



Rural wireless networks

Internet access networks, in aDSL white spots

The RAN acronym

The scheme that comprises of serving rural areas thanks to WLAN links was presented to the “Conseil Général” of Tarn in 1998 by Didier Lebrun (Vaour.net).

He also coined the RAN acronym: Rural Area Network

<http://didier.quartier-rural.org/>

<http://didier.quartier-rural.org/implic/ran/index.html>

2003/2004

Wireless frequencies deregulation

Open source firmwares (Linksys WRT54G)

Numerous in south-western France

Vaour.Net, Wifi-Quercy, Tamniès, etc...

RAN list: <http://ran.vaour.net/cgi-bin/ringlink/list.pl?ringid=ran>

Rural wireless networks



Much less in Brittany

Le Net du Kermeur : <http://www.lekermeur.net/>

Since August 2005

80 users en fin 2009

Geoprahical area 25km x 5km wide



Le Kermeur, en Plougonven
50 inhabitants hamlet
in the monts d'Arrée
15Km² wide area, 300 inh.
20km south of Morlaix (29)

The network spreads over several villages of the towns of Plougonven, Scrignac, Lannéanou, Botsohel, Le Cloître Saint Thégonnec and Plounéour-Ménez



Rural wireless networks

Since ~2000, aDSL for all

The first installations make it clear that the hamlet, with its 8km long telephone lines, won't be served.

We had to find a solution ourselves, with no bias at all towards the funding or the technology we'd use.

First steps for an alternative solution around the end of 2002, ended fruitless.

End of 2003, start of 2004, the « Communauté d'Agglomération » of the « Pays de Morlaix » suggests that we build a « DATAR » experimentation case, for a satellit / wifi solution.

Case ready in summer 2004, accepted 2004; no specific non-profit organization yet, the « Comité des Fêtes » is used (thanks to its extra-large 1961 statutes).

Call for bids in spring 2005.

Service set up in august 2005 by the Alsatis company from Toulouse; the local organization takes in charge maintenance (long distance, few users).



