

Wi-Fi Cowboys

The Role of WISPs in Africa

I am
Henk

FOUNDER







ZONE

but today...



I'm here as the chairperson of ...



WAPA!

WAPA

=

Wireless
Access
Providers
Association

WAPA stands for Wireless Access Providers Association

a non-profit
industry representative body (IRB)
acting as a collective voice
for independent wireless operators
in South Africa.

(> 90 members with true national reach)

So about Cowboys...



In the same way cowboys move herds of cattle across difficult and unfamiliar terrain

00001011011
1000100000
01001111011
01110011001
0100100000
01010100011
00101011000
01011000110
11010000110
01010111001
0001000000
10011110110
11100110010
1001000000
10001000110



so do WISPs move bytes across difficult and unfamiliar terrain.



Part of the job of Wi-Fi Cowboys is to provide Internet Access to people...

VoIP over Wireless (and Mesh Potatoes)



They build rural community telecommunications networks

Long Distance Links



Haiti

and connect people in far off areas at much greater speed

For a while,
WISPs in South Africa
were ILLEGAL

SA Telecoms Act written
by



SBC (now ATT) bought a share in Telkom and as a condition were empowered to “help” write our old Telecommunications Act

“Public Boundary”

Back then you weren't allowed to bypass Telkom's network in any way, including a legal provision saying that you weren't allowed to communicate across a public boundary.

Community Intercom Systems

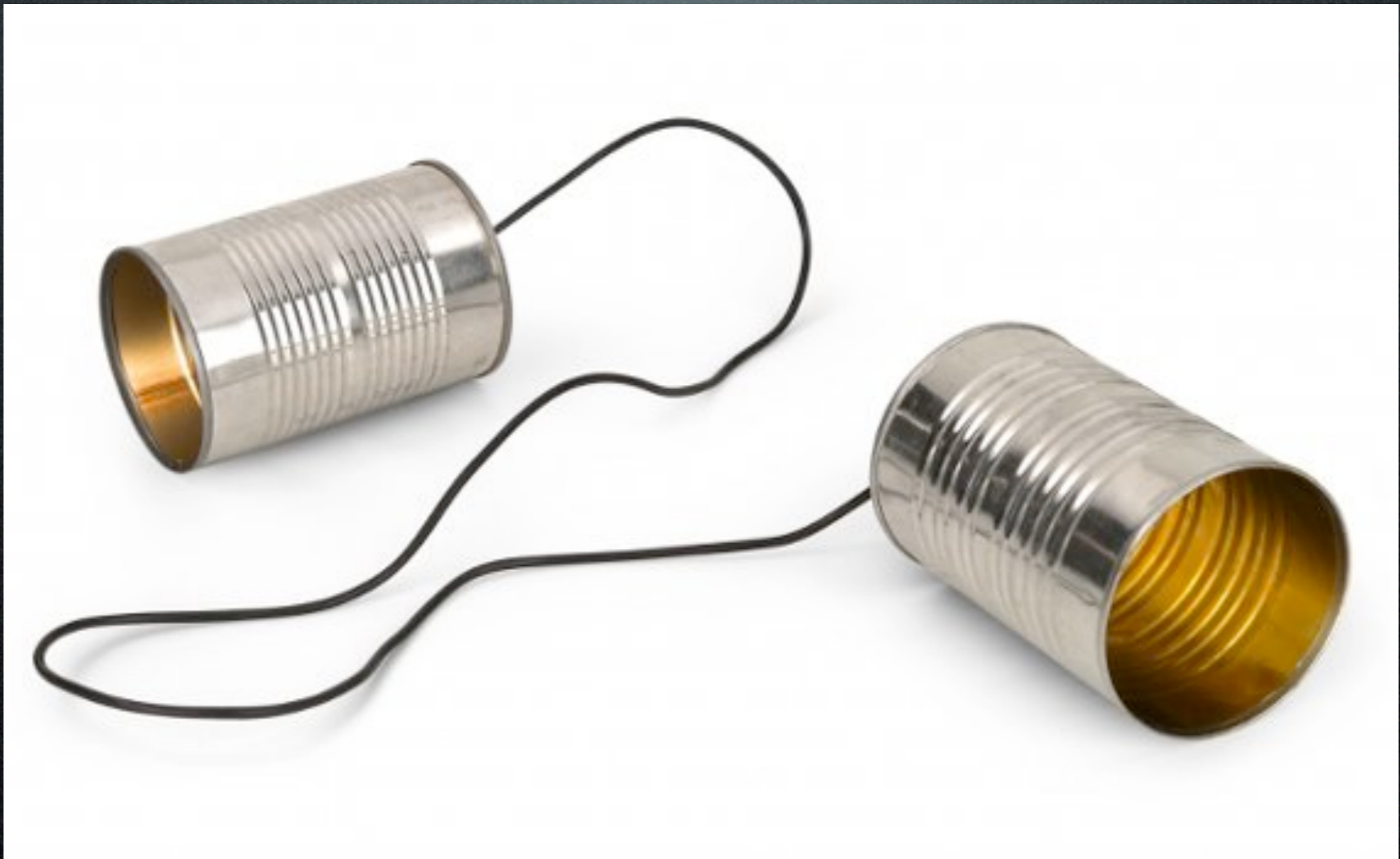
So Community Intercom systems would be illegal. You could have a system on a single property, but couldn't cross a public road or wall.

Walkie Talkies?
No!

Same with Walkie Talkies. One could only use them on a single property.

2 Tin Cans
&
a piece of string

If your kids were to talk to the neighbours kids using 2 tin cans and a piece of string, they would be breaking the law!



Waving at your neighbour...

Taking it one step further, waving at your neighbour would be illegal!



Huh?

