



## The WoQuaZ Experience

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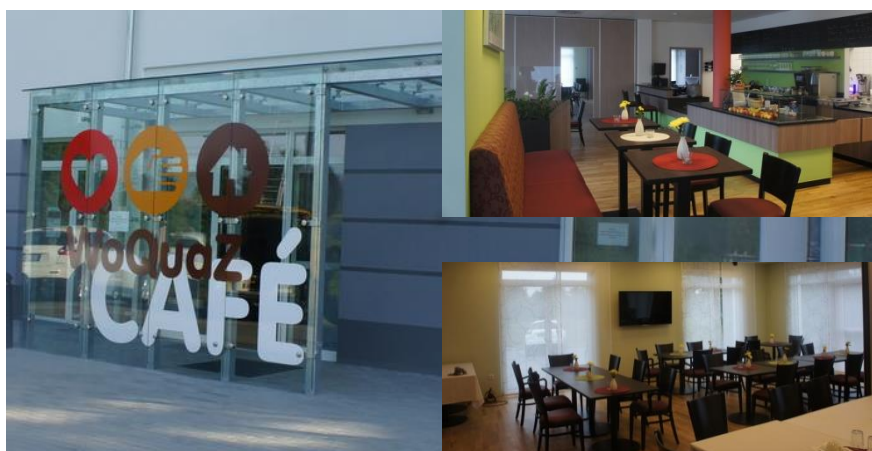
See our position paper under <https://goo.gl/HAnAQf>

## Introduction

WoQuaZ, the German abbreviation for “Wohn- und Quartierzentrum” (**the living & quarter centre**), is the name of a multi-generational house, built 2012-13 in Weiterstadt, Germany, ca. 20 km in south of the Frankfurt international airport. The building comprises

- 22 private flats in the top three levels, each with up to three rooms, rented mostly to retired people from the local area who live independently, running usually a single-person household
- A dementia care centre in an isolated area in the ground floor with 11 private and some shared rooms, supervised 24/7 by the local deaconate
- A day care centre in the ground floor for the older adults from the neighbourhood, supervised by the local red cross (open from 7 a.m. to 6 p.m.)
- The WoQuaZ Café in the ground floor, also with meal delivery services, that is managed by few voluntary tenants from the 22 private flats
- A hairdressing salon and a beauty salon as private businesses in the ground floor
- A physiotherapy clinic and a ballet school as private businesses in the basement

Through the integration of the Café and the private businesses, WoQuaZ has become a building open to the public from which the tenants of the 22 private flats benefit in terms of easy social integration / staying socially active. The Café is a meeting point for the whole neighbourhood and a centre for several regular activities, such as group readings on a weekly basis.



Also technologically, WoQuaZ is a very modern building, not only from the perspective of building construction, such as energy supply, but also in terms of digitalisation. The inhabitants enjoy Internet with fibre optic connections. The private flats are equipped with the following set of sensors and actuators integrated in each flat into an ensemble providing for intelligent behaviour:

**Acting**

- Blinds
- Door locks
- Email sending
- Heating
- IP telephony
- Lights
- Outlets
- Ventilation
- Water flow

**Sensing**

- Bed usage
- CO2
- Humidity
- Localization/ Falls
- Movement/ Presence
- Smoke
- Temperature
- Water & Energy usage

In the basement of the building, there is a powerful computing centre in the WoQuaZ private network without relying on any Cloud server or other external resources. It provides each flat with an own private subnetwork and dedicated storage and virtual machines that process the data separately from the other flats, currently just towards recognizing certain situations of interest and conducting appropriate actions automatically in reaction to those situations:

- Recognition of possible emergencies – such as falls, inactivity, protracted stay in bathroom, prolonged shower-taking and no return to bed during the night – with an individually adaptable alarm system via the apartment telephone (mostly involving trusted neighbours, relatives and house management) in order to reach faster reaction time and reduce service costs.
- Linking the smoke alarm to the alarm system and automatically adjusting the flat state (e.g., power off, blinds up, door open)
- Automatic ventilation depending on humidity and CO2 levels.
- Automatic adaptation of the flat state in the case of short-term or long-term absence (for example, water, electricity and dangerous appliances are switched off and re-activated automatically on entering).
- Situation-aware adaptation of the energy consumption (e.g. shutting off the heating when the window is open, turning off the light in unused rooms, or shutting down the blinds when absent in order to reduce cooling costs in the summer).

