Smart - Digital / City - Village
Wireless Infrastructures for Public Services

Broadband Wireless Networks have had a huge development and growth of applications in the last 10 years, favoring alternative or complementary scenarios to fixed and mobile networks in the Enterprise, Traditional Operators and WISP (Wireless Internet Service Provider), PA, Verticals segmentations.

Point-to-point, point-to-multipoint, mesh architectures, can be implemented quickly and economically compared to xDSL/FO (Fiber Optic) cabling, thanks to the technological evolution of ever more compact, powerful, self-configuring systems, for digital divide areas, low user density, in complex territorial orographies-morphologies, or for the connectivity of a large number of systems/users distributed over wide areas.

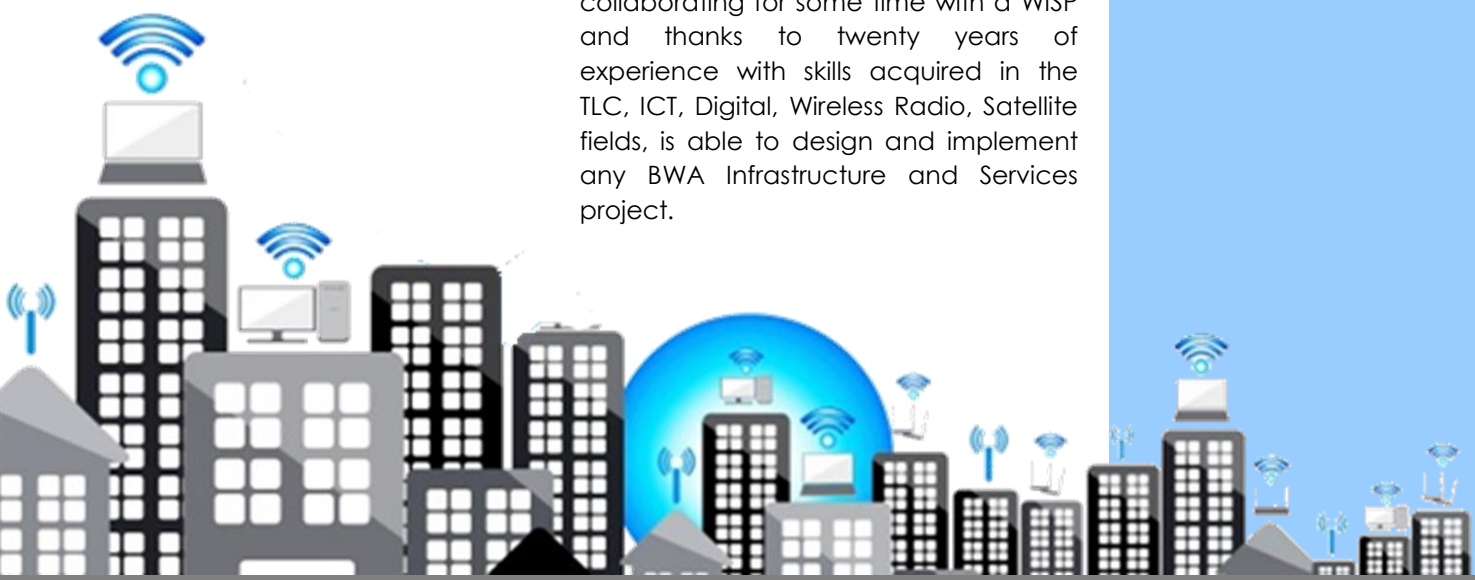
WiFi - Hiperlan - WiMax BWA (Broadband Wireless Access) networks in the unlicensed frequencies 2.4 - 5 - 3.4/3.6 GHz, with 5 and 2.4 GHz frequencies on which the vast majority of services are conveyed, are absorbing ever wider scenarios of Connectivity, Public WiFi Hotspot, Video Surveillance, IoT.

In the public sphere, projects supported by Broadband/Ultra-Broadband (UBB) programs for the digital transition financed by Pnrr funds are multiplying, considering that the absence or poor quality of connectivity and access to the Internet is now considered as a barrier to economic, social, territorial development.

Gordionet, in addition to the positioning of Solutions Integrator, has been collaborating for some time with a WISP and thanks to twenty years of experience with skills acquired in the TLC, ICT, Digital, Wireless Radio, Satellite fields, is able to design and implement any BWA Infrastructure and Services project.

Examples of Services over Broadband Wireless Access Infrastructures

- Last mile broadband connectivity WISP with Hyperlan and FWA technologies
- Public WiFi Hotspots
- Video surveillance
- IoT for Utilities
- Smart Cities / Grids
- Healthcare and Telemedicine
- Teledidactics
- SCADA
- Backhauling of fixed and mobile Infrastructures



Gordionet © 2022 All rights reserved - gordionet.com - info@gordionet.com

Public WiFi Hotspots

WiFi Access Wireless Networks are particularly suitable for public and private hotspots in complex territorial orographies and morphologies such as hills or mountains, which see the historical development of the towns on the tops of the reliefs and in the neighboring areas downstream.

