Building a Taxonomy of Alternative Networks
Contributed by: Wi-5 Project (What to do With the Wi-Fi Wild West)

Researchers from I3A, University of Zaragoza, participating in the H2020 Wi-5 project, have coordinated the writing of a document classifying the so-called “Alternative Networks,” which has just been published by the IETF (Internet Engineering Task Force), the standardisation body in charge of Internet protocols. The title of the document is “Alternative Network Deployments: Taxonomy, Characterization, Technologies, and Architectures.”

It has required more than two years of work, as consensus between researchers and practitioners from all over the world was required. Different meetings have been held in Prague and Berlin, in addition to offline discussions by e-mail. Finally, last summer, consensus was reached and the document has been published as RFC 7962. The document is about the classification criteria, the different types of networks and the technologies used on them.

The Alternative Networks
The so-called “Alternative Networks” are those following different patterns than the “mainstream” ones, in which an operator deploys the network infrastructure, to provide connectivity to a user, who pays for it.

Six different categories of Alternative Networks have been defined:

1. Community networks, where the users are in charge of the design and maintenance of the network. In addition, the users are the owners of the network equipment, as they install their own routers and directive antennae on the roofs of their households. Huge networks can created this way, such as guifi.net, with more than 30,000 operative nodes in Spain. as it can be seen in the image, which shows the operative Wi-Fi nodes near Barcelona. They can be seen as a networking version of the “do it yourself” philosophy. These networks were studied in the FP7 CONFINE project.

2. Crowdshared approaches led by the users and third-party stakeholders. One example is Fon (https://fon.com/), with more than 20 million users worldwide, which allows them to share a part of the bandwidth of their Wi-Fi connection. In return, they obtain free access to millions of Wi-Fi APs in the whole world.

3. Shared Infrastructure Model. If, for example, a remote Amazon village already has an Internet connection for a medical dispensary, they can share this link to an operator, who uses it in order to provide mobile connectivity to the whole village. This constitutes a win-win scenario in which the operator saves the cost of bringing connectivity, and the users get access to the network with low cost. These scenarios were studied in the FP7 Tucan3G project.

4. During the 1930s, rural utility cooperatives were created to bring electric service to low populated areas, where investor-owned utility would not find a good business case. In the last years, some of these cooperatives also bring Internet connection.

5. Wireless Internet Service Providers (WISPs). They are small companies that provide connectivity to remote zones. Some examples are Airjaldi in India, or Embou in Aragon, Spain.

6. Testbeds for research purposes. Some of these networks are promoted by a University or a research institute. They may deploy a Wi-Fi network in a zone, for research purposes, but they may leave it to the users once the research has finished.
The Wi-5 project - [http://www.wi5.eu/](http://www.wi5.eu/)

Wi-Fi is the commercial name shared by a number of devices following the same standard protocol for wireless local area networks. Although its technical name is “IEEE 802.11,” it is commonly known as Wi-Fi. The first version (1997) has about 20 years, but the technology became popular some years later, and now it is ubiquitous: our mobile phones, tablets, laptops, and the routers that provide connection in our homes, use this protocol to send and receive information.

However, this popularity can make Wi-Fi die from its success. The protocol uses unlicensed bands: in contrary to what it happens with radio or TV, no permission is needed in order to use that bands. This is positive in principle, but it is in fact bringing us to the so-called “Wi-Fi jungle,” caused by the saturation of the band. As it can be seen in the figure, obtained in an apartment block in Zaragoza, Spain, although Wi-Fi has 11 different channels, it may happen that a number of Access Points use the same one. And this problem is stressed in urban zones, business centres, etc.

**Contributor**

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<th>Organisation</th>
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**Contact**

<table>
<thead>
<tr>
<th>Contact</th>
<th>Melania Bentue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tel.</td>
<td>+34616408339</td>
</tr>
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