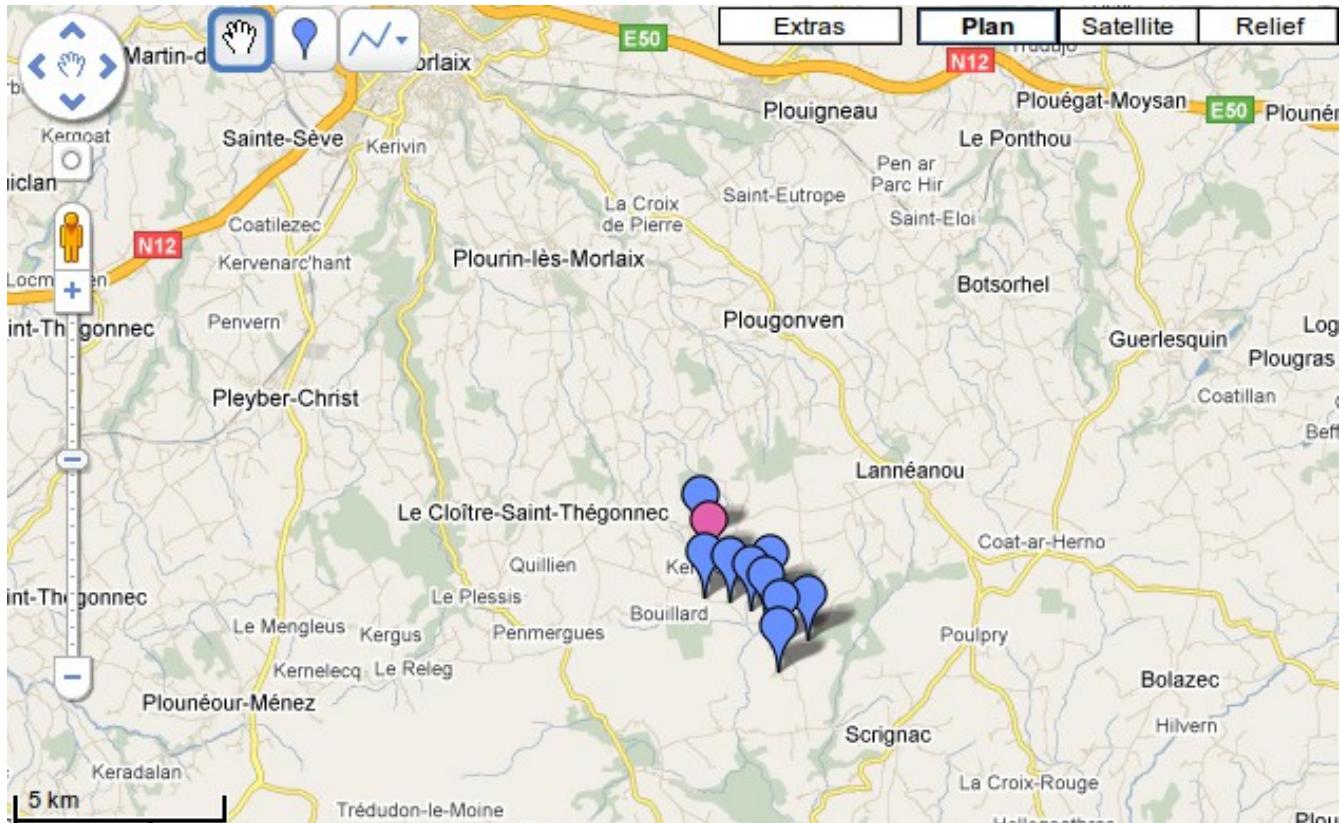
Rural wireless networks



Mise en service en Août 2005
Some interesting ressources in a rural context



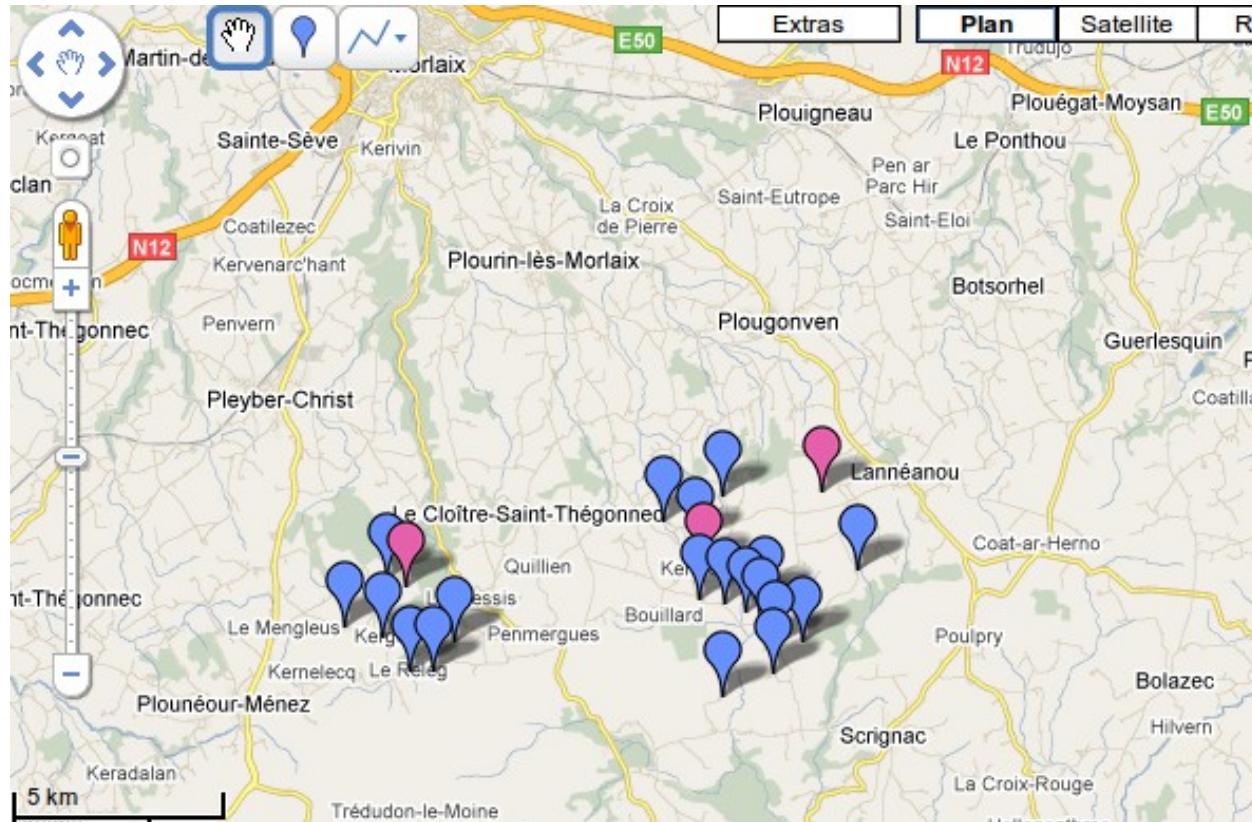
Rural wireless networks



Couverture in august 2005
Setup by the Alsatis company from Toulouse
Satellite + Wifi, 512Kbps uplink



