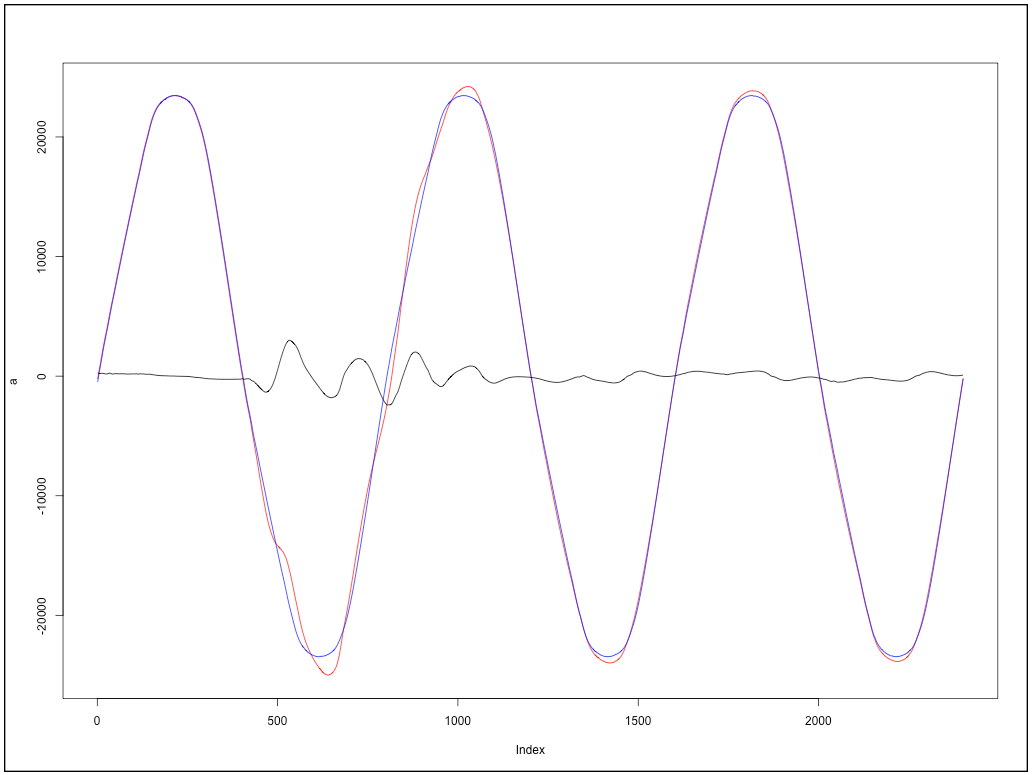
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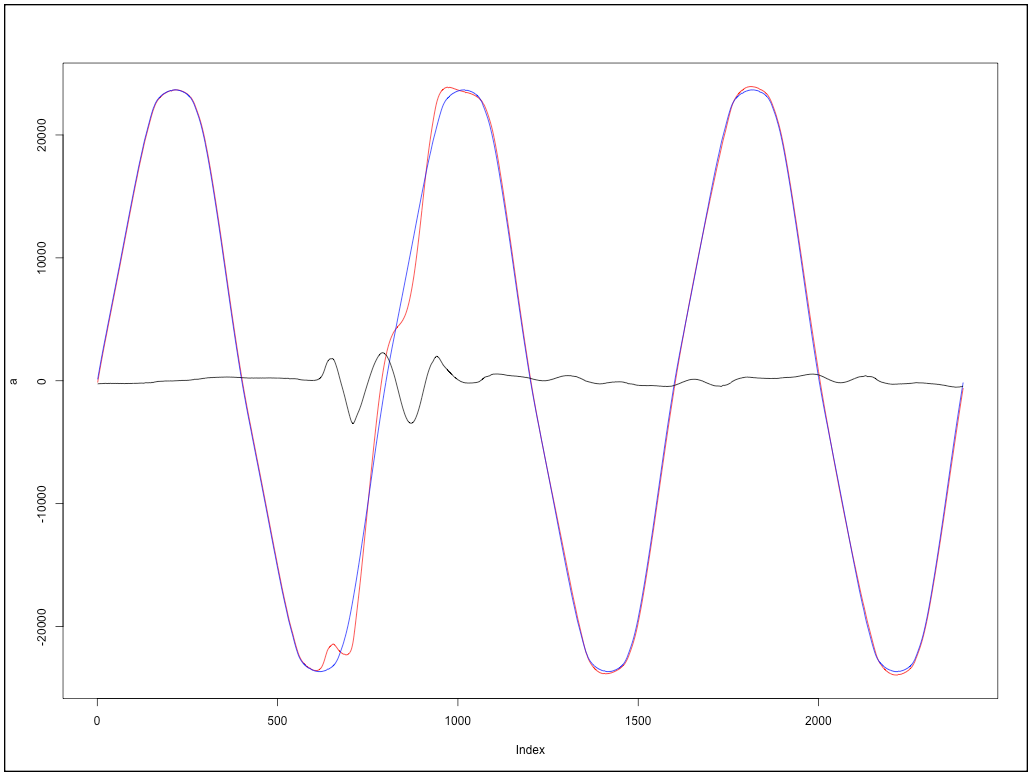
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