A characteristic of WoQuaZ is that the technology in there is in the background; the inhabitants are not confronted with any complexity and are not forced to deal with the technology in any form<sup>1</sup>. The main interface of the system to the people is the phone system, and this only whenever the system assumes an emergency situation.

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<sup>1</sup> If they would like, they may use a local Web-app for checking the apartment state and / or controlling devices, but only the inhabitants in one flat (from 22) showed interest to learn and start using it.

## Key enabling conditions

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In addition to the unique features summarized already in the introduction, the following are estimated as key success factors of WoQuaZ:

- Certainly, elements that have led to the acceptance of the technology are among the key success factors. These comprise
  1. first and foremost the synergy-building concept of the building as a whole which makes it attractive for the people to rent these flats and live in them;
  2. secondly, the non-intrusiveness of the technology, never being in the foreground, has played a major role in the system acceptance. All the processes take place in the background based on implicit interaction while the inhabitants live their normal life. All the decision making processes in the system to automatically perform certain actions in certain situations take several different preferences of the inhabitants into account; these are parameters that can be changed at any point in time whenever the inhabitants wish new adaptations. The people have understood that the technology is not there to monitor them or utilize their data for not explicitly stated purposes, but to assist them privately and provide for more safety and comfort.
- Even if WoQuaZ has received 50% public funding for a part of system-building activities in the context of a European innovation project, but it was funded mostly (over 80% of total costs) by the private investors of an SME whose business is project development for age-friendly housing. Being not a trial but real business with long-term investment, the practical and immediate benefits for the inhabitants have always been in the foreground. What has helped very much not to lose this focus is the fact that the investors were not following the “illusion” of data-driven business, but were motivated to earn relatively higher rents and secure the RoI for the next 20 years.
- A further enabling factor has been the partnership of WoQuaZ with Fraunhofer IGD as a trusted entity with a long history of research in the field of smart environments and the eagerness of this research institute to transfer more mature research results to real life by building synergies with the business model of WoQuaZ.
- From a technological perspective, we should mention universAAL IoT<sup>2</sup> as an enabler for integrating IoT technologies towards smart living environments. As an open source platform distributed with Apache License 2.0, universAAL IoT is serving as a candidate for a global standard enabler that provides for seamless interoperability of devices, services and applications in open systems across domains, vendors, devices, locations and deployment strategies, on an unprecedented scale. Therefore, universAAL IoT is contributing to the WoQuaZ success by providing for being and staying future-proof, which is essential for long-term investments.

While being one of the first long-term investments of this type in real business, WoQuaZ is proud to have to manage today a long queue of interested people waiting for next free flat to live in there and become part of WoQuaZ.

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<sup>2</sup> [www.universaal.info](http://www.universaal.info) – see also the blog [<universaal.info/blog/>](http://universaal.info/blog/) and the videos [<universaal.info/page/videos/>](http://universaal.info/page/videos/)

## The way forward

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In the meanwhile, the partnership has concluded that several actions have to be taken in order to ensure the replicability of the WoQuaZ experience, from among which the following have / are already been / being implemented:

- Launch Assisted Home Solutions GmbH as a consultancy business for smart living systems that on one side takes the responsibility for planning and deploying such systems in the context of the general housing stock, and on the other side strives to resell the concrete system developed in WoQuaZ.
- Improve the replicability of the technology in terms of wireless technology, reducing the infrastructure costs and completing the set of tools for deployment, configuration, personalization and administration.
- Practise the replication process in the context of three new deployment sites involving also few new requirements<sup>3</sup>.
- Ensure the sustainability of universAAL IoT by contributing to the launch of the universAAL IoT Coalition A.I.S.B.L. (uIC) as an open, non-profit, international association based in Brussels, Belgium in order for uIC to serve as the link between the open source community of universAAL IoT and the market.

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<sup>3</sup> Acknowledgement: the latter two steps are being taken with the help of EU public funding in ACTIVAGE <[www.activageproject.eu](http://www.activageproject.eu)>. ACTIVAGE is one of the five running large-scale IoT piloting projects (IoT LSPs) of the new EU IoT research and innovation programme. ACTIVAGE is the LSP for “smart living environments for ageing well”, with 20 M€ EU funding, 50 project partners from nine countries, and 14 deployment sites in seven countries that started in January 2017. It plans to conclude by the end of June 2020, and aims at creating the ecosystem of ecosystems involving ca. 50,000 devices and 10,000 end users. The ecosystem of universAAL IoT is the largest one within ACTIVAGE, with four installations in Germany, two installations in Greece and two in Spain + one possible installation in Italy.