We need Good Regulation

Waving is
transmitting data
using light waves
which is simply a form
of
Radio Frequency



Visible light

Low energy

High energy

Frequency (s^{-1})

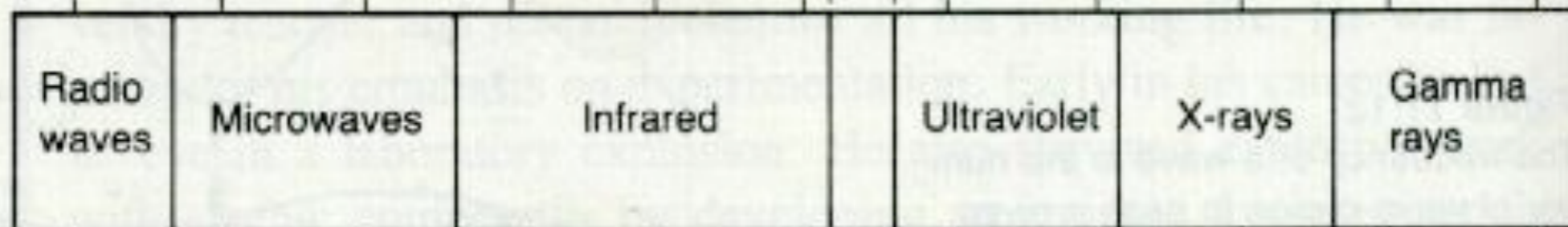
3×10^{10}

3×10^{12}

3×10^{14}

3×10^{16}

3×10^{18}



10^{-1}

10^{-2}

10^{-3}

10^{-4}

10^{-5}

10^{-6}

10^{-7}

10^{-8}

10^{-9}

10^{-10}

10^{-11}

Wavelength (m)

so there was a court case

Things much better today...

Operators can get a licence

and you...



So now you can wave at your neighbours without getting into trouble. (Legally speaking, at least)

“Such hazardous work in isolated conditions also bred a tradition of self-dependence and individualism, with great value put on personal honesty, exemplified in songs and poetry.”

WISPs (the cowboys) do the
work that
Big Telcos can't (won't) do.

For example...

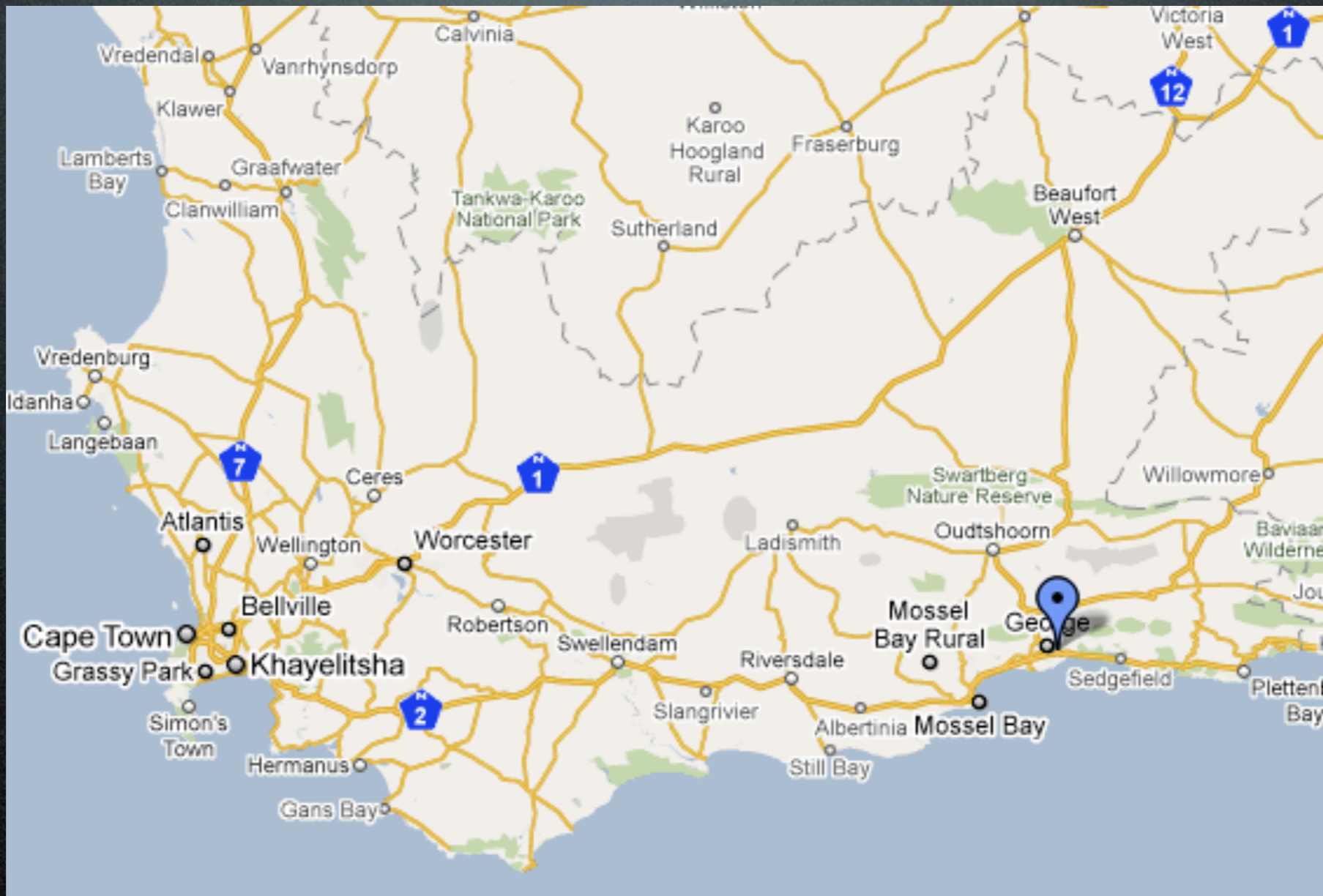
Countless schools!

Countless schools have been connected to each other and the internet by WISPs. More affordable, higher speeds, free VoIP with each other... I feel the Schools example has been used a bit too much lately (because there are so many), so I wanted to talk about some of the lesser known driving practices.

Rugby Sevens Tournament



Computicket set up a temporary office to sell tickets to the Sevens Tournament in George. 3G too slow/unreliable and ADSL would take weeks to install.