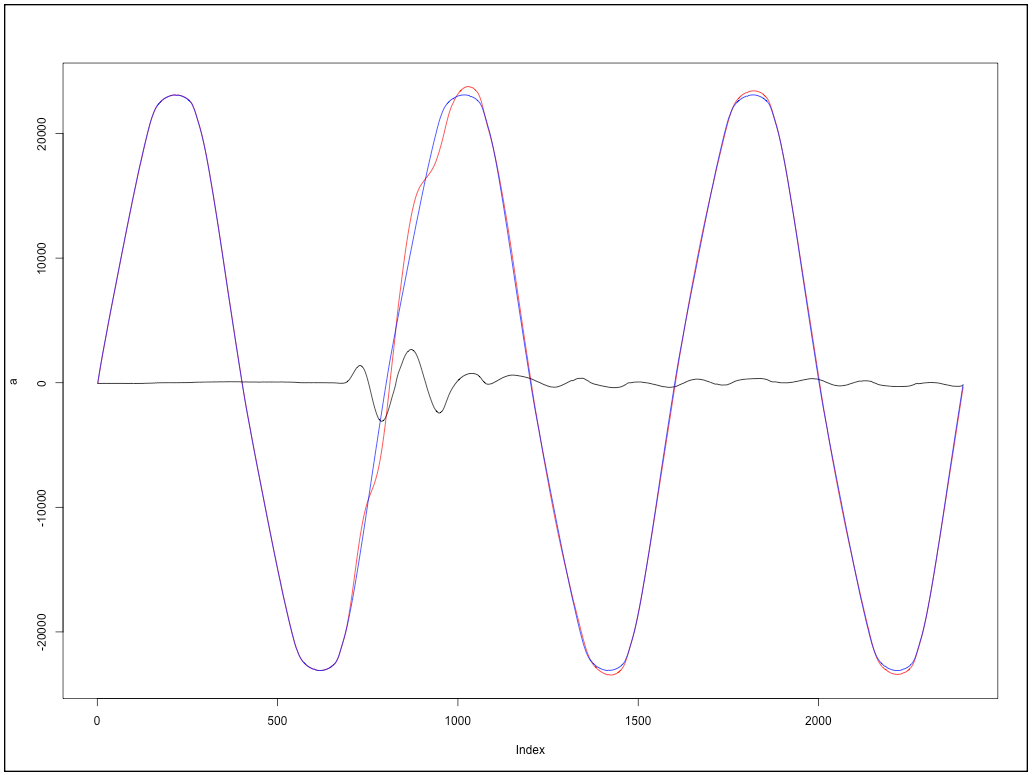
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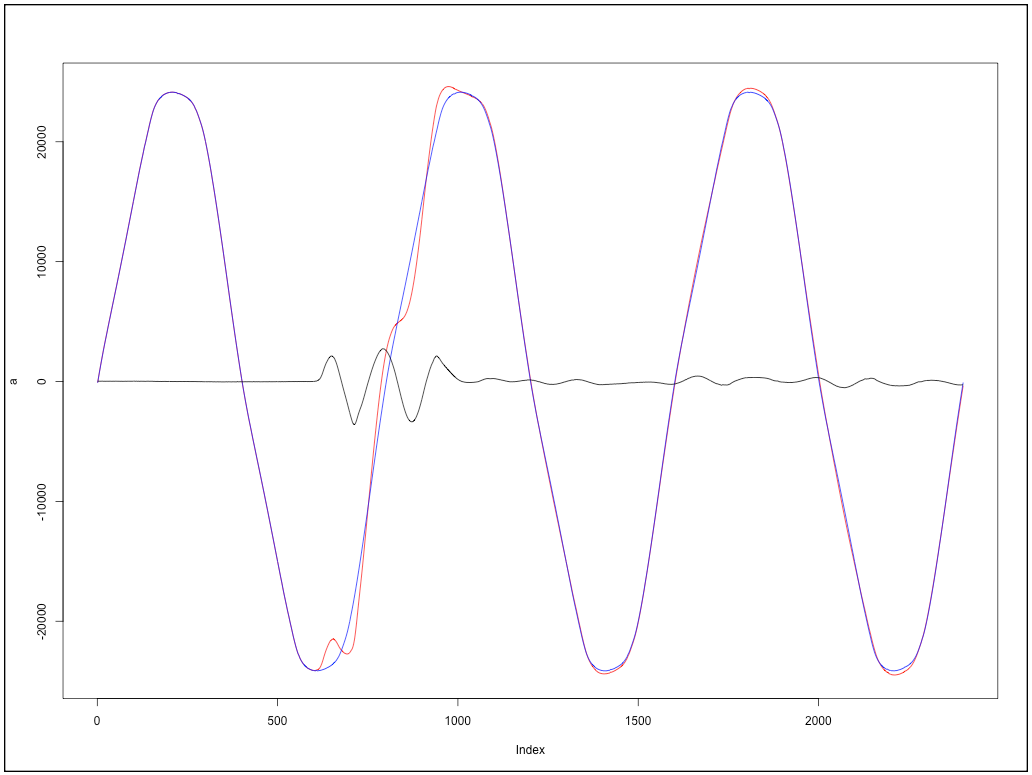
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take aways