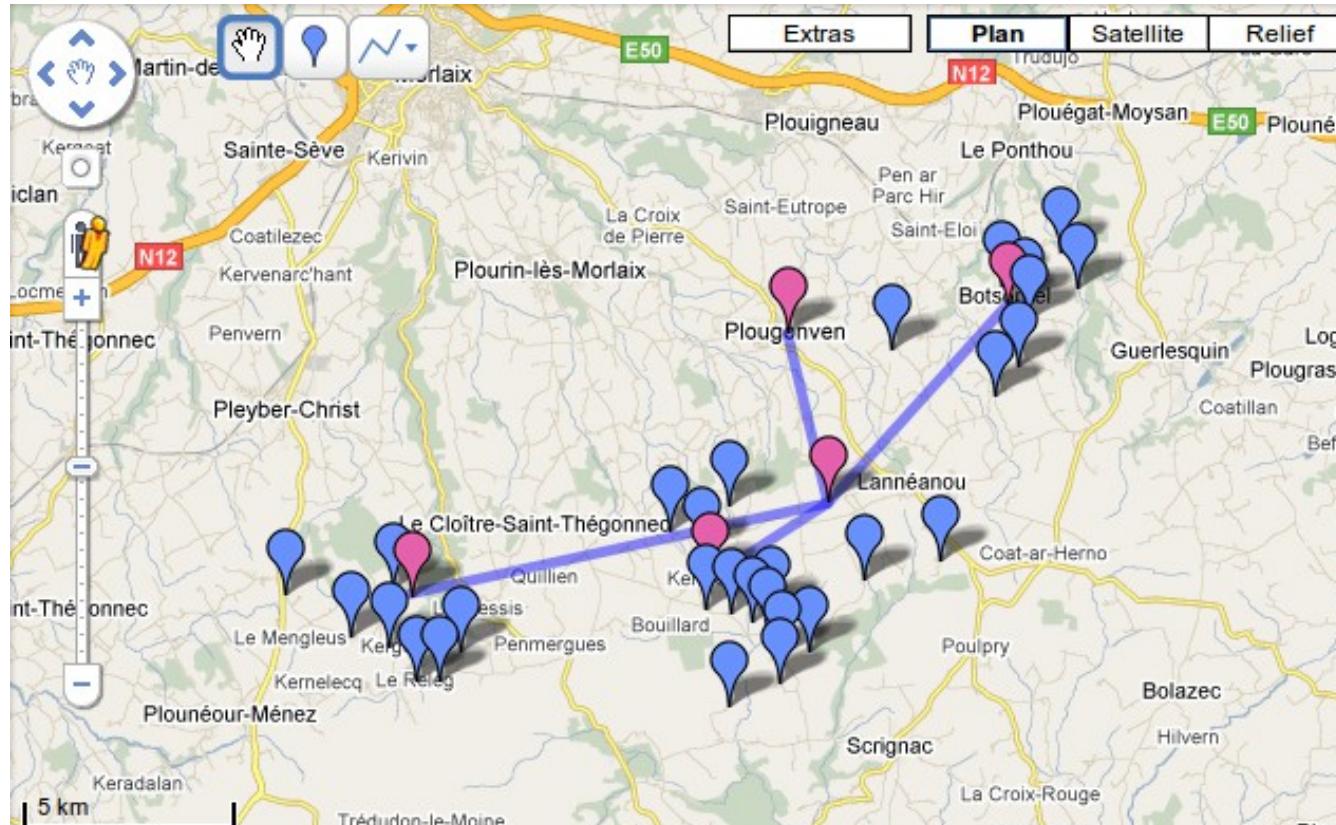
Rural wireless networks



End of 2007, extension towards west
Around 45 users, 2Mbps uplink, 1 solar powered relay
Starting with 2006, SDSL uplink instead of satellite



Rural wireless networks



Coverage end of 2009
80 users, 15 relays (3 using solar power)
1 optical fiber backhaul, backed up by Multiwan Adsl (since 2013)



Rural wireless networks

CPE evolution

Since 2008: progressively switching from Linksys WRT54G (and Buffalo WHR54GS) to Ubiquiti Nanostations



