HFA

GRAVELROAD
thinking beyond consulting

Building Reliable Wireless Broadband

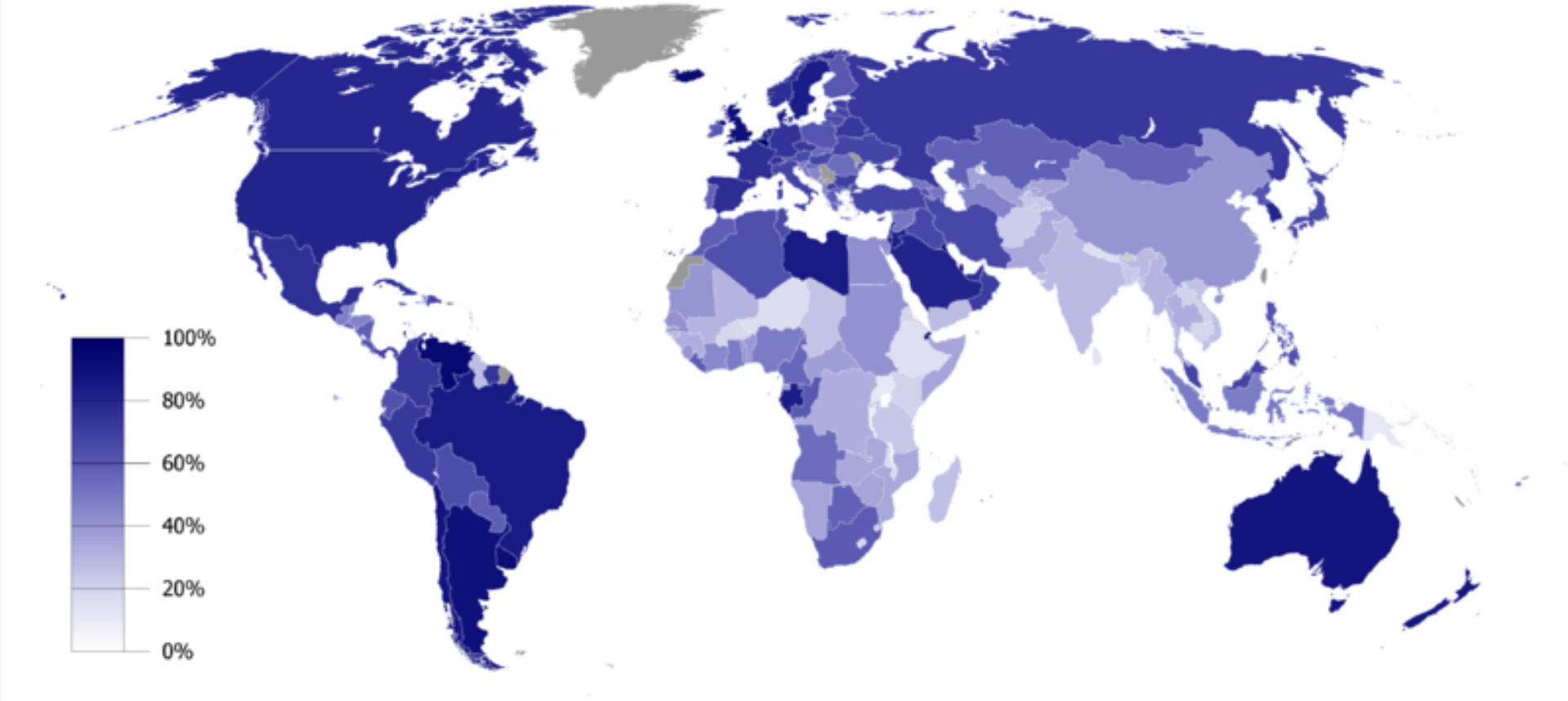
In regard to…

- Fixed wireless access
- Not cellular
- Not nomadic access
- Low cost