interesting things have block diagrams

the knobs aren't where they use to be

global society needs more resilience

hams must think big to be relevant

native is within reach of amateur radio operators: the TV
terminals and microprocessors flourishing in the hobby computer
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and [illegible] speed.
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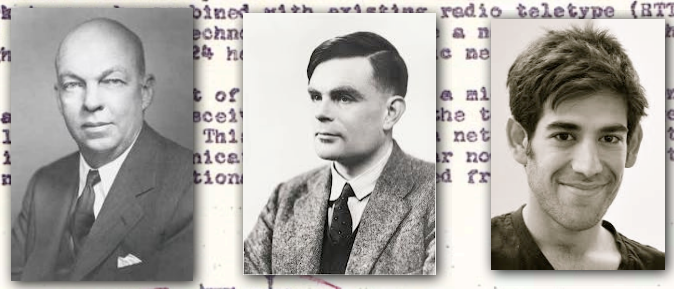

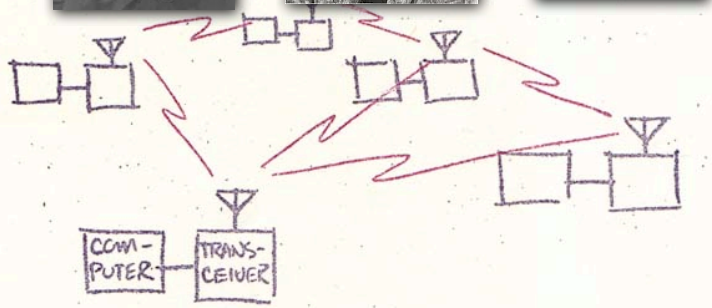

Figure 1. Computers communicate directly with neighbors and through relays with the remainder of the network.