2005-2008

- 😊 Possibilities,
Openwrt packages
Switch
Adaptability

- 😢 Setup
Antenna coax cable

2008-2012

- 😊 Easy setup (ethernet cable)
Reliability (sealing pb?)
Radio Performance
802.11a band

- 😢 No switch
Bare bones firmware

2012-

- 😊 Easy setup
Radio performances

- 😢 No switch
No SDK anymore (v. 5.5.2)



Rural wireless networks

Service

2Mbps/256kbps, old generation (<10 % of the pool) (to be replaced)

4Mbps/512Kbps

8Mbps/1Mbps (< 10% pool, newest generation, dedensified(?) network)

Public IP v4, IP v6 /56 prefix (since end of 2012)

Mise à disposition routeur Wifi domestique

VOIP, not a provider, but possible:

OVH (1,20€ /month), Keyyo, ...

SIP terminals lending

VPN

OpenVPN

Television

NOPE



or



Voip



or





Rural wireless networks

Electrical power

Connected to the EDF net:

Multiple power cuts, sometimes several hours long
Scaling and costs for inverters, mostly on the central site
(Access points, POE switches, servers, terminal server, remote power control, etc...)

2008 :

Setup servers on low-powered i386 boards (Alix)
Replaced second-hand consumer PCs
2,5' hard drives, consumption under < 10W
Consumption went from 250W to ~75W (but increased since)

2014 (running) :

Goal : 4H of autonomy
Server virtualization, inverters + batteries rack

Outside the EDF network:

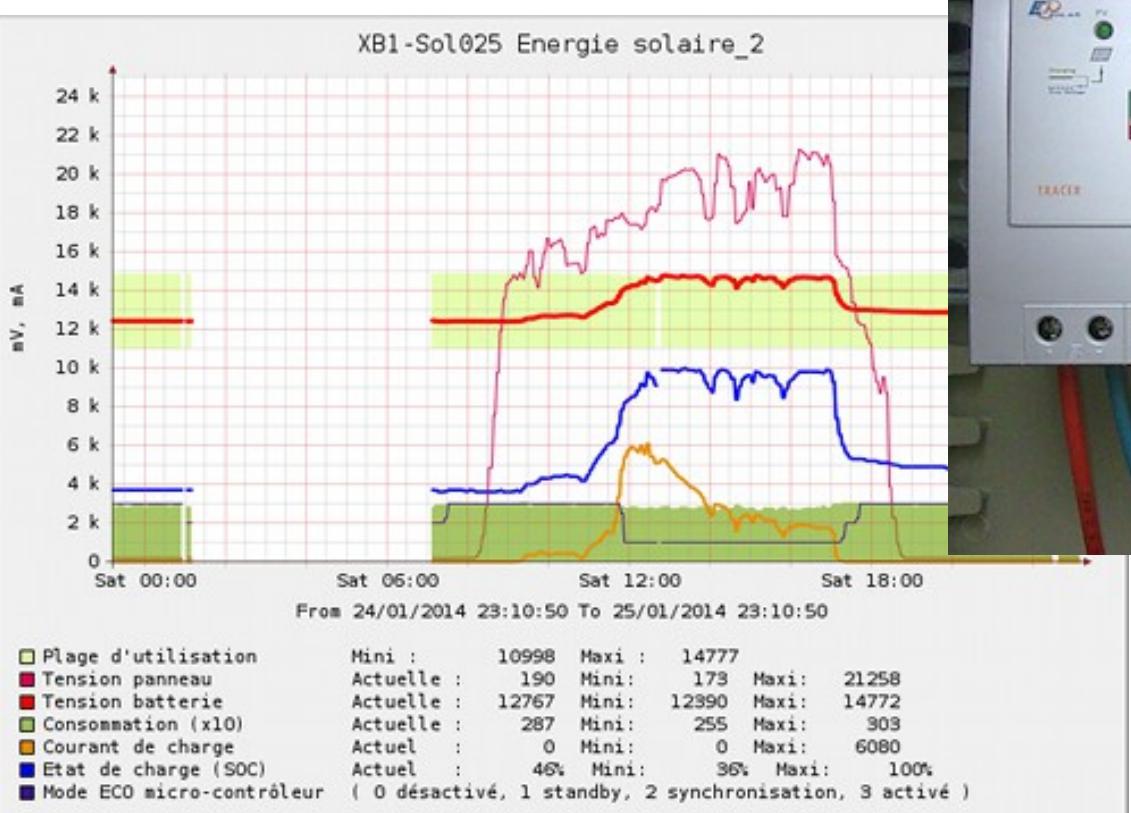
Solar power production limited during end of year
Larger solar panels ?
Power cut off during night



