

Forget Comcast. Here's The DIY Approach to Internet Access.



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The first rule of a conversation: listen. Bio and disclosures: <http://dangillmor.com/about>

Spanish engineer Ramon Roca got tired of waiting for telecom companies to wire his town—so he did it himself.



You can see the snow-capped Pyrenees mountains from Gurb, about 75 kilometers north of Barcelona. It's a quiet farming community of 2,500, and in most ways there's nothing special to set it apart from many such towns across the Catalonia region of Spain.

So why do people like me eagerly journey to Gurb? Because it's the birthplace of [Guifi.net](#), one of the world's most important experiments in telecommunications. Guifi is a community network that has long since transcended its local roots. From a single node more than a decade ago, it has become a vast mesh-and-more system linking tens of thousands of people in hundreds of communities to each other and the global Internet. In the U.S. most of us go online via Comcast, AT&T, Time Warner Cable or

other telecom giants to run Facebook, shop, watch videos and check our email. In Gurb and other communities, Guifi is the on-ramp to the fabled information superhighway.

For people who want to see an Internet at least partly liberated from the grip of rapacious, government-connected telecommunications giants, Guifi is one of the most hopeful developments to date. Its core values, ownership, and operations are testament to the idea that you and I, and our communities, can—and should—control how we communicate. For the tens of thousands of people using it, some at no charge, Guifi operates as well as Time Warner Cable does for New Yorkers (and maybe better).



Guifi exists because a technically savvy local man, Ramon Roca, got tired of waiting for Telefonica, the Spanish telecom giant, to provide Internet access to the people of his community. He had a personal need for access. But he had a powerful second motive as well: “to help my neighbors.”

Guifi started with a single wifi node in 2004. Today there are more than 30,000 working nodes, including some fiber connections, with thousands more in the planning stages.

The project is a testament to tireless efforts—in governance, not just in adding hardware and software—by Roca and his colleagues. They’ve been unwavering in their commitment to open access, community control, network neutrality, and sustainability.

“What they’ve built is extraordinary,” says Sascha Meinrath, an open Internet activist, professor of telecommunications at Penn State University, and director of the telecom-focused think tank [X-LAB](#). In the U.S., he told me recently, we’ve collectively decided that it’s impossible to create a community owned, operated and led service of any serious scale—that most of us *need* a corporate behemoth like Comcast or Verizon for our connections. Guifi, he said, proves that it can be done, at some scale, in a very different way.



At **the heart of Guifi** is the [“Compact for a Free, Open and Neutral Network.”](#) which starts with these principles for people who want to join the network:

You have the freedom to use the network for any purpose as long as you don’t harm the operation of the network itself, the rights of other users, or the principles of neutrality that allow contents and services to flow without deliberate interference.

You have the right to understand the network and its components, and to share knowledge of its mechanisms and principles.

You have the right to offer services and content to the network on your own terms.

You have the right to join the network, and the obligation to extend this set of rights to anyone according to these same terms.

Those terms, put into practice, have been astoundingly robust. They’ve been the basis for a community of varying constituencies, ranging from everyday people who just want communications to several dozen small Internet service providers (ISPs) that have set up shop on Guifi to provide installation, guidance and customer service for end users. It’s all a far cry from the early days, when Roca was peeved that he couldn’t connect to the Net.

Roca was then, and remains, an engineer who works for Oracle. (During the week he often commutes to an office in Barcelona.) On a trip to California 12 years ago, he bought some Linksys WiFi routers at Fry’s Electronics. The routers were hackable. That is, one could rewrite the internal programming to make the routers do things the company didn’t expect customers to do. In this case, the routers could be turned into nodes in an extensible mesh-like system where each could receive data and supply it to routers owned by other people who wanted to join the network.

The first node went live in the early summer of 2004, when Roca turned on a router with a directional antenna he'd installed at the top of a tall building near the local government headquarters. That office was also the only place in town with Internet access, a DSL line Telefonica had run to municipal governments throughout the region. The antenna was aimed, line of sight, toward Roca's home about six kilometers away.

Soon, neighbors started asking for connections, and neighbors of neighbors, and so on. Beyond the cost of the router, access was free. Some nodes were turned into "supernodes"—banks of routers in certain locations, or dedicated gear that accomplishes the same thing—that could handle much more traffic in more robust ways. The network connected to high-capacity fiber optic lines, to handle the growing demand, and later connected to a major "peering" connection to the global Internet backbone that provides massive bandwidth. ([Peering](#) is a voluntary exchange of traffic from one network to another.) Guifi grew, and grew, and grew.

As it expanded, Roca realized that connecting more and more nodes, hardly trivial in its own right, wasn't enough. Making it sustainable while preserving the core principles was going to be at least as challenging.

Again, he was in the right place, at the right time. Barcelona and Catalonia are, in many ways, at the forefront of community-driven activism and collective action. The most visible is the movement to gain Catalan independence from Spain, but the city and region are [home to some of the world's most advanced](#) bottom-up, collaborative-economy projects. It has become almost a laboratory, and test bed, for rejecting the excesses of Big Capitalism in favor of something much more peer-to-peer.

