



openHAB's Kai Kreuzer (left) and Thomas Eichstädt-Engelen in front of the electrical cabinet at Kreuzer's home

# SMARTTEST HOUSE ON THE STREET

The Internet of Things meets home automation with openHAB, a Java-based software environment that integrates devices and applications into a cohesive network. **BY DAVID BAUM**

ART BY WES ROWELL: PHOTOGRAPHY BY TON HENDRIKS

Kai Kreuzer is not an easy man to sneak up on. As you approach the front door of his highly automated house, you will trigger a sensor that activates a webcam mounted above the front door. Ring the doorbell and he will be alerted to your presence, via either loudspeakers throughout the property or a video display on his iPhone. He may choose to let you in by remotely unlatching the door. With a few more taps on his















Kreuzer and Eichstädt-Engelen discuss openHAB with *Java Magazine*'s Caroline Kvitka during JavaOne 2013.

With openHAB, we are bringing this same level of sophistication to average homes and apartments."

Home automation use cases can be divided into three basic categories: comfort, security, and energy management. Some features of a home, such as draperies and shutters, span multiple categories: automatically opening them in the morning and closing them in the evening keeps the house comfortable; saves energy; and improves security, because it makes it appear as if the resident is home even when the house is empty. These activities can occur automatically based on the time of day or can be triggered by sensors that detect when people are home. Lighting, heating, cooling systems, and appliances can also be activated automatically or can trigger other systems. For example, when Kreuzer's washing machine finishes a load it broadcasts its status over the loudspeaker.

## WORKING WITH THE JAVA COMMUNITY

The first binary build of openHAB was available for download in the fall of 2010. Since then, Eichstädt-Engelen and Kreuzer have presented the solution at Java user groups and Java conferences such as EclipseCon, Devvxx, JAXconf, and GeeCON. Their growing community now includes a loyal base of contributors that help to expand the openHAB ecosystem by creating *bindings*, or connections to various devices, applications, and interfaces.

"Bindings are the pieces of code that allow us to connect openHAB to other systems and also to integrate it all together," says Eichstädt-Engelen.

There are currently about 50 bindings to commercial automation systems including Z-Wave, Plugwise, SONOS, Bluetooth, Modbus, EnOcean, and KNX. openHAB also provides consoles such as XMPP, OSGi, and Google Calendar. Thanks to these consoles and bindings, along with the steady evolution of home automation technologies, homeowners no longer need physical buttons to switch on lights and other electric devices. Pointing a smartphone at an NFC tag hidden behind the wallpaper will do the

job—or they can program openHAB so that the phone will signal these devices automatically whenever their owner walks into the room.

"Soon, presence detection technology will allow openHAB to identify you as you move around the home," Kreuzer says. "This will allow openHAB to adjust the lights or shutters or music to your preferences, based on the time of day or any other variables you choose."

End users simply download openHAB and unpack it in a Java runtime environment on the target system. "It's more or less a one-click installation," Eichstädt-Engelen notes. "Within five minutes, you can have a running openHAB system."

The project includes the openHAB Designer, an Eclipse Rich Client Platform application for configuring the openHAB runtime. It comes with editors for the openHAB configura-

tion files, with full integrated development environment (IDE) support such as syntax checking, autocompletion, highlighting, and content assistance. Kreuzer claims that this mature development environment makes it easier to implement and deploy rules for automatic actions.

### NO LOCK-IN

One of the fundamental design goals is modularity: it is easy to replace one technology with another so that homeowners aren't locked in to particular types of applications and devices.



