

10 Mistakes we made in VoIP
- so they don't have to in IoT.

Tim Panton - Protocol Droid - westhawk Ltd
@steely_glint

The original IoT devices?

- ✦ Connected device
- ✦ Minimal GUI
- ✦ Couple of sensors
- ✦ Mimicked existing thing



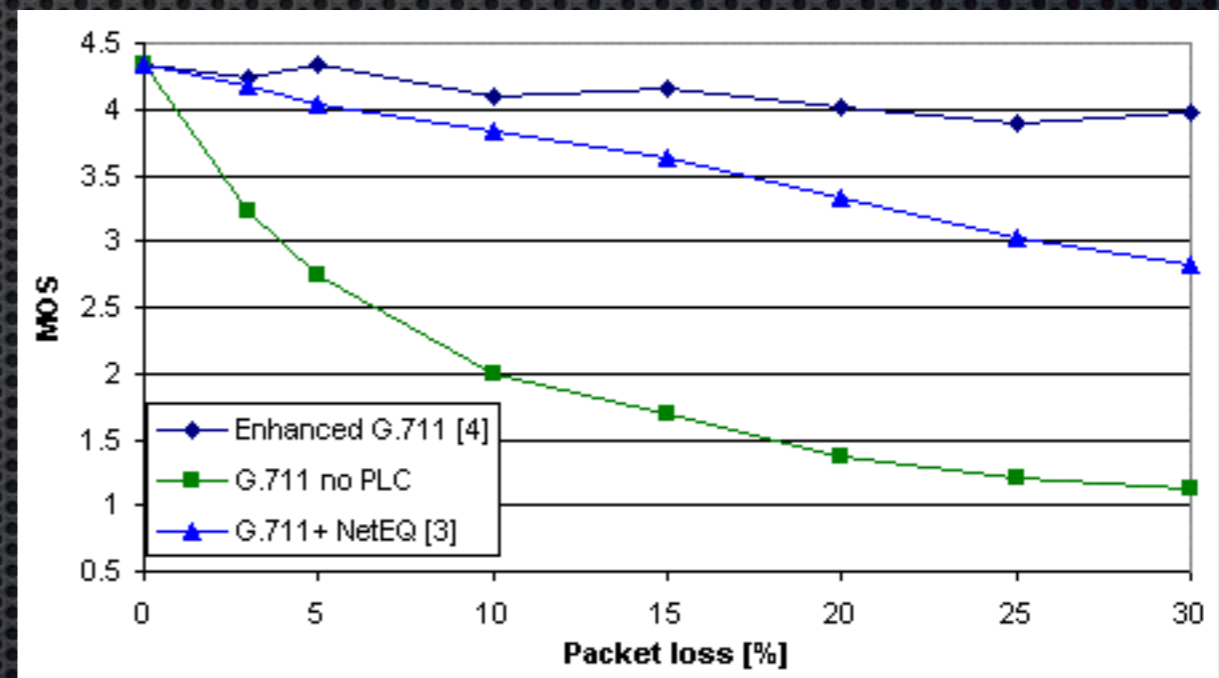
10 Mistakes - 10 years

- ✦ or more
- ✦ all shockingly relevant now

(see also https://en.wikipedia.org/wiki/Fallacies_of_distributed_computing)

Assume perfect network

- ✦ Audio cracks up with packet losses
- ✦ So we added data redundancy
- ✦ We added SRV in DNS for multiple redundant services



[Update: fixed] Nest faces outage, users can't remotely access thermostats and Dropcams

by ABHIMANYU GHOSHAL [Tweet](#) — 2d ago in GADGETS



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Horrrific provisioning

- ✦ Complex manual setup

- ✦ on small keyboard

- ✦ so we added auto provisioning

ZyXEL P2000W VoIP Wi-Fi Phone Configuration Guide

1. Enable DHCP on the phone by pressing Menu , then Net Setting and then Network Mode and Select the DHCP option. The phone will reload automatically. Go back to the main menu and choose Menu , then Information and then IP Address . You will see the phone's IP Address on the screen.
2. Type IP Address into a web browser on a local PC and you should see the login screen. The default login is: zyxeladmin password 1234 .
3. Click on the SIP Proxy configuration section and enter the configuration details as shown below. Please make sure you enter your Voipfone Number into the Registrar Username entry and the sip: entry of the SIP URI . Enter your Voipfone password into the Registrar Password entry. Click SUBMIT and SAVE to save your settings.