Rural wireless networks

Solar power control

Monitoring system
Cut-off if needed





Rural wireless networks

Management tools

VtigerCRM
accounting,
equipment, issues, etc ...

vtiger CRM 5

Gmail Favoris Actualités vtiger Retour sur expérience Mes préférences Aide A propos Déconnexion (marc)

Tickets FAQ Comptes Contacts Documents Webmail Agenda Contrats de Service

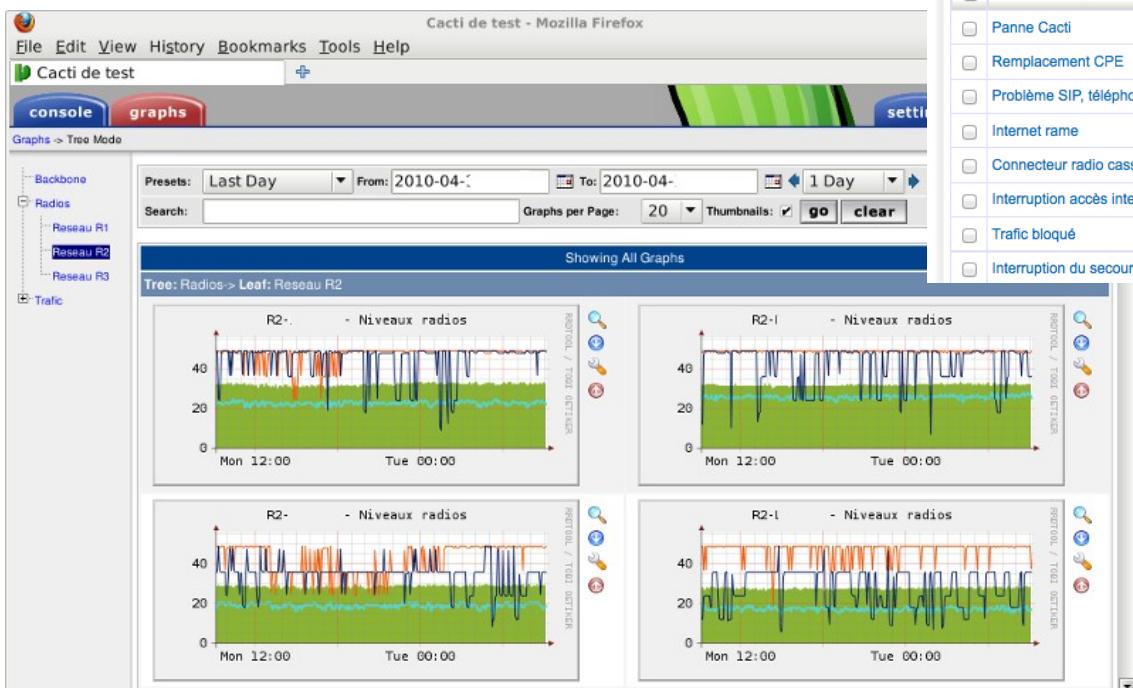
S.A.V. > Tickets

Rechercher Rechercher Dans Titre Rechercher [x]

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Supprimer Edition en masse Afficher Enregistrements 1 - 20 de 329 1 de 17 Filtres : kermeur

Titre	Assigné à	Statut	Créé le	Effet
Panne Cacti	Groupe Support	Fermé	27-03-2014 11:23:23	éditer Sup A
Remplacement CPE	Groupe Support	Fermé	22-03-2014 09:14:14	éditer Sup A
Problème SIP, téléphone de la salle	Groupe Support	Fermé	19-03-2014 21:37:08	éditer Sup A
Internet rame	Groupe Support	Fermé	10-03-2014 10:07:03	éditer Sup A
Connecteur radio cassé	Groupe Support	Fermé	01-03-2014 19:22:08	éditer Sup A
Interruption accès internet	Groupe Support	Fermé	01-03-2014 19:18:59	éditer Sup A
Trafic bloqué	Groupe Support	Ouvert	27-02-2014 16:34:21	éditer Sup A
Interruption du secours Wimax	Groupe Support	Fermé	20-02-2014 16:50:52	éditer Sup A



Cacti, for network metrology

vs Nagios (mesures pour mises au point firmware)

Rural wireless networks



Websites

Le Net du Kermeur



Le Net du Kermeur

A Rural Area Network, since 2005

Accueil

 Printemps du Wifi 2014

A Innimond (Ain), les 1, 2, 3 et 4 mai 2014

Installation OpenBSD sur serveur dédié

oct 2013 30 Réseau Pas de commentaire »

L'installation d'OpenBSD sur un serveur hébergé pose parfois problème, ce choix n'étant pas proposé dans le menu d'installation. La procédure ci-dessous propose une solution pour ce cas et a été testé sur l'offre DigiOne de Digicube.