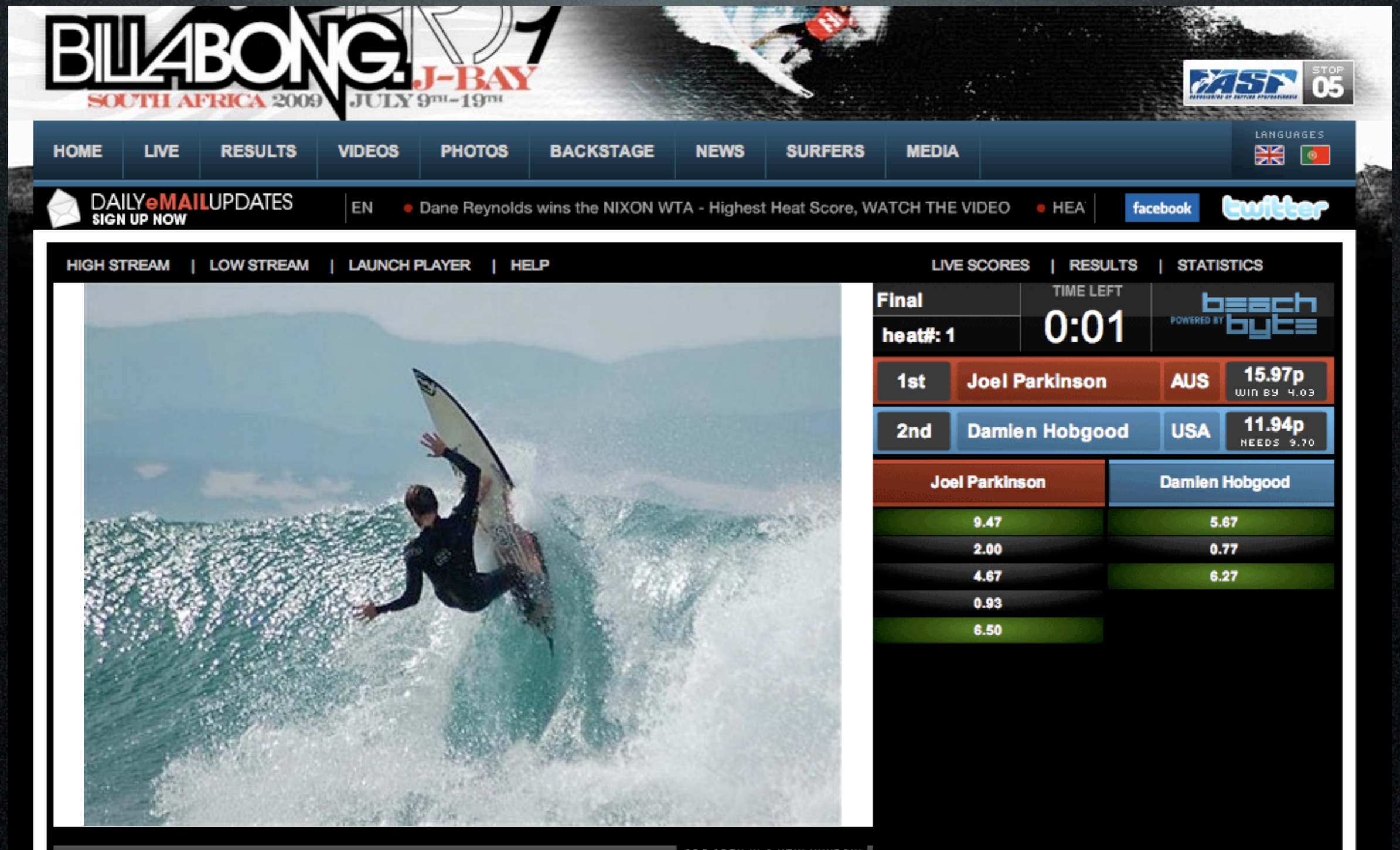
Computicket
the Ticket you can **Trust**

Up the Creek Music Festival



Up the Creek Music festival, remote area, Wi-Fi the only way.
Now, the festival goers might not need internet access, but there is media, band managers etc that are pretty dependent on it.

Billabong Pro Surfing World Contest



The screenshot shows the Billabong Pro Surfing World Contest website. At the top, the event is identified as "BILLABONG J-BAY SOUTH AFRICA 2009" from "JULY 9th-19th". A "STOP 05" indicator is visible in the top right. The navigation menu includes HOME, LIVE, RESULTS, VIDEOS, PHOTOS, BACKSTAGE, NEWS, SURFERS, and MEDIA. A "DAILY eMAIL UPDATES SIGN UP NOW" button is on the left, and social media links for Facebook and Twitter are on the right. The main content area features a live stream of a surfer performing a maneuver on a wave. To the right of the stream is a results table for "Final heat#: 1".

Navigation: HIGH STREAM | LOW STREAM | LAUNCH PLAYER | HELP

Final heat#: 1

TIME LEFT: 0:01

POWERED BY beach byte

Rank	Surfer	Country	Score	Notes
1st	Joel Parkinson	AUS	15.97p	WIN BY 4.03
2nd	Damien Hobgood	USA	11.94p	NEEDS 9.70

Joel Parkinson	Damien Hobgood
9.47	5.67
2.00	0.77
4.67	6.27
0.93	
6.50	

Billabong J-Bay Surf Contest

Telkom had technical problems...

Telkom had technical problems due to the fact that the Diginet lines were too far from the exchange. Within an hour, we provided connectivity via our wireless network for their live video streaming, linking their diginet line from our premise, which was closer to the exchange (for a few days until Telkom replaced old copper). In the end, wireless bridged the gap for this important international event & saved the day! If it wasn't for wireless, millions of surfing fans would have missed the first few days of the webcast...