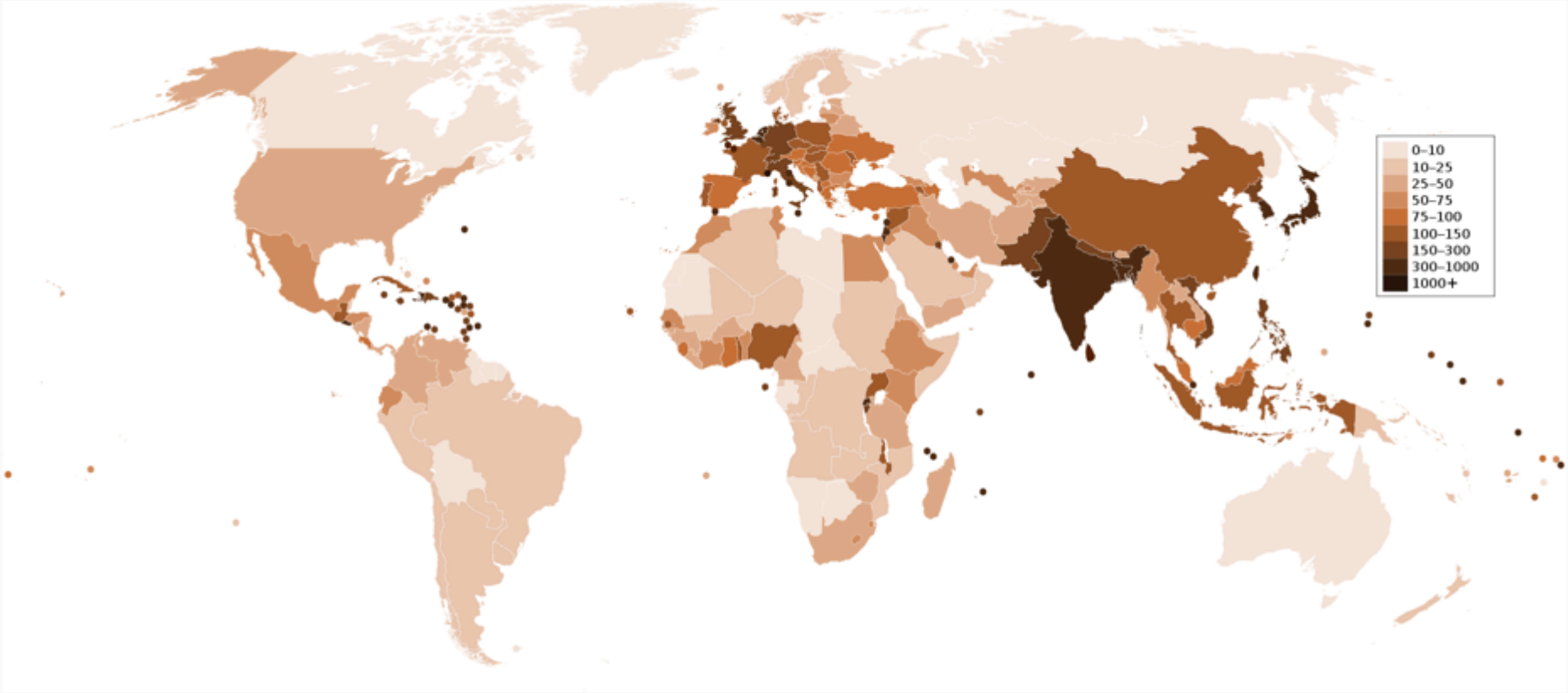
THE MARKET

New Zealand is Highly Urbanised

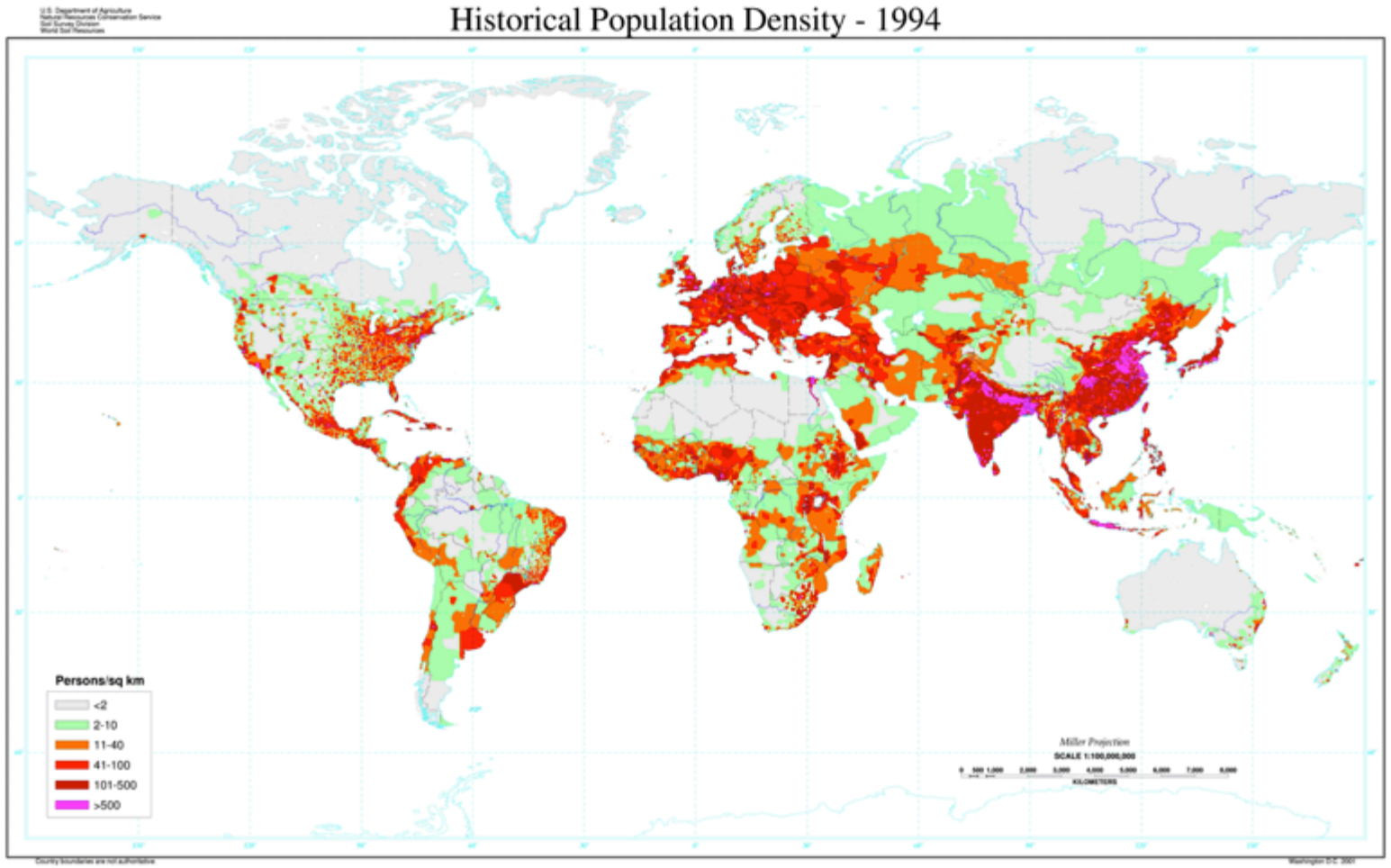
- One of the most urbanised countries in the world – 4th in the OECD