SIP Proxy	
SIP URI	sip: 30040041 @voipfone.co.uk : 5060
Expire Time	300
OPTIONS Interval Timer	0
Session Expires Time	0
Registrar Username	30040041
Registrar Password	*****
Display Name	Your Name
Registration Status	Registered

4. Click on the Outbound Proxy configuration section and enter the configuration details as shown below. Click SUBMIT and SAVE to save your settings.

Honeywell Wi-Fi Thermostat Registration -- DIY Installation | Training | Honeywell

4:21 PM 11%

services.alamnet.com/TotalConnectComfort/Gateway/Register/location/...

Account Confirmation Sent | Gmail | Register Gateway

Welcome Jane | Sign Out | Control Center | My Account | FAQs | Contact Us

Control Center - My Locations - Edit Location Living room - Register Gateway

Register Gateway For Living room

Device MAC ID
00022d242e9c

Device CRC
3875

▶ Cancel X

device MAC ID and CRC?
can be found on the bottom of your

English | Français

3.3

▶ 🔊 1:15 / 2:11

CC HD YouTube

Closed identity systems

- ✦ VoIP systems had 1 number then lots of extensions
- ✦ Everyone wants direct dial

You need a federated identity so systems can interop
We used e164 and PSTN backbone (not perfect)

Google's parent company is deliberately disabling some of its customers' old smart-home devices



Rob Price [✉](#) [🐦](#)

🕒 Apr. 4, 2016, 4:22 PM 🔥 34,891 💬 1

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Nest, a smart-home company owned by Google's holding company Alphabet, is dropping support for a line of products — and will make customers' existing devices completely useless.

It's a move that has infuriated some customers, and raises worrying questions about the rights of consumers in the ever-more connected future.

In October 2014, Nest acquired Revolv, a smart-home device



David McNew/Getty Images

If your home relies on a Revolv smart-home hub, you're in trouble.

Multiple protocols

- Skinny
 - H323
 - IAX
 - Megaco
 - Jingle
 - etc.
- All gone.
- Specifically watch out for proprietary services that vanish over night.
- Pick a standard with multiple open implementations.
- Don't bet against IP end to end.

We settled on SIP - horrible but it did what we needed.

Guest

How to avoid the next Parse-shutdown scenario

RICH MENDIS, ANYPRESENCE FEBRUARY 6, 2016 10:00 AM

TAGS: FACEBOOK PARSE, RICH MENDIS



Insecure media

- We had unencrypted data flows
Unacceptable for HIPPA - lawyers etc.

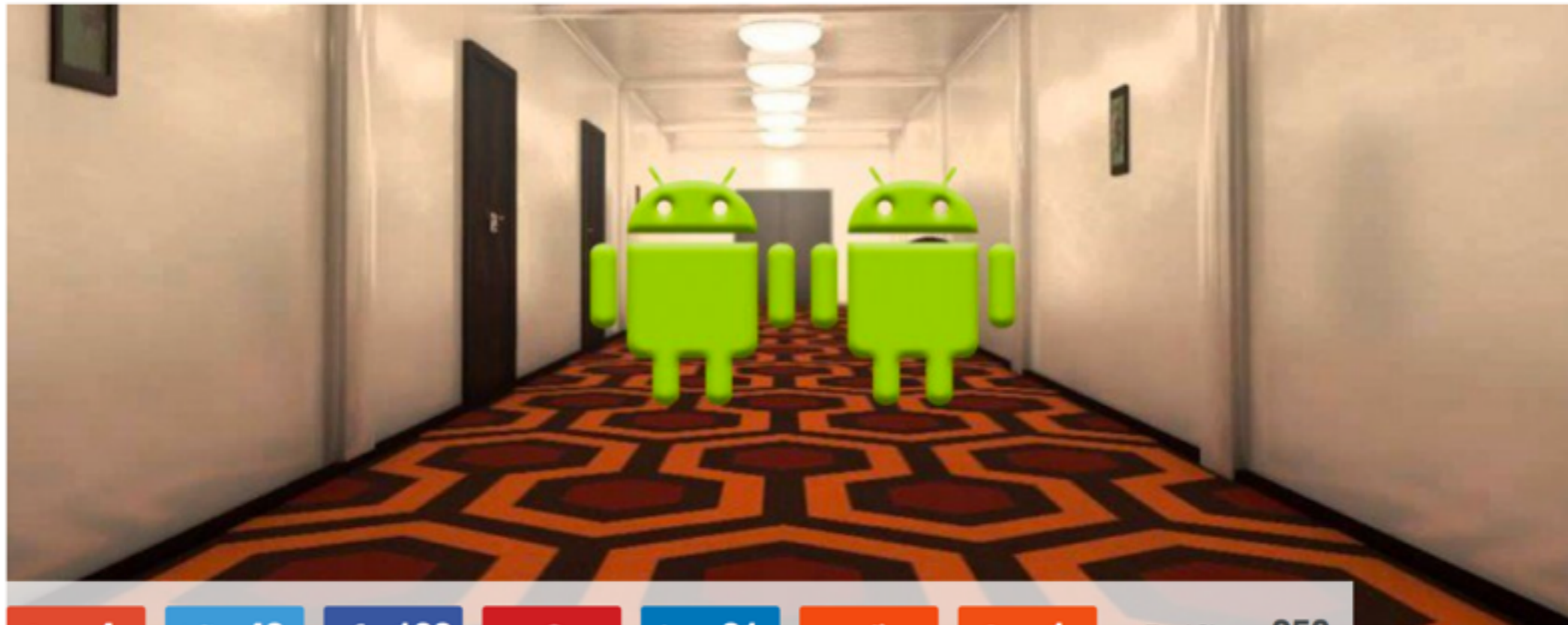
Now we use SRTP (ideally DTLS-SRTP)