Wedding in the Breede River Valley

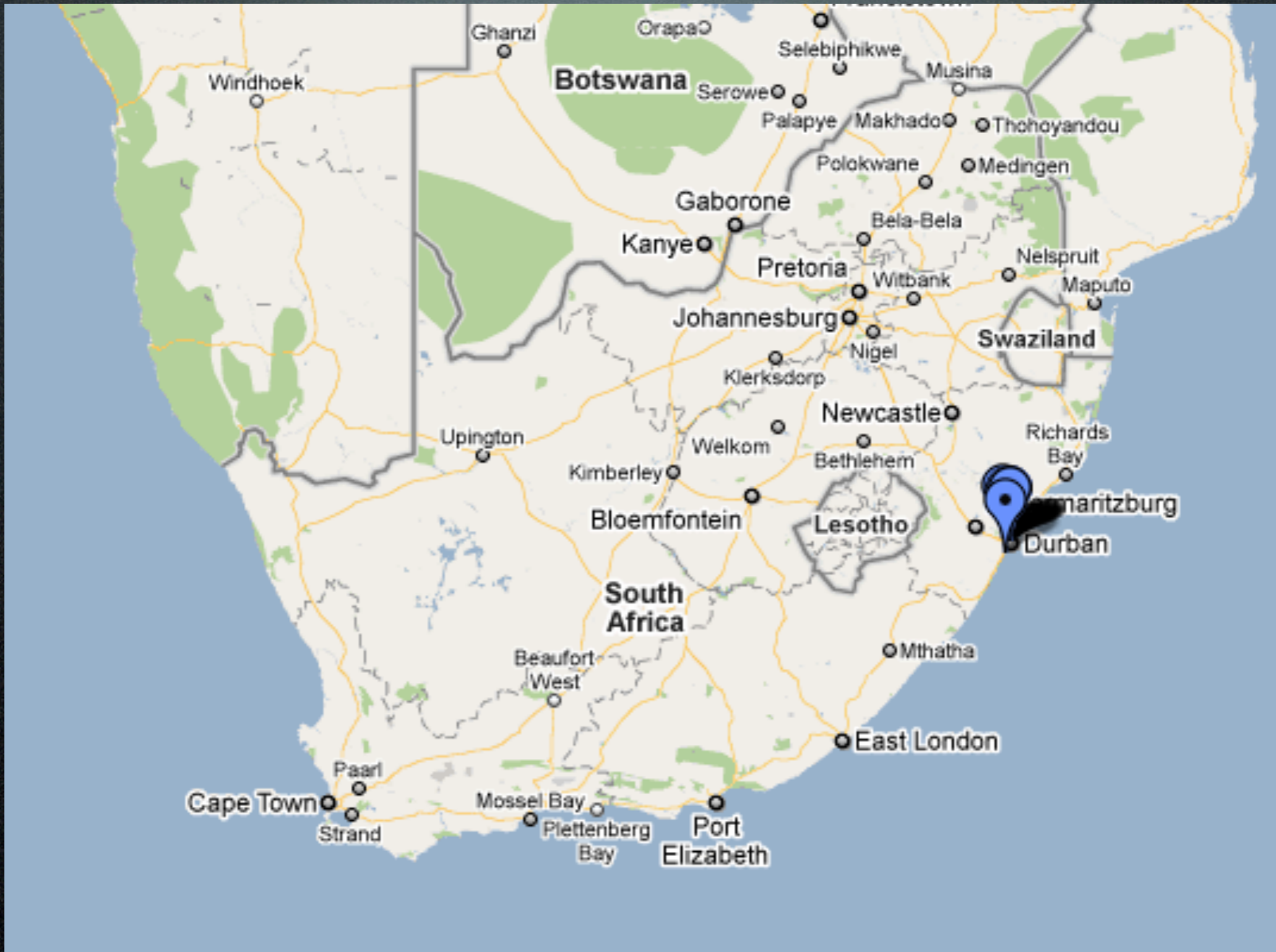


A family member who was terminally ill was not able to attend. The wedding was held on a farm 20 km from the nearest town.



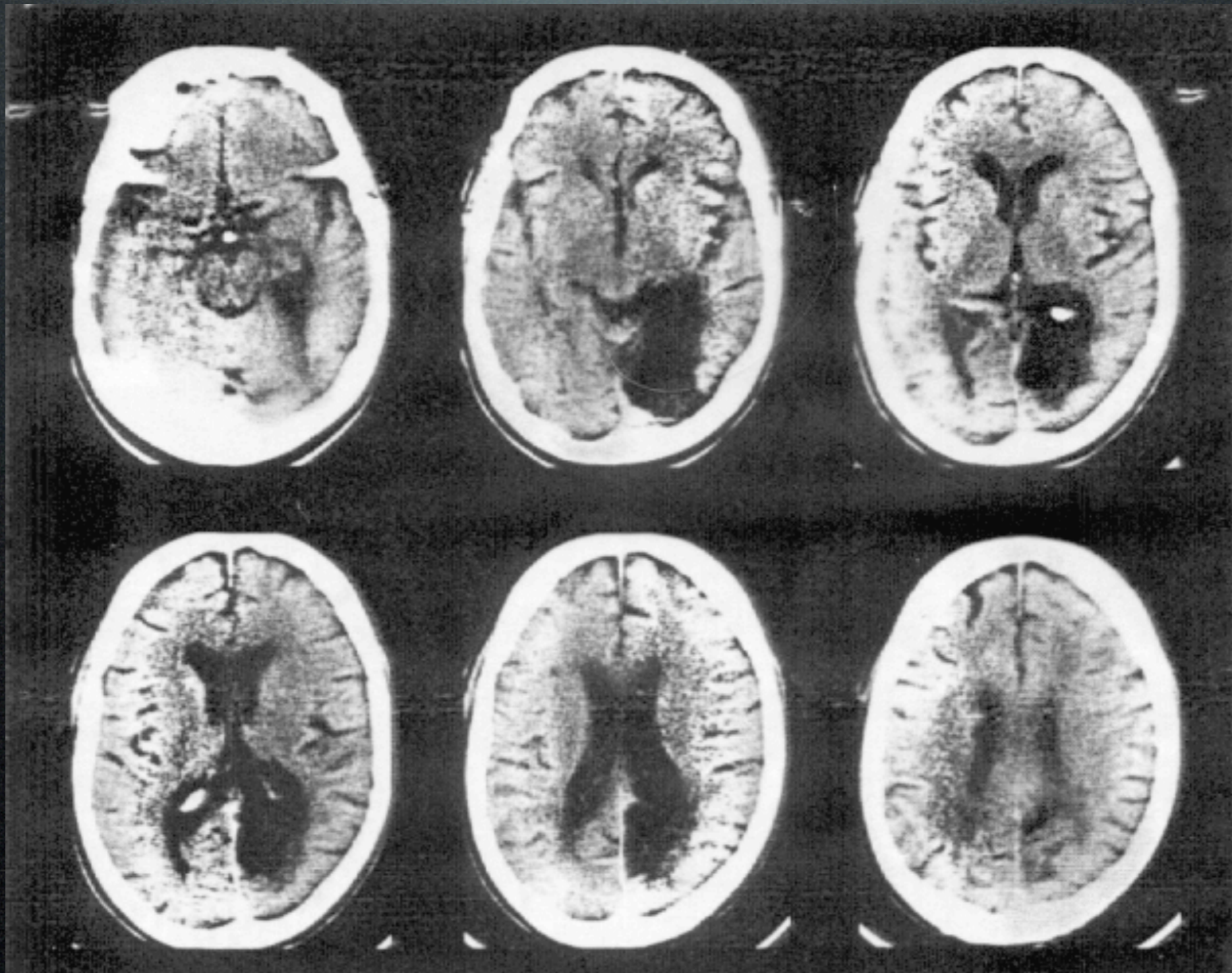
A WAPA member set up a 20 km wireless link which enabled a 2 way Skype conversation AND a live uStream to all their friends around the world.