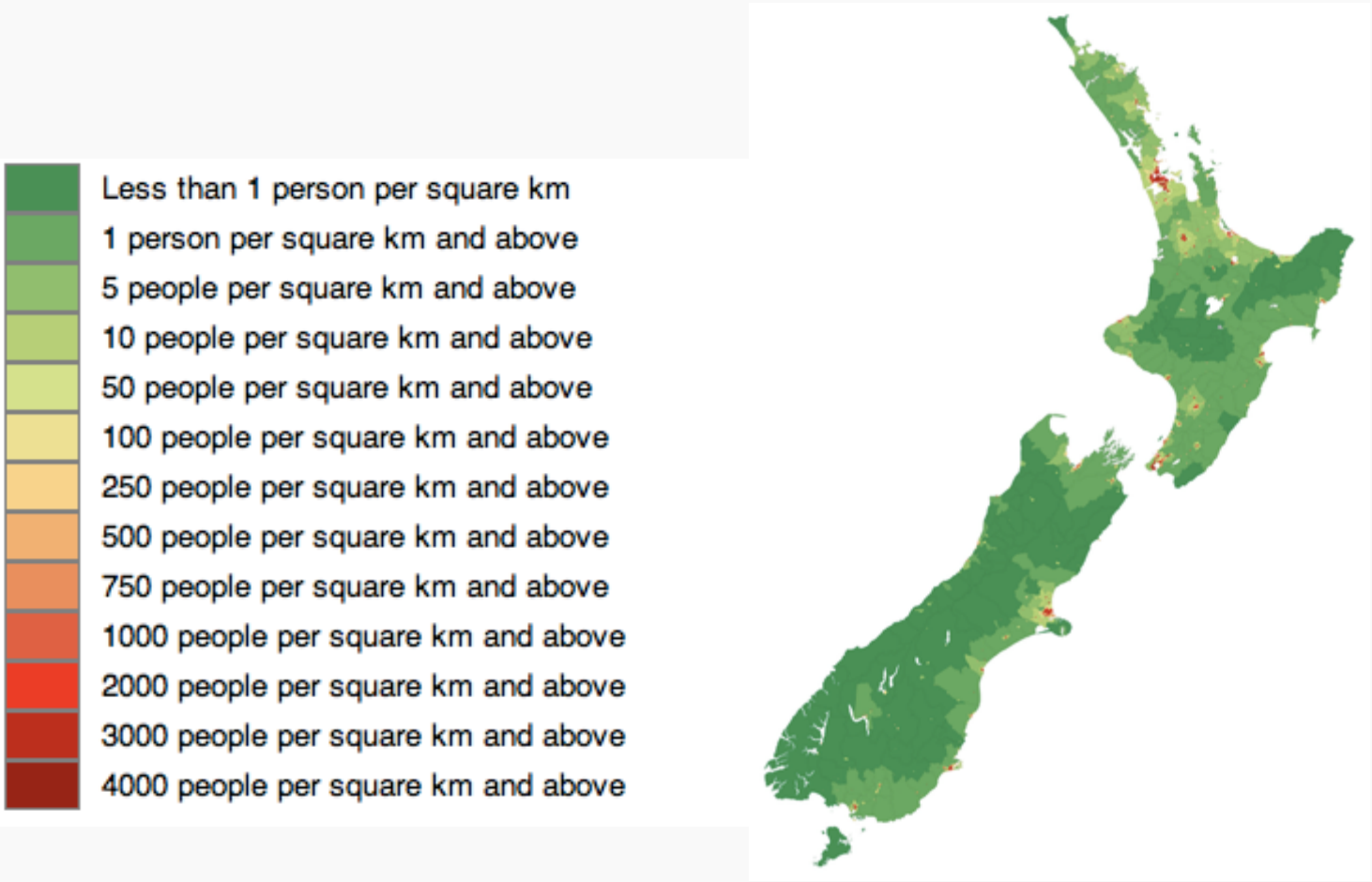
Low Population Density



Low Population Density



Low Population Density



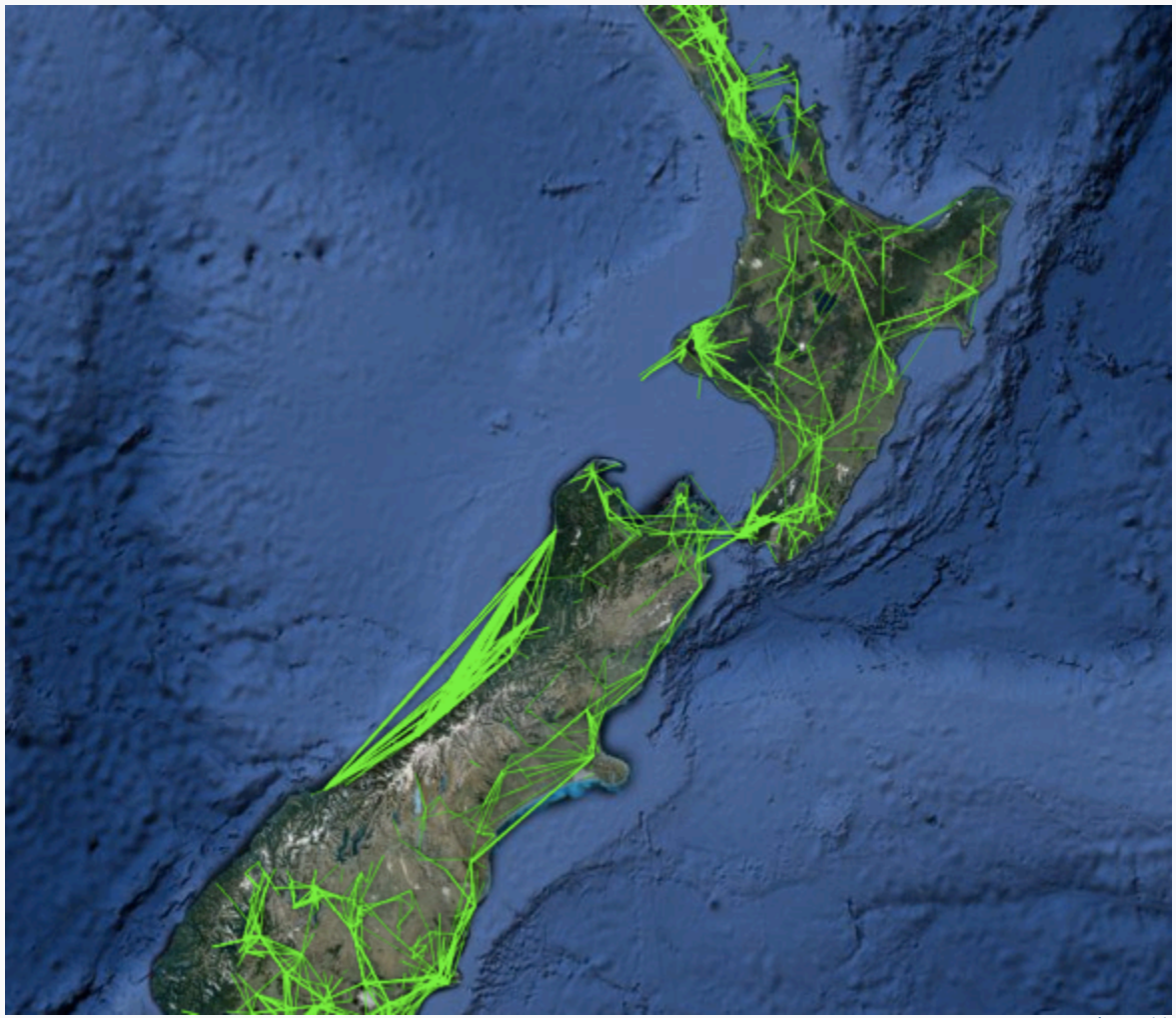
http://en.wikipedia.org/wiki/File:NewZealandPopulationDensity.png

Rural Areas Very Important to the Economy

	2009	2004
Main export commodities	$(million)	
Milk powder, butter, and cheese	8,970	5,115
Meat and edible offal	5,526	4,479
Logs, wood, and wood articles	2,330	2,071
Crude oil	1,964	318
Mechanical machinery and equipment	1,842	1,470
Fruit	1,611	1,254
Fish, crustaceans, and molluscs	1,302	1,111
Aluminium and aluminium articles	1,102	1,008
Total – all commodities	**43,028**	**29,864**
Main destinations		
Australia	9,717	6,332
United States	4,808	4,297
Japan	3,373	3,283
China, People's Republic of	3,359	1,617
United Kingdom	1,757	1,449
Total – all countries	**43,028**	**29,864**