Guifi's infrastructure is held in common by its users, and operated as a commons. Working with volunteers who'd assumed key administrative roles, Roca concluded that the network needed a parent organization. They created a not-for-profit entity, the Guifi.net Foundation, under which a sound governance structure could be created and maintained. The foundation employs a small team (Roca remains an unpaid volunteer and board member). It handles overall governance and runs the overall network operations.

Funding has come from various sources including several levels of government. The European Union has provided grants via international organizations that support innovation aligned with [EU "Digital Agenda"](#) objectives, of which broadband is one. The grants have not been for infrastructure; they've been part of EU research projects, and Guifi has used its participation to help bootstrap its own broader mission.

That funding—over a million Euros to date—is a drop in the bucket next to the lavish subsidies and favors that state-approved monopolies like Telefonica have enjoyed for decades. But it's been vital to Guifi's emergence.

So has one of the network's most important structural elements: The Guifi Foundation isn't the paid provider of most Internet service to end-user (home and business) customers. That role falls to more than 20 for-profit internet service providers that operate on the overall platform. The ISPs share infrastructure costs according to how much demand they put on the overall system. They pay fees to

the foundation for its services—a key source of funding for the overall project. Then they offer various kinds of services to end users, such as installing connections—lately they’ve been install fiber-optic access in some communities—managing traffic flows, offering email, handling customer and technical support, and so on. The prices these ISPs charge are, to this American who’s accustomed to broadband-cartel greed, staggeringly inexpensive: 18 to 35 Euros (currently about \$20–\$37) a month for gigabit fiber, and much less for slower WiFi. Community ownership and ISP competition does wonders for affordability.

Contrast this with the U.S. broadband system, where competitive dial-up phone access—phone companies were obliged to let all ISPs use the lines as the early commercial Internet flourished in the 1990s—gave way to a cartel of DSL and cable providers. Except in a few places where there’s actual competition, we pay way more for much less.

It became clear early on in Guifi’s existence that just being open and available wasn’t nearly enough. “We realized we had to make a community able to embrace these users—farmers, not technical people,” Roca says. Among other things, this meant teaching local people how to become installers, to offer professional-grade services.

Some municipal governments in the region, meanwhile, offered some financial support to create and build out local networks. In other places, volunteers pooled money and talent in an early form of crowdfunding.

In many communities, people were taking what Roca calls a “wait and see if it works” stance. So Guifi itself set up what it called “*apadrinaments*” —Catalan for “sponsorships”—by working with suppliers who’d build local systems once it was clear that people would pay for installation and ongoing access. “It was about announcing a plan, describing the cost, and asking for contributions,” Roca says. The payments weren’t going to Guifi, but to the suppliers of gear and ISP network services. All of these initiatives laid the groundwork not just for building out the overall network, but also creating the array of ISPs.

As the network grew, the Guifi.net Foundation oversaw the volunteer and commercial providers. It handled network traffic to and among the providers; connected to the major data “interchange” providing vast amounts of bandwidth between southern Spain and the rest of the world; planned deployment of fiber; and, crucially, developed systems to ensure that the ISPs were paying their fair share of the overall data and network-management costs.

much higher up-front investments. This will make the Guifi business more complicated, or at least a lot different than the current one.

Can Guifi survive, much less thrive, in a world increasingly dominated by highly centralized technology, networks, and services? Compared with Big Telecom ISPs, it's still tiny. Governments, often in league with the telecom industry, can thwart innovative projects of this kind if they change laws, or abuse existing ones. Guifi has to worry about incumbents, but despite threatening communications there haven't been any direct attempts to shut it down using the legal system, Roca says.

More important—at least for people who believe in open technology and communications—is whether it can become a counterweight to the Big Telecom dominance we've taken for granted in America and most of the world. Moreover, how can such a thing compete in an increasingly mobile world where telecoms, frequently in collaboration with Facebook, are almost literally deciding what the Internet will be?

At the very least, Guifi shows what smart and committed communities can do with open technology. (Some router manufacturers are [locking down their gear](#), in one of the more alarming recent developments, but some remain open for modification.) Guifi has filled a need with a system that, seemingly, could be replicated in rural areas in many nations, including the U.S., where telecom companies have left much of the countryside begging for genuine broadband. It has shown that mesh-like systems (Guifi technically isn't a mesh network, by typically used definitions, but it has many of the aspects of such systems) can work, and work well.

I'm hugely impressed—that should be obvious—by what Roca, Baig and their compatriots have achieved. They'll never have the capital to turn Guifi into a massive, Comcast-scale enterprise; then again, they haven't shown any desire to do so. But they've definitely demonstrated that communities *can* build relatively “large-scale, locally-owned, broadband infrastructure that provides faster speeds for lower prices in more locations than telco incumbents,” as Meinrath, the open-networks advocate, puts it.

At some point, perhaps soon, Guifi will reach its own logical best size, an evolving combination of wireless and fiber, expanding in nodes and, as wireless technology improves, increasing bandwidth at all levels. If Roca and his team can pull off their vital project to create a sustainable governance and financial structure—a network that continues to live up to the Internet's decentralized ideals and which can't be co-opted by corporatism—they'll be creating a model for others. That, in the end, could be the most important thing they do.

If they can pull off this transition, and if other people learn the right lessons, we could see more and more Guifi-like networks in more and more places. Then Roca's legacy will extend far beyond the exemplary things he's done for his extended community. It will also be his leadership, the kind that spreads.

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