Lake Smit & Partners
Radiology Experts





CAT Scans
as big as 1GB
needs to reach
a referring doctor within 10
minutes



Forget HSPA

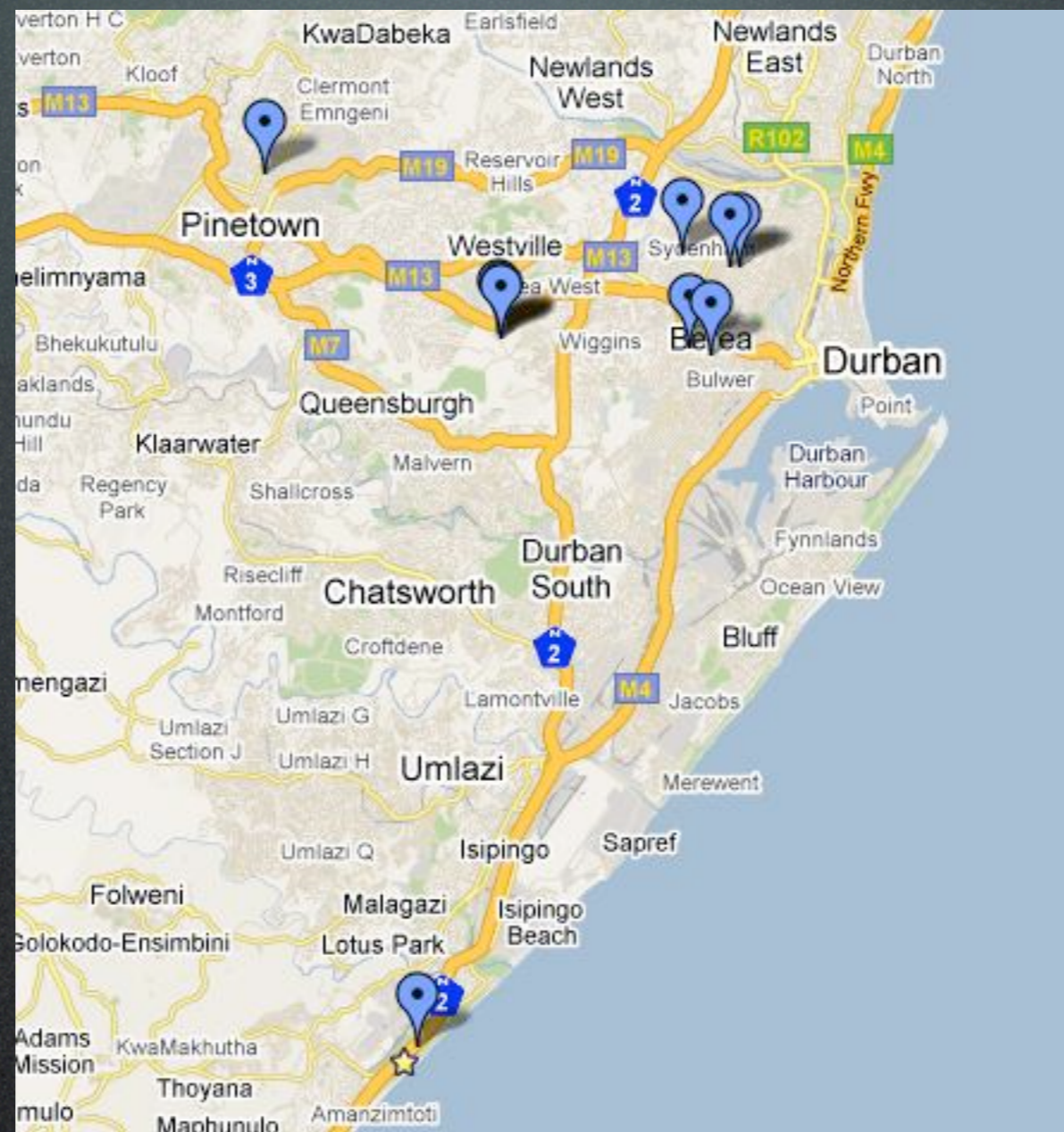
18 min theoretical at 7.2 mbps
(but more like 6 hours if you're
lucky)

Forget ADSL

33 min

ADSL will take 33 min if using a 4 Mbps link running at full speed. (Typically you'll only get about 3.5 max). Furthermore, ADSL is a Best Effort service, which means there's no guarantee that you'll get any speed out of it. Then, you have to battle with contention ratios.

Let's try Wi-Fi



100 Mbps

That's
114 seconds

!

Wow!

1 GB file
in less than
2 minutes



Double Wow!

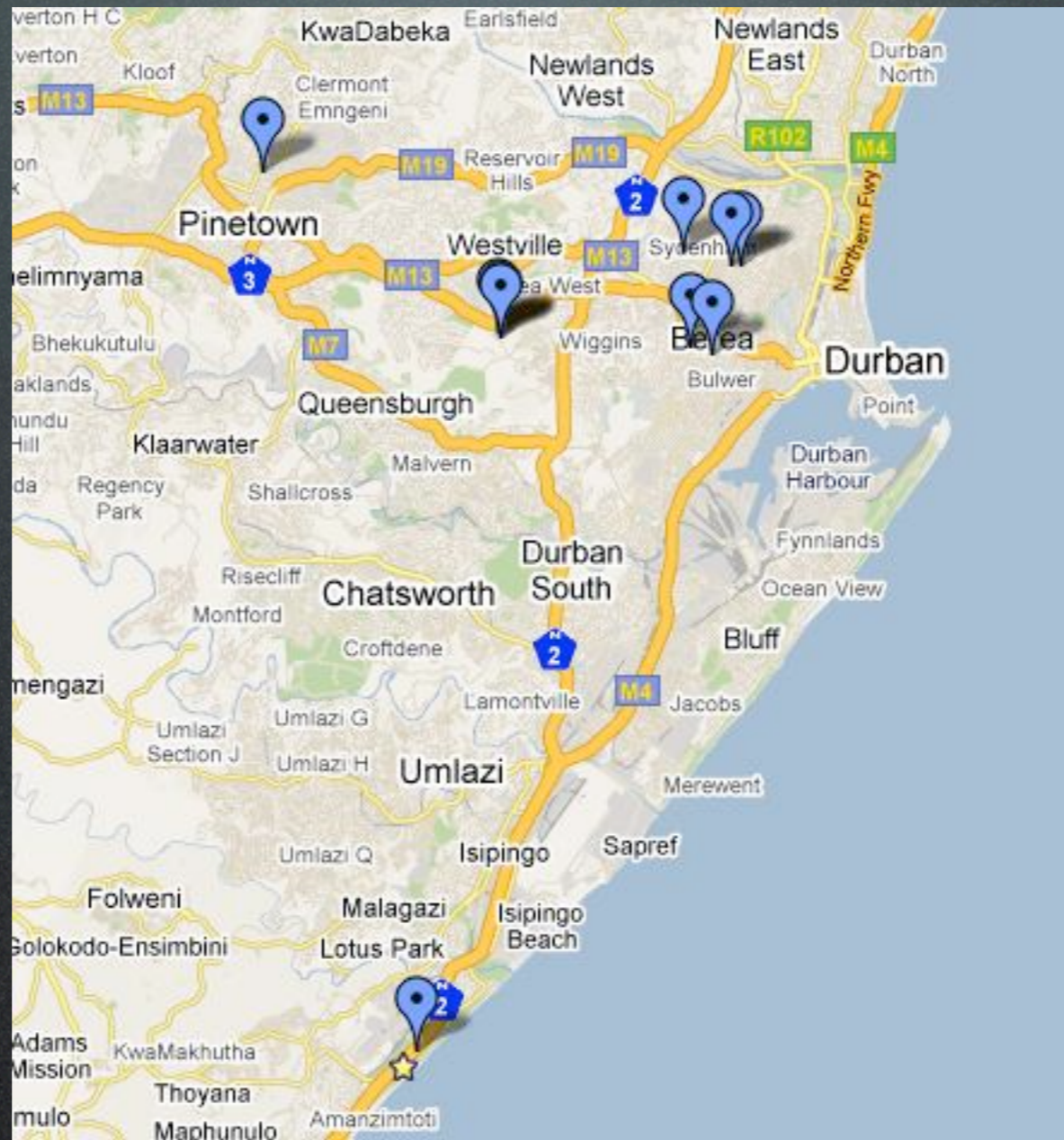
Other ways to achieve that?