For such orography, a capillarity of wired copper or fiber network at points on buildings or poles where WiFi Access Points, Video Surveillance Cameras, IoT Sensors of various kinds are installed, is unthinkable.

4/5G Mobile Network (provided it has satisfactory territorial coverage), is currently an unsuitable transport infrastructure for these Services, further considering that Outdoor WiFi Access Points and professional Cameras do not have SIM/eSIM interfaces and relative radio module mobile, but only IP Network interfaces that can be connected directly to the transport Wireless Infrastructure.

The Wireless Network for public WiFi Hotspots is different from a point-to-point/multipoint transport Wireless Network normally used for Video Surveillance Systems, as it is radio-electrically and digitally sized for WiFi access from mobile and nomadic devices according to an established simultaneous access to the Internet.

For Municipalities and Public Administrations, the opportunity to offer citizens free WiFi access in squares, public and social meeting places of aggregation, museums, libraries, parks, commercial spaces, etc., represents a great collective benefit.

The development of a Web Portal for Authentication and Access to the Service that can be used by mobile and nomadic devices, further allows for the expansion of information, social, logistical, tourist, territorial and commercial communication towards citizens, with potential economic impacts.

Gordionet quickly designs, sizes, implements and configures public WiFi Hotspot Wireless Networks, on the basis of some project elements communicated or focused in synergy with the Administrations, such as the coverage areas, the location of the Management and Control Center, the estimate of simultaneity of access terminals, the regulation of the public service such as the authentication process, the time of free use, the bandwidth dedicated per user, the filters for websites that do not comply with the service, etc.

Gordionet © 2022 All rights reserved - gordionet.com - info@gordionet.com

Network Architecture and WiFi Hotspot Systems

WiFi Hotspots architecture

The network architecture of WiFi Hotspots in an urban context, provides a WiFi Access and Authentication system, Radio Transport if there are several Hotspots distributed geographically and processing by WAN/LAN Gateway Systems and Switches (Security Gateway and Aggregation Switch).

The Hotspot Access Systems, necessarily with an outdoor version, act both as WiFi coverage and as MultiHop relaunch as they are equipped with an Uplink, and therefore do not require an additional Wireless transport network.

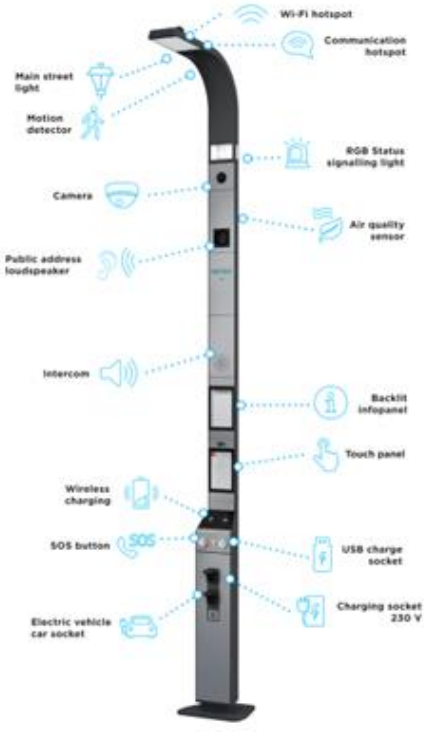
The indicated WiFi Hotspot models, are Dual Band 2.4 - 5 GHz 3x3 MIMO with a Radio Rate of 450 Mbps @ 2.4 GHz / 1300 Mbps @ 5 GHz, Std Wi-Fi 802.11 a/b/g/n/ac, coverage range of about 120 - 180 meters, PoE 802.3af / PoE+ 802.3at, with about 200 simultaneous user accesses.

The connection request process involves the user terminal equipped with WiFi (Smartphone, Tablet, PC), the Access Points that act as Authenticators, the Security Gateway that performs the function of Authentication Server according to a process of EAP/RADIUS 802.1X protocols.

Management and Control Center

The Management and Control Center consists of the Base Station Access Point, the LAN Aggregator Switch with PoE, the Security Gateway which includes all the Server functional appliances such as Authentication, Authorization, Accounting, Firewall, VPN, DHCP, NPS Network Policy Server Role, Local Storage.

The Security Gateway is connected to the ISP modem router with WAN connectivity preferably FTTH.