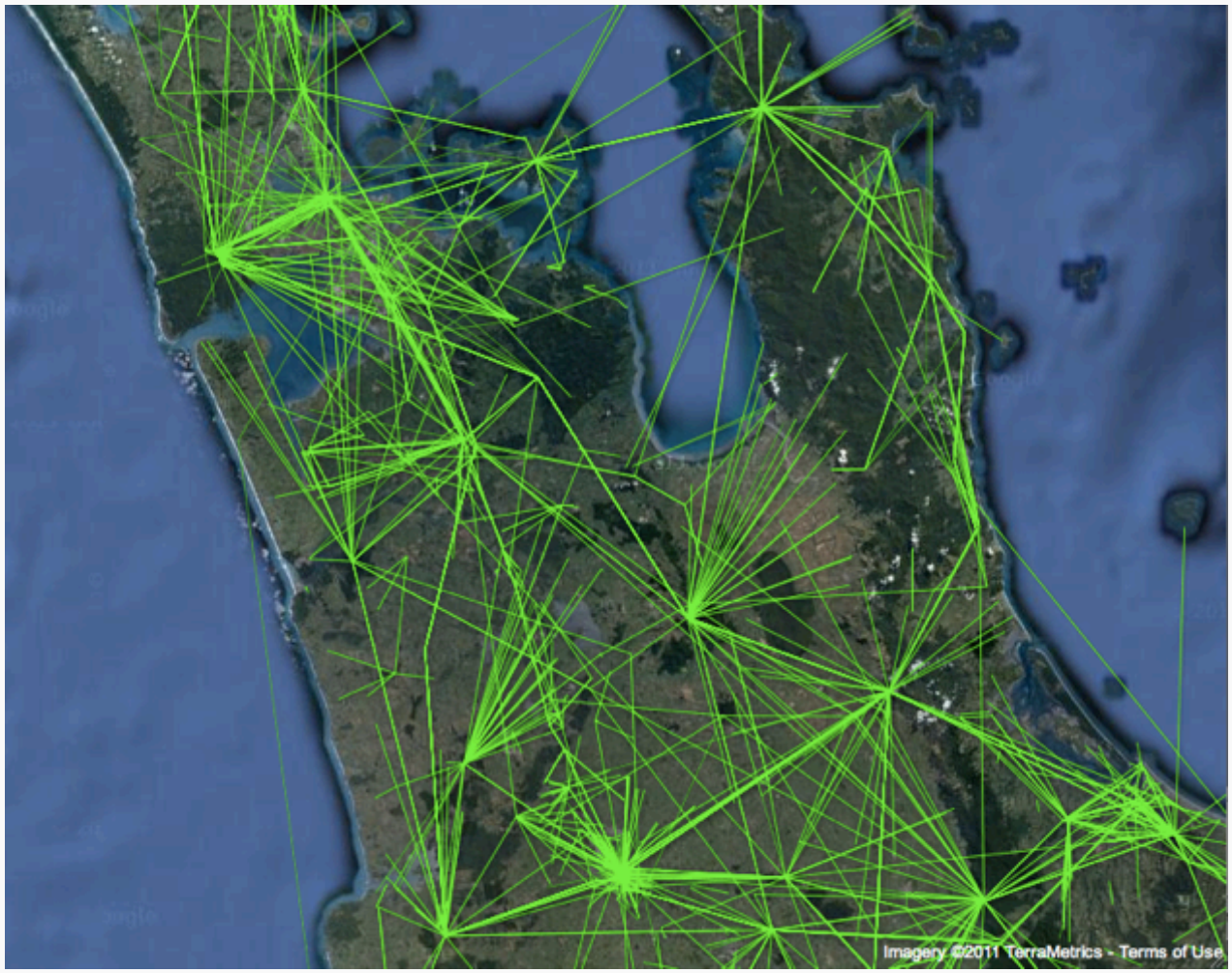
NEW ZEALAND HAS A BIT OF WIRELESS

Licensed Point to Point Links



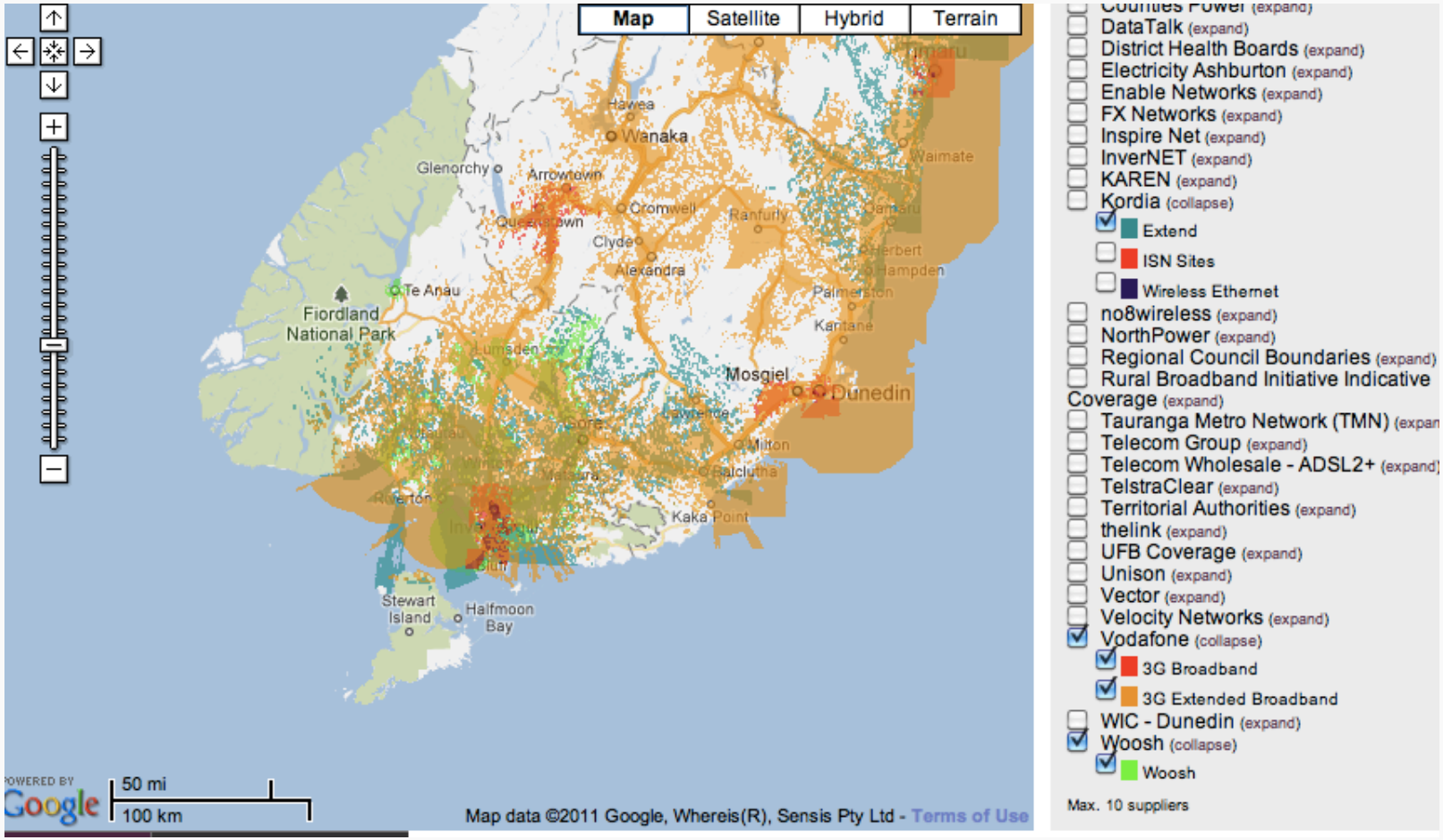
http://markhansen.co.nz/nz-wireless-map/