Installer une distribution Debian mais en partitionnant le disque et en ne conservant qu'une faible partie pour la distribution Linux.

Installer GRUB

Pages

- A PROPOS
- Antenne BiQuad
- Asus EeePC : Customisation
- Bientôt l'ADSL ?
- Consommation de routeurs
- Crontab sur WRT54G
- Dlink DIR-300 révision B
 - DIR-300 sous DD-WRT
 - DIR-300 sous OpenWRT
- Le Buffalo WHR G54S
- Notes sur pfSense
- OpenBSD 4.7 sur carte RB600A
- OpenBSD sur carte Alix 2D3
- OpenBSD sur Symantec 5420
- Openwrt : extensions SNMPD
- Openwrt sur Routerboard RB153
- OpenWrt WhiteRussian RC4
- OpenWrt WhiteRussian RC6
- Régulation du txpower
- Relais wifi alimenté en solaire
- Sélecteur d'antenne du WRT54G

Outsourced mail service



Rural wireless networks

Free software's place

AP and clients: Linux systems

Openwrt on Linksys and Buffalo, on Mikrotik boards during 2 years

Mikrotik RouterOs, license

Ubiquity AirOS, a few proprietary modules, they ship a SDK

*BSD systems:

FreeBSD (pfSense),

OpenBSD (HTTP servers, maintenance, logs, etc ...)

Database: Mysql

Cacti (monitoring), VtigerCRM (management), Wordpress

Languages: Bash, Perl, Php, C



Rural wireless networks

Router firmwares

Until 2003-2004, proprietary firmwares (Dlink at Vaour.net)



2003: Linksys WRT54G with a Linux firmware
First alternative firmwares
Sveasoft, Hyperwrt, etc ...

2005: first usable Release Candidates
OpenWRT WhiteRussian

2007: Freifunk firmware (mesh)

Firmware

First based on Linksys sources, unstable CPEs

Based on Openwrt WhiteRussian RC4 (01/2006)

Addition of a few features (snmpd, remote flashing, ...)
Graphical interface only for status, shell scripts configuration

Based on Openwrt WhiteRussian RC6 (01/2007)

On Ubiquiti hardware

Slighter modifications

Rebuilds with feature additions

No SDK anymore since release 5.5.2



Rural wireless networks

Spin-offs

2009

- [Tréflévénez](#)(29), non-profit, aDSL backhaul
- [Saint Nicolas de Plélo](#)(22), ~~commercial~~, SDSL backhaul
non-profit since 2013, will stop at the end of 2014

2010

- [Guiclan](#)(29), ~~commercial~~, SDSL backhaul
non-profit since january 2014, will stop at the end of 2017
- Bodilis(29), commercial, ADSL backhaul
- XANKOM networks between Brest and Landivisiau (29)

2013

- [Pont Melvez/Bulat](#)(22), commercial, fiber backhaul
10Mbps/2Mbps service



Rural wireless networks

Future of this network

Traffic doubled per user every two years.

The limits of hertzian communication will soon be reached

Wimax deployed by the « Conseil Général »
Impact?

In a rural context, the main obstacle is distance, only one technology copes, optical fiber.

Limits of the DIY

Collaboration with the collectivités territoriales.

Optical fiber sheaths to the backbone site: 90 % of the work is done.

Service:

aDSL: DSLAM for a part, local loop unbundling

Fiber :

Small minority: le Kermeur (using a subsoiler)

The remaining parts:

Désinténification des réseaux



Wireless rural networks

What I haven't said may be here:

<http://blog.lekermeur.net/>

History of the network

Or, about the RAN

<http://didier.quartier-rural.org/implic/ran/ranmanif.html>

The RAN list archives

<http://ran.vaour.net/mailing-list/>

Long silence periods, high noise level, interesting information if you know where to look



Rural wireless networks

?



Rural wireless networks

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Les réseaux Wifi ruraux



Les réseaux Wifi ruraux



Les réseaux Wifi ruraux