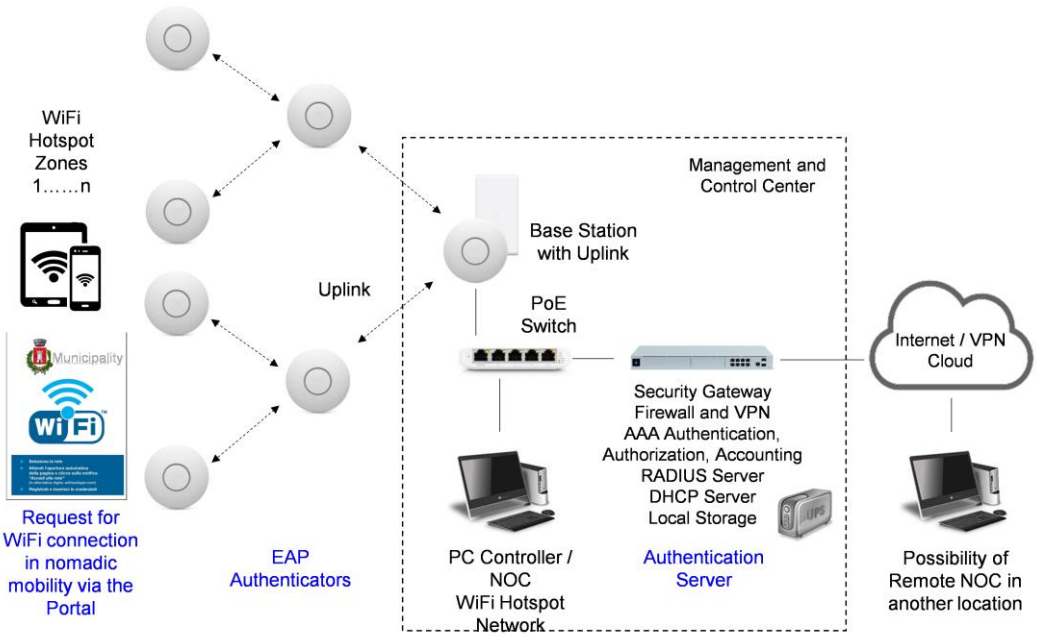


Gordionet © 2022 All rights reserved - gordionet.com - info@gordionet.com

Network Architecture and WiFi Hotspot Systems

The diagram shown, although professionally detailed, is indicative.

Complex territorial orographies and morphologies can include different network architectures and topologies that Gordionet is able to rapidly evaluate.



Example of WiFi Hotspot architecture on MultiHop Mesh roaming topology with Access Point alternative

Public WiFi Hotspots Network

- Dual Band Frequencies 2.4 - 5GHz
- Outdoor WiFi Hotspot Access Point 3x3 MIMO with PoE
- Radio Rate 450Mbps @ 2.4GHz / 1300Mbps @ 5GHz per Access Points
- Standard WiFi 802.11 a/b/g/n/ac
- Coverage range Access Point Hotspots of about 120 mt. / 180 mt.
- PoE 802.3af / PoE+ 802.3at
- Up to 200 simultaneous user accesses for each WiFi Access Point Hotspot
- 802.1X EAP / RADIUS Authentication process
- Wireless Security WEP, WPA-PSK, WPA-Enterprise (WPA/WPA2, TKIP/AES)
- Operating Systems: Linux, Mac OS X, Microsoft Windows

Gordionet © 2022 All rights reserved - gordionet.com - info@gordionet.com

Network Architecture and WiFi Hotspot Systems

Philosophy of Public Service activation and Gordionet implementation

Managing public WiFi Hotspots is like receiving hundreds if not thousands of guests on your own network, in this case owned by the local public administration, whose service profiling has no limits, except those imposed by Internet filters and usage Policies.

For this reason, the segmentation of these systems is Enterprise grade, which implies an excellent quality design, implementation and service, as indeed it should be for all TLC, ICT, Digital indoor and outdoor systems, starting from the Web Portal of Access and Authentication.

Furthermore, the increasingly massive presence of Digital Transformation technologies and processes with the relative opportunity to intercept dedicated Pnrr funds, implies for Public and Municipal Administrations the availability of internal or Outsourcing skills, Departments and management spaces (Wireless WAN Infrastructures and/or Fiber Optic, LAN Networks, Management, Control and Archiving Server).

For example, unless we are dealing with territorial security systems, in many Municipalities the Management and Control Systems no longer burden the Local Police already engaged in the traditional roles.

The performance of the Solution, the QoS Quality of Service, the Firewalling perimeter Cybersecurity, cannot ignore the multidisciplinary professional skills that Gordionet is able to offer, thanks to twenty years of technological experience as Integrator.

Gordionet for indoor and outdoor installations at height, strictly complies with current regulations, using professional supports and PPE Personal Protective Equipment.

Gordionet © 2022 All rights reserved - gordionet.com - info@gordionet.com