Licensed Point to Point Links



http://markhansen.co.nz/nz-wireless-map/

Access Networks

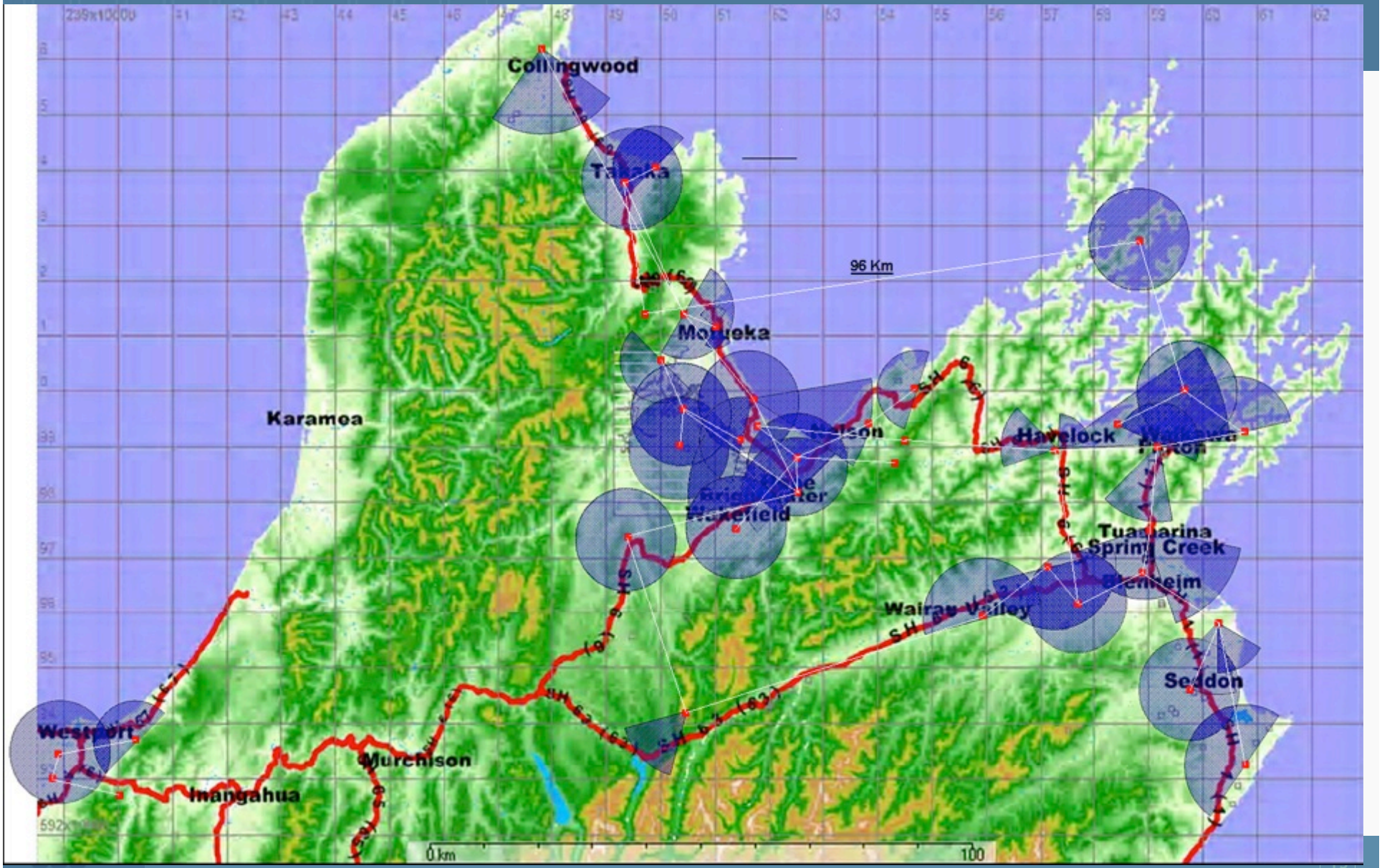


http://broadbandmap.govt.nz

GRAVELROAD
thinking beyond consulting

HTTP://BROADBANDMAP.GOVT.NZ

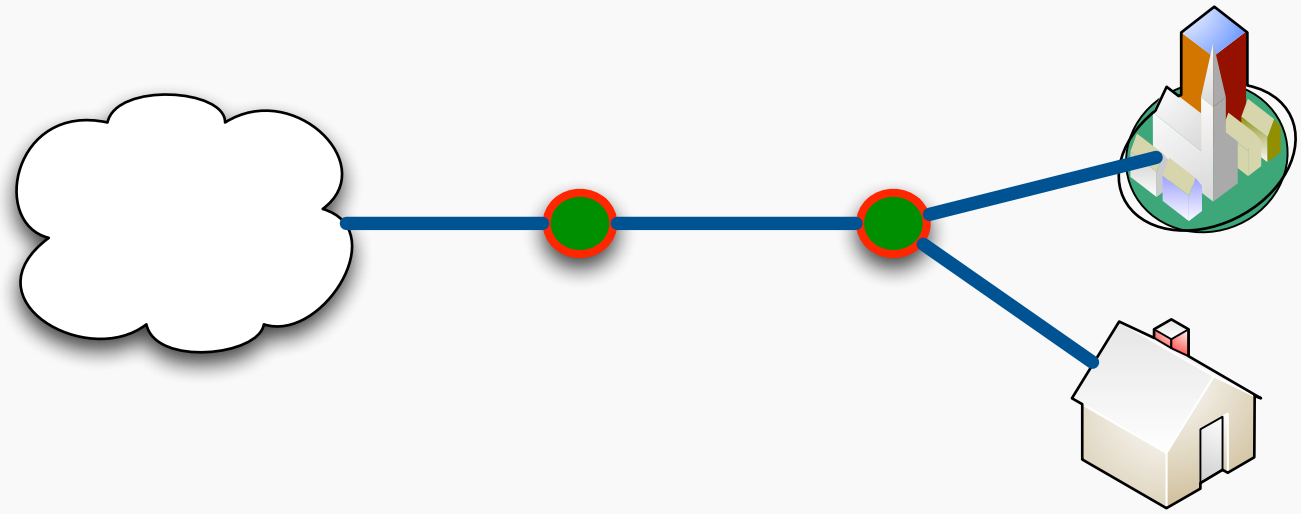
Access Networks



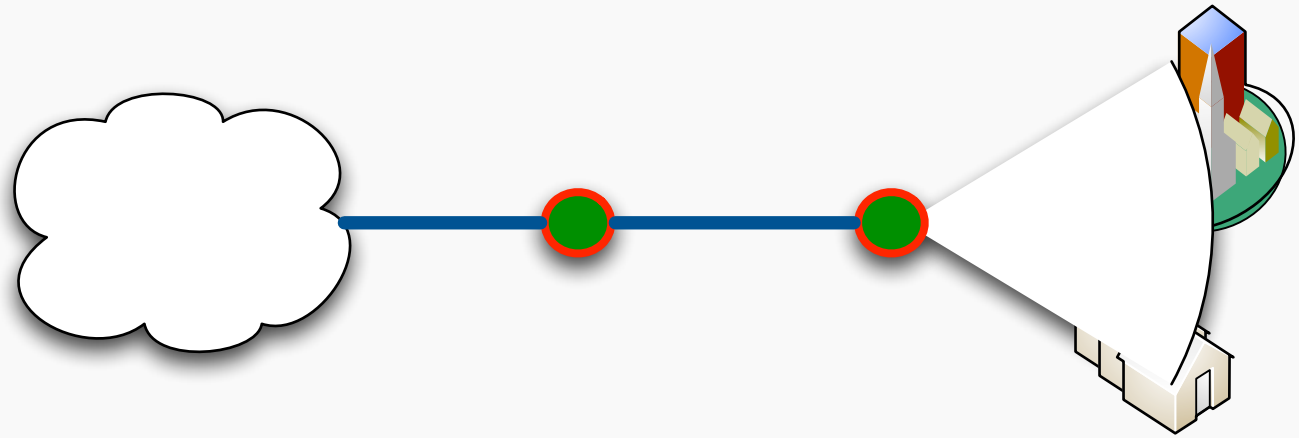
ACCESS MODELS

Bespoke Point to Point

Dedicated Access Layer

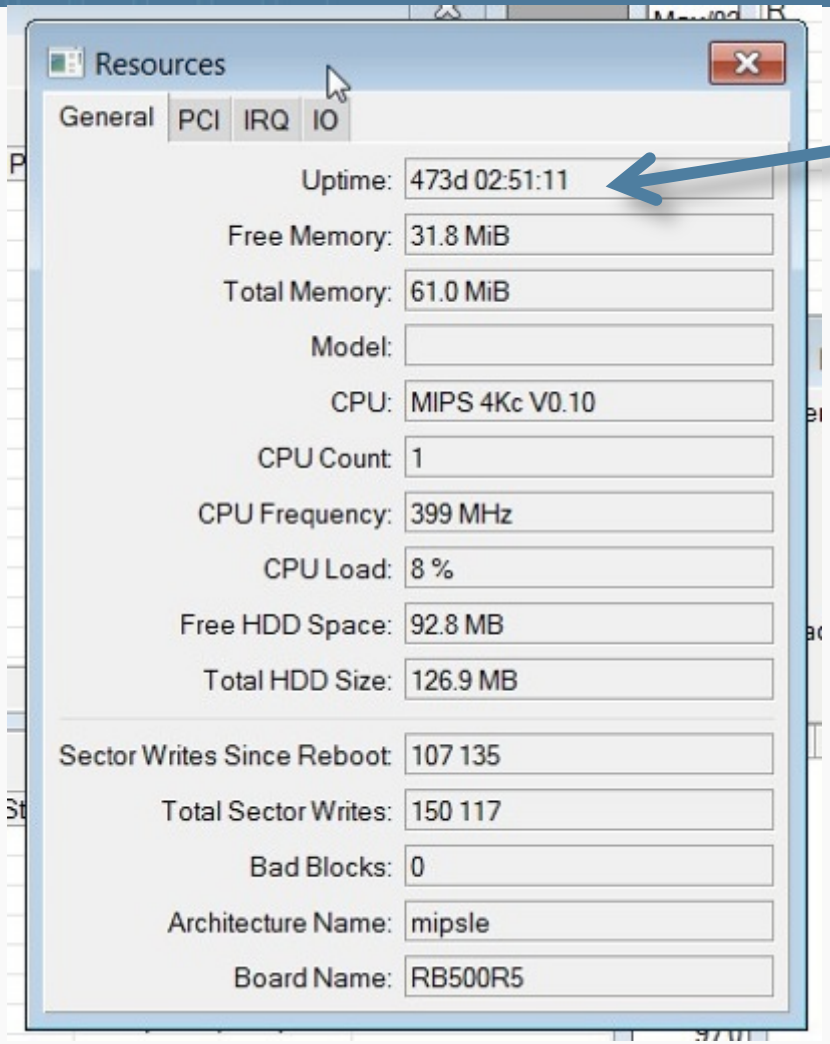


Shared Access Layer



RELIABILITY

Wireless Can Be Very Reliable



473 Days Uptime

It’s All About Reliability

- Uptime
- Predictable performance
  - Bandwidth
  - Latency
  - Jitter

With reliability, applications work.

And…real world example

- ThePacific.Net
- 45 sites
- Furthest site 6 hours from base
- No on staff “outdoor guy”
- Maintenance scheduled once a year

Some Guidelines

- Environment – know it
- Structural and mechanical do not underestimate its importance
- Power – get it right
- Cables, connectors and earthing – its the little things.
- Standardise design
- Plan and plan some more
- Good RF decisions
- Maintain