Encrypt everything.

SECURITY

Hacker uses Android light-switches to gain control over an entire hotel

Martin Anderson Sat 12 Mar 2016 9.51am



G+ 4 Twitter 42 Facebook 182 Pinterest LinkedIn 21 Reddit StumbleUpon 1 Total Shares 250

A Linux developer staying in a hotel for a conference has found, with very little experimentation, that he was able to use the establishment's innovative Android-based

Insecure Auth

- ✦ Once there is money there will be fraud
- ✦ Toll fraud in VoIP
- ✦ Seek strong Auth. Don't use passwords.
- ✦ Don't assume you won't be found.

TECHNOLOGY | Phone Hackers Dial and Redial to Steal Billions



Hackers targeted the phone system at Bob Foreman's architecture firm in Georgia, making \$166,000 in calls in a weekend. Tami Chappell for The New York Times

SAN FRANCISCO — Bob Foreman's architecture firm ran up a \$166,000 phone bill in a single weekend last March. But neither Mr. Foreman nor anyone else at his seven-person company was in the office

The screenshot shows a web browser window at shodan.io displaying search results for the IP address 217.194.177.129. On the left, a table lists metadata: Country (Italy), Organization (Redder Telco), ISP (Redder Telco), Last Update (2016-04-10T03:54:35.355113), Hostnames (host-217-194-177-129.sbs.redder.net), and ASN (AS33986). A yellow arrow points from the Hostnames field to a service listing on the right. The service listing shows a port for 5900/tcp with the text 'http-simple RFB 003.008 authentication disabled'. Below this, there is a remote control interface with buttons labeled 'RADIO', 'USCITA VAGLIO', 'LETTONI', 'SCELTA AUTOMATICA', and 'ALLARMI'. At the bottom right, a 3D CAD model of a shredder is shown with labels 'REP 51', 'REP 52', and 'REP 53'.

Country	Italy
Organization	Redder Telco
ISP	Redder Telco
Last Update	2016-04-10T03:54:35.355113
Hostnames	host-217-194-177-129.sbs.redder.net
ASN	AS33986

Ports: 5900

Services: 5900/tcp
http-simple RFB 003.008 authentication disabled

Buttons: RADIO, USCITA VAGLIO, LETTONI, SCELTA AUTOMATICA, ALLARMI

3D Model Labels: REP 51, REP 52, REP 53

Hard to update

- ✦ manual, complex, risky process. No one did it.
- ✦ Security patches don't get applied.
- ✦ Auto update - often.



