Extend App Inventor with MQTT

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App Inventor provides a simple way of programming. Instead of writing code, the user takes a block, which hides code and builds a mobile application. App Inventor supports the inclusion of extensions in their web IDE to add missing components. In this work, the missing ability to make a connection between two device was implemented by using the MQTT protocol.

Conceptual Formulation

The objective of this work was to provide the MQTT protocol to a wider range of developers in mobile computing with the help of App Inventor. The user is able to establish a connection to a broker with TLS and can use publish and subscribe with or without wildcards. Additional the configuration of clean session and last will is possible. In the end the extension is user-friendly for untrained programmers and tested with example applications.

Implementation

With App Inventor's open source code, the exetension was realised by adding components and build the sources. Beginning with a Publish and Connect Block, a first attempt to establish a connection to a broker was made. The message was successfully received by a second client. Therefore the implementation of the remaining blocks were doable, however well sophisicated. App Inventor takes away the thinking about handling lifecycle and complicated designing, which means that while implementing, this has to be considered. To make the blocks user-friendly, they must be easy to apply, well descripted and flawless. The figures below show an example of the blocks in use. A smartphone connects as a client to a broker and subscribes on the topic "temperature". At the other end a temperature sensor is publishing its value to the same broker on the same topic. Each time the said sensor is sending data, the app receives the messages and displays them on the screen. The transmission of the data is done with the MQTT protocol.

Conclusion

Working with App Inventor was both a new learning experience and a hassle. The restriction while implementing was high and the documentation were unclear. The result of this work was the functioning blocks, an instruction on how to use them and a clear tutorial on hwo to make an extension by your own. Also a byproduct was realised with this work. At this moment the BFH is running its own instance on App Inventor with a Docker container. The image was created while developing the extension and now members of the BFH do not have to rely on the servers of MIT.

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