All of these support Layer2+ networks, they enable the deployment of Internet

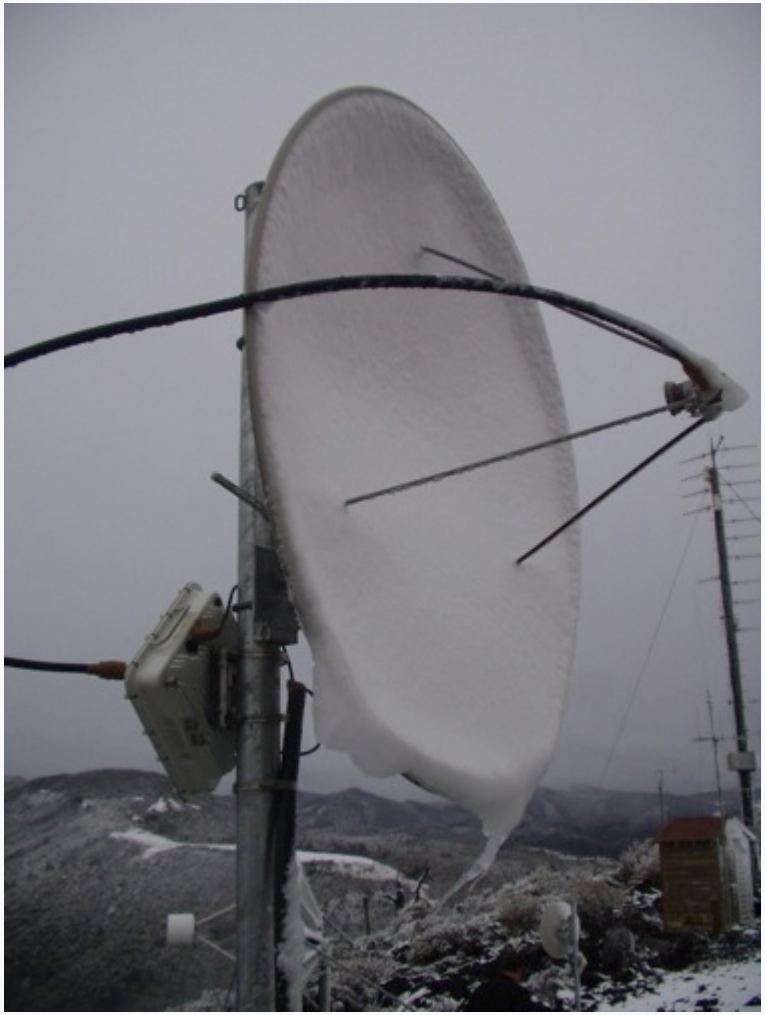
ENVIRONMENT

Environment

GRAVELROAD

thinking beyond consulting

Winter 2004



Environment

GRAVELROAD
thinking beyond consulting

Environment

GRAVELROAD
thinking beyond consulting

Environment

GRAVELROAD
thinking beyond consulting

Environment

Environment

GRAVELROAD

thinking beyond consulting

Environment

Some Guidelines

- Environment – know it
- Structural and mechanical do not underestimate its importance
- Power – get it right
- Cables, connectors and earthing – its the little things.
- Standardise design
- Plan and plan some more
- Good RF decisions
- Maintain

All of these support Layer2+ networks, they enable the deployment of Internet

STRUCTURAL

GRAVELROAD
thinking beyond consulting

Structural

Structural

GRAVELROAD

thinking beyond consulting

Structural

GRAVELROAD

thinking beyond consulting

Structural

Structural

Some Guidelines

- Environment – know it
- Structural and mechanical do not underestimate its importance
- Power – get it right
- Cables, connectors and earthing – its the little things.
- Standardise design
- Plan and plan some more
- Good RF decisions
- Maintain

All of these support Layer2+ networks, they enable the deployment of Internet

POWER

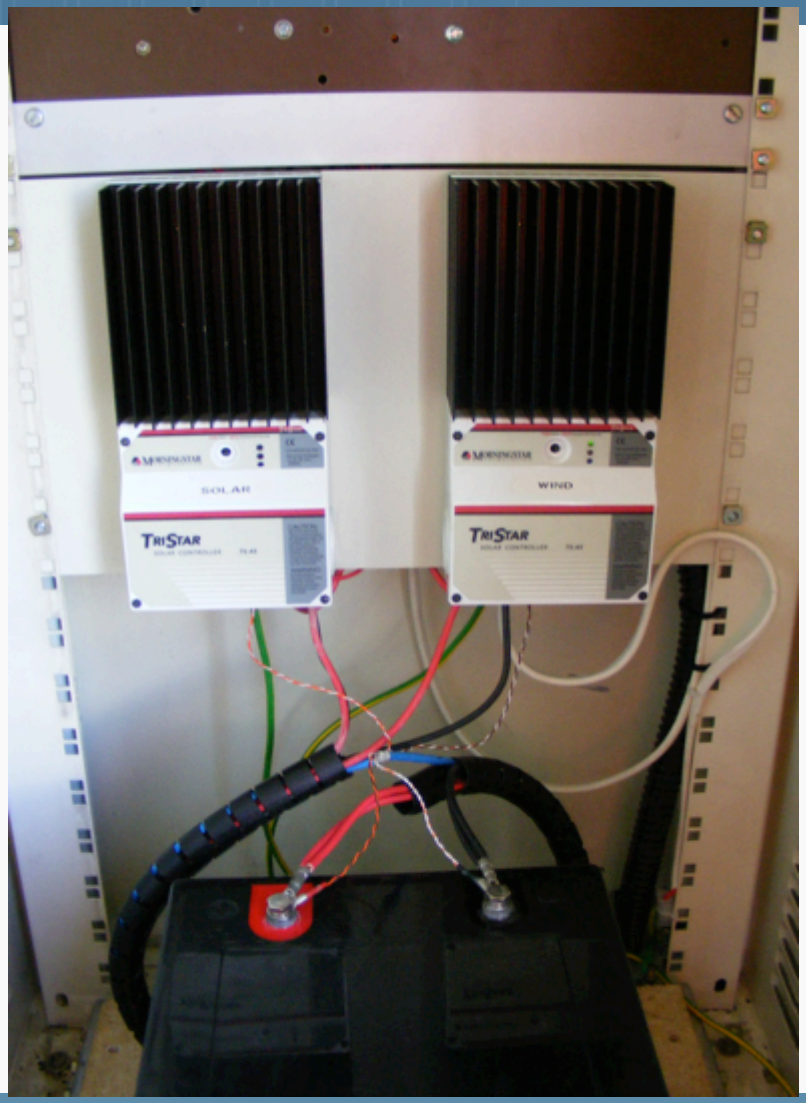
Power

- Getting electricity
  - Mains
  - Solar
  - Wind?
- Storing electricity
  - Batteries – normally
- Using electricity