Technology

Fiat Chrysler **recalls** 1.4 million cars after Jeep hack

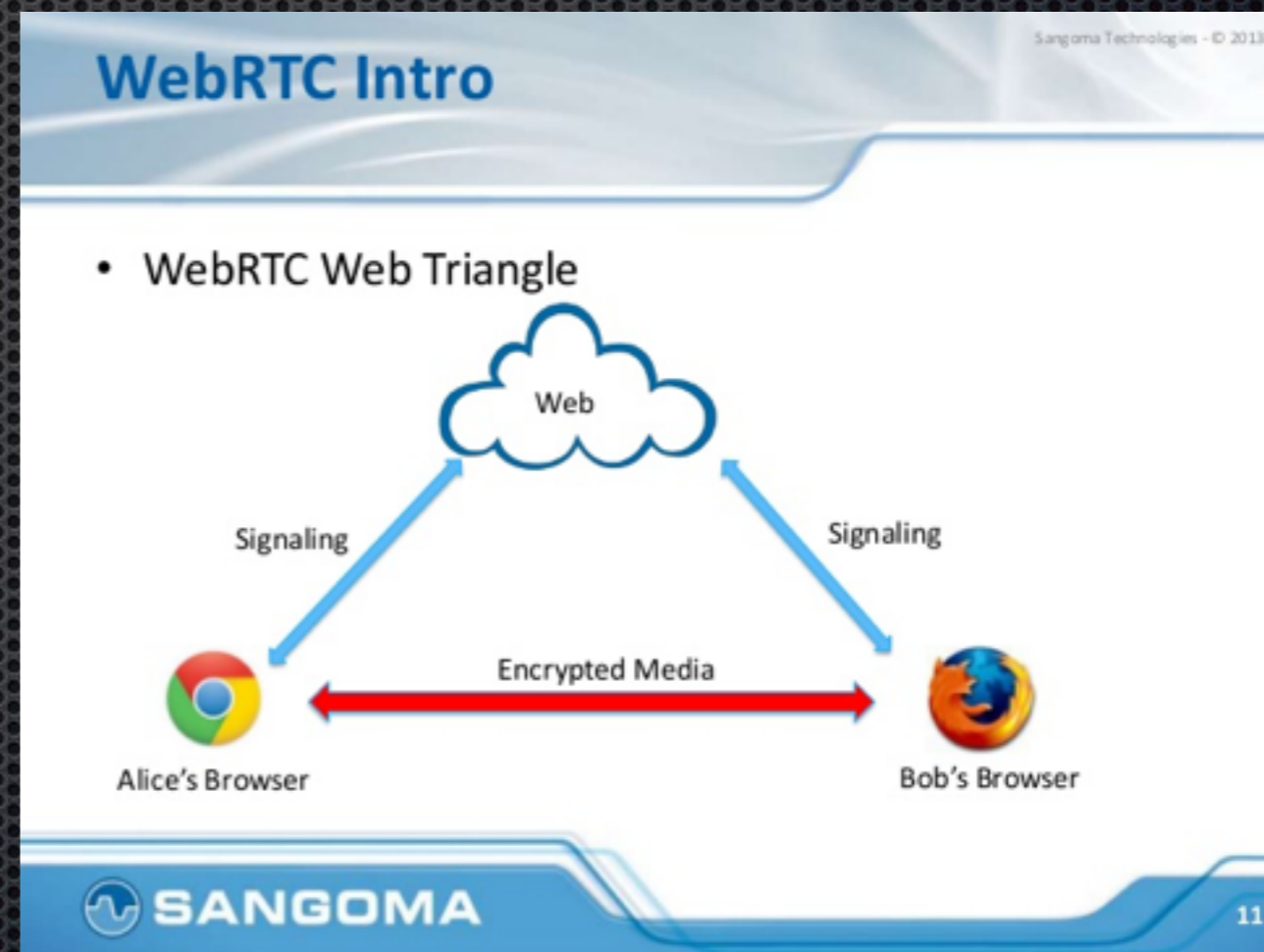
24 July 2015 | Technology



Jeep's Grand Cherokee is one of the recalled cars

Latency due to server round-trips

- ✦ Time sensitive media round trips through central servers.
- ✦ Route/act locally if possible (STUN, TURN, ICE)
- ✦ Gives better results in server outages
- ✦ Enhanced privacy



<http://gizmodo.com>



It is amazing how much you miss a simple old light switch when you have to pull out your phone, fumble through a poorly designed app, and then wait half a second for the light to turn on.

@steely_glint - Westhawk Ltd

User Benefits?

- ✦ Best until last...
Users won't use
without a clear benefit.
- ✦ Think about the user first.

Why use VOIP?