Yes!
with Fibre

Cost?

R.350 per meter

20 km link



$$\begin{aligned} & R350 \text{ pm} \\ & \times 1000 \\ & \times 20 \\ & = R7,000,000 \end{aligned}$$

Wireless?

Wireless?
± R20,000

WISPs need your support

Cowboys are NOT

Gunslingers



Cowboys
LIKE
rules!

GENE AUTRY'S COWBOY CODE

1. The Cowboy must never shoot first, hit a smaller man, or take unfair advantage.
2. He must never go back on his word, or a trust confided in him.
3. He must always tell the truth.
4. He must be gentle with children, the elderly, and animals.
5. He must not advocate or possess racially or religiously intolerant ideas.
6. He must help people in distress.
7. He must be a good worker.
8. He must keep himself clean in thought, speech, action, and personal habits.
9. He must respect women, parents, and his nation's laws.
10. The Cowboy is a patriot.

Gene Autry

All WAPA members
are ICASA licensed
(ECS & ECNS)
and adhere to the
WAPA Code of Conduct

We pay licence fees
&
USAF contributions
&
actively contribute to
community projects
(because that's what geeks are
like)

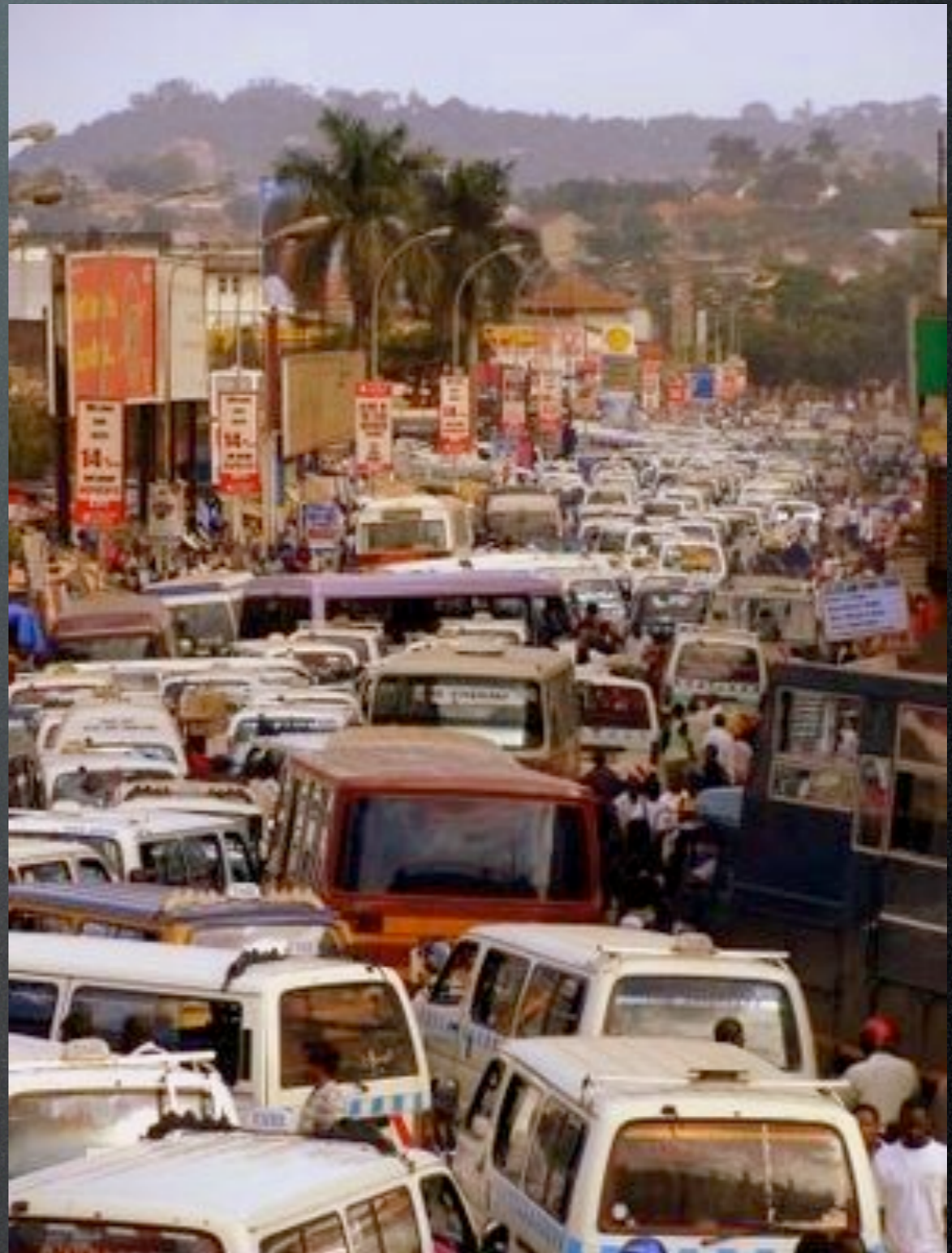
So we like rules

but

but NOT
bad rules



No Rules
=
Congestion



Light Licensing

a set of

GOOD rules

that

WISPs

can and want to

abide by

(and maybe even self-regulate)

