

## Hearing Aid Configuration over the Internet

**Project: Systems architecture and development of a tele-audiology solution for Phonak, from first prototype to successful field studies**

To establish an optimum fitting in diverse hearing situations, the fine-tuning of new hearing aids has to be adapted by an expert audiologist. In the past, this often required multiple follow-up appointments.



The broad availability of Internet-connected smartphones with Bluetooth connectivity enables a simple and time-saving alternative. The patient starts a smartphone app to give the audiologist remote access to the hearing aids. Time-consuming travel is no longer necessary.

**Challenge: Secure ad-hoc connection from the expert's PC to the patient's hearing aids**

For patient safety, the integrity of configuration data must be guaranteed, from the audiologist's PC to the patient's smartphone and on to the hearing aids. Also, as both the audiologist and the patient are located in local networks protected through firewalls and NAT servers, often neither the PC nor the smartphone has a public IP address. Establishing a connection becomes a challenge.

**Solution: Integration through a connectivity service and a Bluetooth-based gateway app**

The integrity of transmitted configuration data is guaranteed through SSL-encryption on the transport layer and a checksum on the application layer. The integration of Yaler.net, a cloud-based connectivity service, enabled a secure ad-hoc connection for data streaming, without the hassle of port forwarding. An easy-to-use app forwards the received configuration data via Bluetooth to the hearing aids. The patient thus decides when and where remote access is enabled.



**Phonak – leading manufacturer of innovative hearing care solutions**

Sonova is the leading manufacturer of innovative hearing care solutions. The Sonova group is currently present in over 90 countries across the globe and has a workforce of over 9,000 dedicated employees.

Phonak is a member of Sonova group, headquartered in Stäfa, Switzerland. Since over 60 years, Sonova develops, produces and distributes innovative hearing care solutions.

**Oberon microsystems AG – software engineering for innovation projects**

Oberon was founded in 1993 as a Spin-off of ETH Zürich. Our focus is the *Internet of Things*, i.e. the convergence of IT and physical world, from systems-architecture to the implementation of Internet-connected apps with Bluetooth Smart - on Android and iOS, native or with Xamarin. As for embedded systems, we're active in the .NET Micro Framework core tech team and in the Bluetooth SIG.

**Yaler GmbH – secure, controlled and manageable access to embedded systems**

Yaler was founded in 2011 as a Spin-off of Oberon microsystems AG in Zürich. Yaler.net enables simple, secure and scalable Web- and SSH-access to embedded systems.