There are two major reasons to use VOIP

- Lower Cost
- Increased functionality

Lower Cost

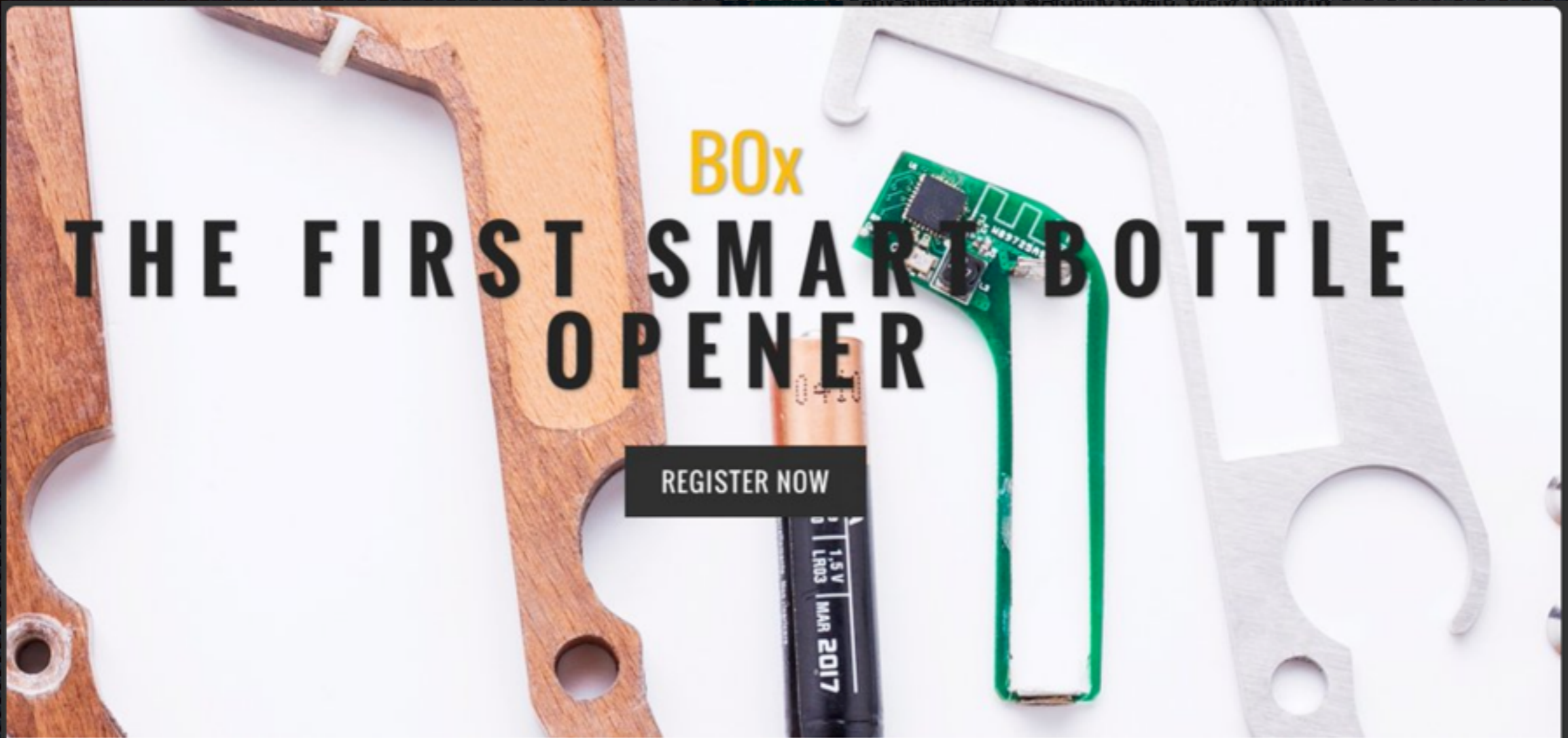
In general phone service via VOIP costs less than equivalent service from traditional sources. This is largely a function of traditional phone services either being monopolies or government entities. There are also some cost savings due to using a single network to carry voice and data. This is especially true when users have existing under-utilized network capacity that they can use for VOIP without any additional costs.

In the most extreme case, users see VOIP phone calls (even international) as FREE. While there is a cost for their Internet service, using VOIP over this service may not involve any extra charges, so the users view the calls as free. There are a number of services that have sprung up to facilitate this type of "free" VOIP call. Examples are: [Free World Dialup](#) and [Skype](#) for a more complete list see: [VOIP Service Providers](#)

Increased Functionality

VOIP makes easy some things that are difficult to impossible with traditional phone networks.

- Incoming phone calls are automatically routed to your VOIP phone where ever you plug it into the network. Take your VOIP phone with you on a trip, and anywhere you connect it to the Internet, you can receive your incoming calls.
- Call center agents using VOIP phones can easily work from anywhere with a good Internet connection.



Internet of Shit @internetofshit · 1m
ban tech people (via @therealnelsonsa)



21



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Pinnacle of VoIP -> WebRTC

- ✦ secure by design
- ✦ P2P
- ✦ web-based
- ✦ realtime
- ✦ voice/video/data
- ✦ in 2bn browser + endpoints
- ✦ open source
- ✦ standard

WebRTC can carry data too.

Proof by example

Live

Synth

- Midi keyboard
- Web-Midi in chrome on mac
- Server in England - at home
- WebRTC chrome data channel (javascript)
- BeagleBone black with yopet.us data channel
- Local (java) app on BeagleBone
- Ledscape (c+PRU) LED driver on BeagleBone
- LEDs

tldr;

Learn from our mistakes.

IoT can use webRTC.

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