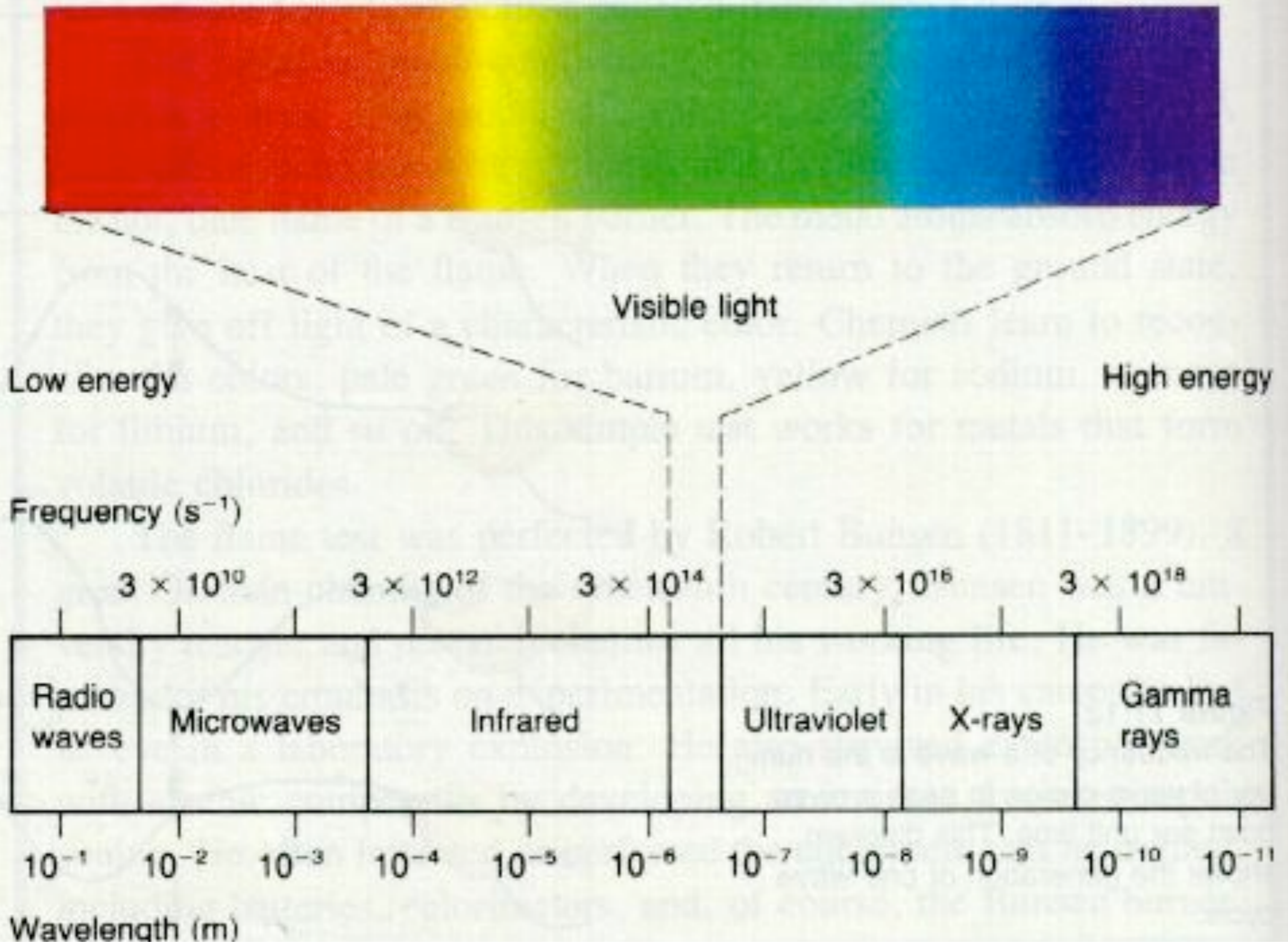


You'll probably still need a sheriff. But you won't need many. Enforcement of good rules is cheap. It's in everybody's favour

Light Licensing

So where does Light Licensing feature? Current paradigm is that the sheriff has to do everything. Also known as the “Command and Control” paradigm.

What is “Spectrum”?



Visible light is simply a form of Electromagnetic Frequency. It's the same with radio waves. Humans can only see a small part of the Electromagnetic Frequency band.



Imagine having 10 Morse code lamps on a hilltop. If they are all the same colour, you won't be able to distinguish between them.

What if everyone used
morse code with lamps?

History

Spectrum Commons

(1968 article by Garrett Hardin
re: “tragedy of the commons”)

He asserts that even though the contribution of each "bad actor" may be minute, if summed over all bad actors the resource could be degraded to the point of uselessness

Spectrum Property Rights Model
(i.e. treat spectrum like land)

First proposed in 1951 by Leo Herzel
Championed in 1959 Ronald Coase
(Nobel economist) in 1959

When Ronald Coase first
presented his vision to the FCC,
they asked:

“Is this some kind of joke?”

E-band Light Licensing in the US

\$75 for 10 years, automated process that takes 15 seconds

- ☒ The database manager assigns a time and date stamp to the application
- ☒ An automated interference analysis is conducted against other closely located links
- ☒ A check is made to ensure the link does not interfere with any of the three specific FCC imposed rules; risk of international cross border transmission, proximity to radio astronomy quiet zones, or violation of special antenna rules.
- ☒ Finally, system parameters are passed to the NTIA for final interference analysis against undisclosed military and government links in the area

Assuming no problems are encountered, this completely automated procedure takes 15 seconds!

Link registrations are \$75 for the duration of the license (10 yrs).

If there is an issue with the license application, the user is advised to manually file a registration with the FCC.

E-Band Light Licensing in the UK

Currently a manual process and is administered by Ofcom; however they are currently developing a web based tool to automate the entire process.

The applicant must first apply to Ofcom to become a nationwide licensee.

The annual fee is £50 per year and turn around time is 7 days.

The main difference between the UK and the US is that the UK does not perform an interference analysis.