GRAVELROAD
thinking beyond consulting

Power

GRAVELROAD
thinking beyond consulting



Power

GRAVELROAD

thinking beyond consulting

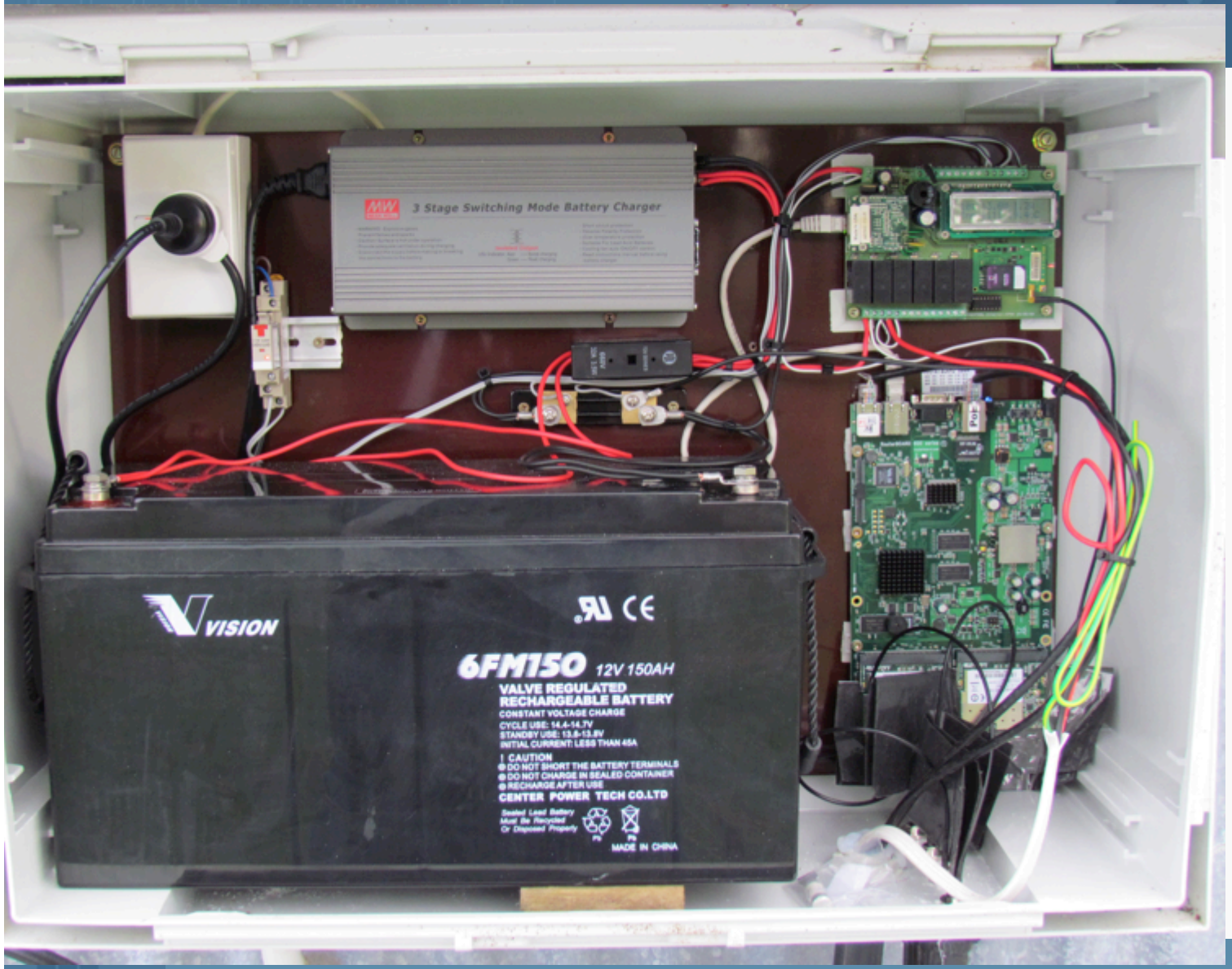
Power

Power

Power

GRAVELROAD

thinking beyond consulting



Power

Some Guidelines

- Environment – know it
- Structural and mechanical do not underestimate its importance
- Power – get it right
- Cables, connectors and earthing – its the little things.
- Standardise design
- Plan and plan some more
- Good RF decisions
- Maintain

All of these support Layer2+ networks, they enable the deployment of Internet

CABLES, CONNECTORS, EARTHING

GRAVELROAD
thinking beyond consulting

- Drip loops
- Cable management
- Bulkhead N Connectors
- Earthing < 10 ohms
- Electronics earthed
- Cable earthing kits
- Quality cable and connectors

GRAVELROAD
thinking beyond consulting

Cables,
connectors,
earthing

Cables, connectors, earthing

Cables,
connectors,
earthing

STANDARDISE DESIGN

Why Standardise?

- Fast deployment
- Maintenance is easy
- It’s proven
- Decommissioned sites can be reused
- Parts can be held in stock
- Less mistakes in commissioning
- Trouble shooting is easy
- Great economies of scale
- Iterative improvements easy

Standardise

Standardise

GRAVELROAD
thinking beyond consulting

Standardise

Standardise

Standardise

Standardise

Standardise

GRAVELROAD
thinking beyond consulting

LOTS OF PEOPLE DO THINGS DIFFERENTLY AND IN SIMILAR WAYS

ASI

GRAVELROAD

thinking beyond consulting

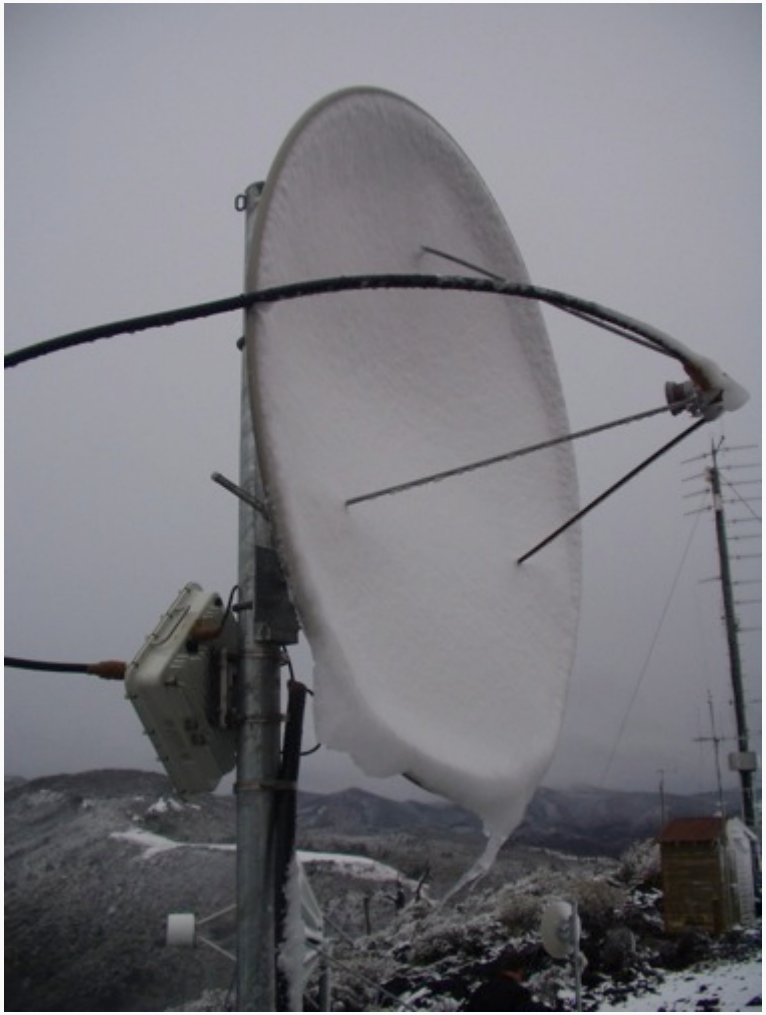
Some Guidelines

- Environment – know it
- Structural and mechanical do not underestimate its importance
- Power – get it right
- Cables, connectors and earthing – its the little things.
- Standardise design
- Plan and plan some more
- Good RF decisions
- Maintain

All of these support Layer2+ networks, they enable the deployment of Internet

And…

- Plan and plan some more
- Good RF decisions
- Maintain



Thanks

@nzjamie
jamie@marylebone.co.nz

DD
R44

GRAVELROAD

thinking beyond consulting

PLAN

Never before have we had so many tools

- Google Earth
- Radio mobile
- Online tools
- Online information

There is never a substitute for a site visit.

The Steps

1. Get approached by a community, or pick a community to meet our own needs
2. Plot out the best hill according to Google
3. Go site visit with our camera, take huge hi res photos and confirm that reality matches Google (it often doesn't due to 20m averaging of terrain)
4. Do politics with farmer over pole on land
5. Do local signups of at least 10 people
6. Build pole / base = 2 days work
7. Wait 1 week
8. Go back, fit out radios and test / commission (1 day)

9 wait 1 week for any out of box failures

10. Go back and hook up every customer and setup their computers / phones etc