2.4 GHz & 5.x GHz “Light Touch” Licensing in Bahrain

The Telecommunications Law in Bahrain does not make provision for license exempt frequencies. Every owner or operator of WiFi hotspot or WLAN equipment must therefore apply for a frequency license in compliance with the Telecommunications Law.

The “light touch” license regime allows for a simple online application for users. No service fee is charged and following the online application the applicant would be deemed to be granted a license unless the Authority notifies the person that the application has been rejected within 14 days of the application.

802.11y
3650 - 3700 MHz

In June 2007 the [FCC](#) issued final rules for a novel "lite licensing" scheme in the 3650-3700 MHz band. Licensees pay a small fee for a nation wide, non-exclusive license. They then pay an additional nominal fee for each high powered base station that they deploy. Neither the client devices (which may be fixed or mobile), nor their operators require a license, but these devices must receive an enabling signal from a licensed base station before transmitting.

When industry considers itself indispensably a part of the regulatory system it will be more committed to seeing that regulation succeed because it is necessarily in its own interest to make the system work.

Self-regulation is also a faster way of dealing with apparent breaches of the rules than going to law. It is also much more 'user friendly' being readily accessible, predominantly informal and at minimum cost to its users. Even where a statutory regulator can offer the same consumer access, a self-regulatory system is able to judge in accordance with the spirit of the rules and, being non-statutory, self-regulation is well-placed to respond with the flexibility needed in a fast-changing world such as that of wireless industry over which WAPA presides.

Contracting out the management of the allocated spectrum provides the benefits of specialisation through empowering a dedicated and expert body with a responsibility for which it is uniquely suited instead of requiring the national regulator, with many other responsibilities, to focus on activities which an existing self-regulatory body may already have developed expertise.

In Conclusion

Today,
Wi-Fi

is the only practical solution
for certain applications

Great for Last Mile

(but WiMax, 3G, LTE, ADSL also good,
sometimes better)

Wi-Fi is a great way to do Last Mile connectivity

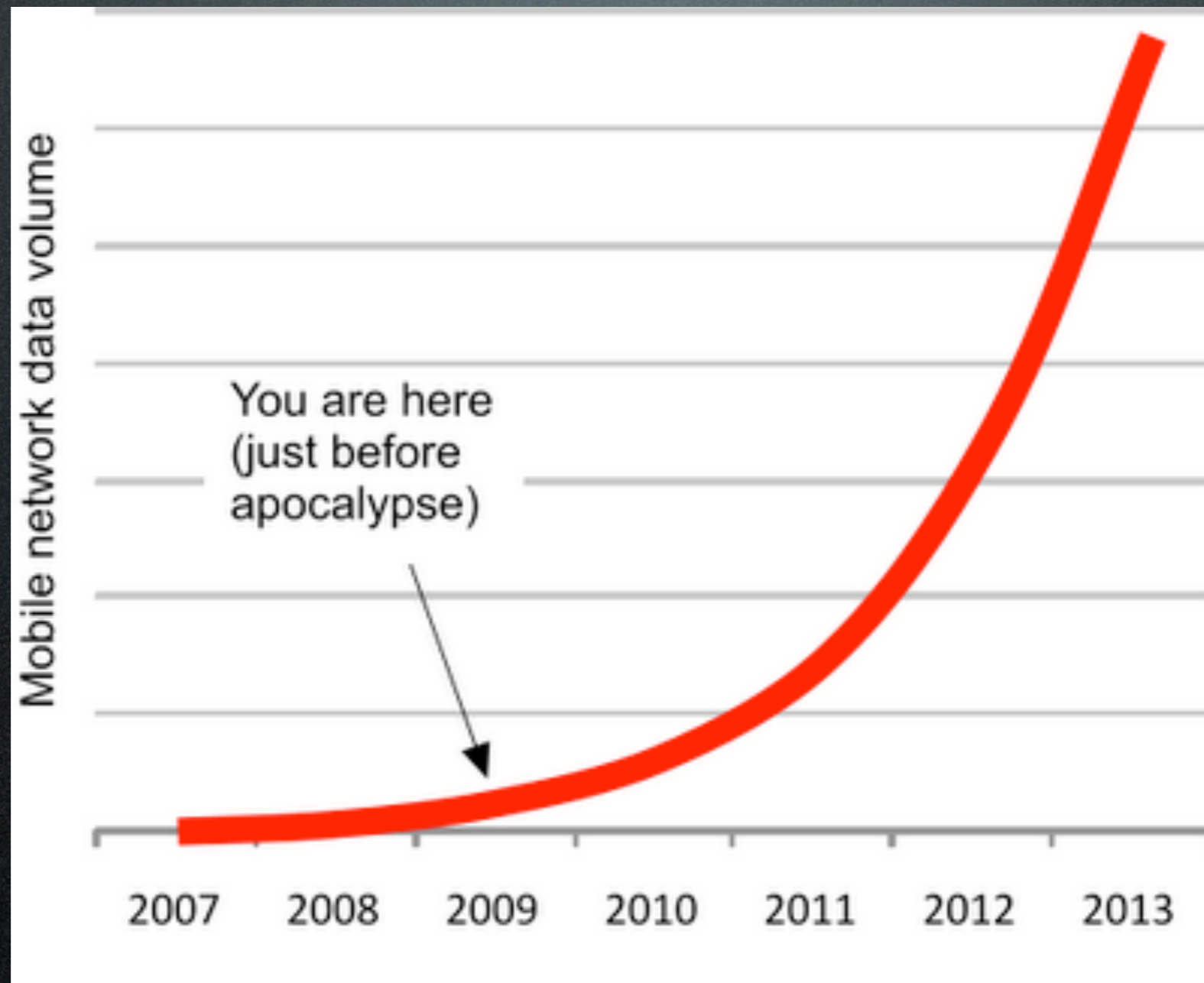
only good way for
Last Yard

Wi-Fi is the only good way for Last Yard



It is unnecessary to wire a Telkom line into each apartment, when you can run a single fibre or copper line into the building, then use Wi-Fi to connect everyone (to the net, VoIP service, intercom system) inside the building

Mobile Data Apocalypse



<http://tinyurl.com/mobiledataapocalypse>

“Big players are only interested in density and scale - and many city-bound networks have little grasp of last-mile connectivity into rural areas. WISPS build local relationships, and these relationships are the only way to succeed in rural areas.”

Goals

1. Spectrum
2. Marketing
3. Compliance
4. Training
5. Business Enabling

We need Good Regulation

WAPA's 3 Magic Bullets:

1. National Reach
2. Local Relationships
3. Technical Expertise



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