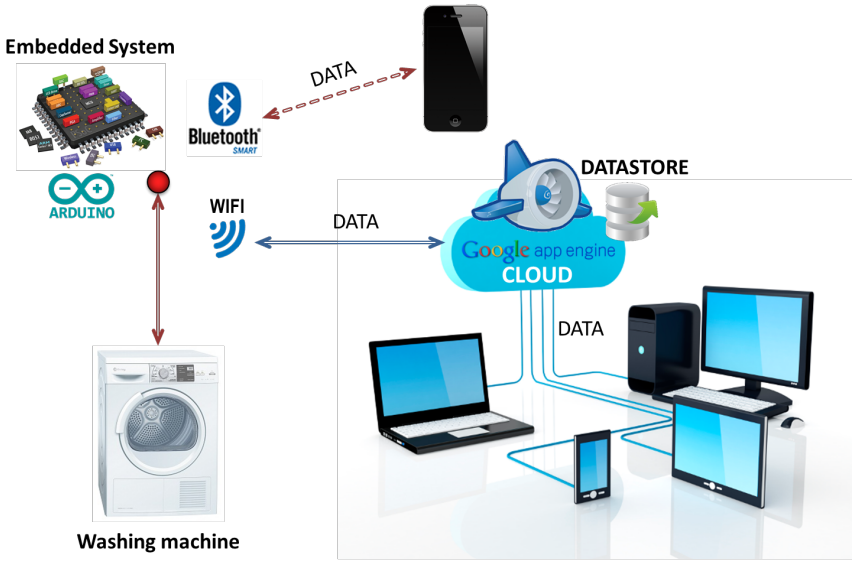
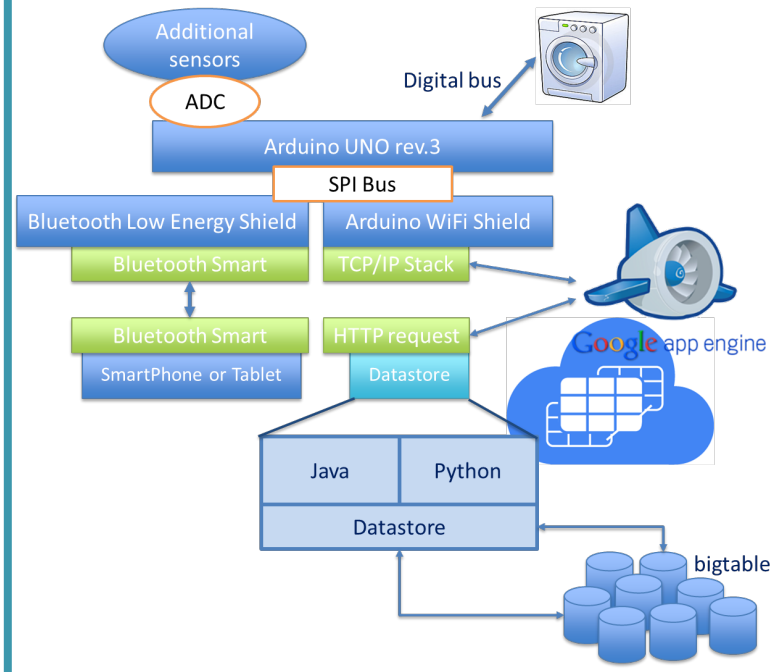
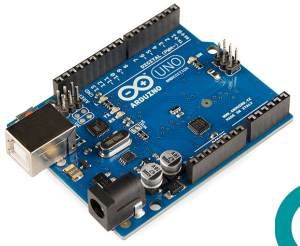
6 THE FUTURE WASHING MACHINE



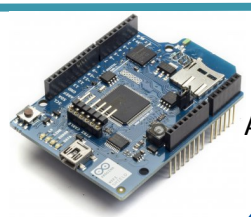
- The washing machine control unit is connected to an embedded control system based on Arduino.
- If a specific event occurs (e.g. the washing process is finished or there is a failure), the information is sent via Bluetooth or WIFI to a remote device.
- Information can be remotely received by different client devices (PC, tablet or smartphone).



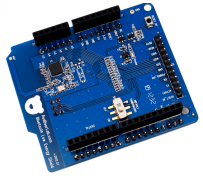
Hardware modules



Arduino UNO rev.3



Arduino WIFI Shield



Bluetooth Low Energy Shield

9 V power supply

Arduino UNO enclosure

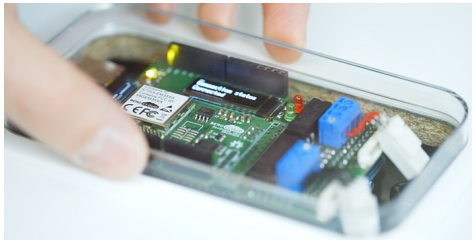
An electrical household appliance, e.g. a washing machine

THE FUTURE WASHING MACHINE

HOW TO

1. Download the Arduino IDE and the necessary libraries and install Google App Engine API and Eclipse (Luna).
2. Connect all the hardware modules together.
3. Write a Google Web Application by using the Google App Engine API with the Eclipse plugin and implement two Java Servlets for respectively storing and retrieving data using the low level Datastore API.
4. Debug the program using the localhost; then, deploy the app.
5. Write the Arduino Sketch using the methods provided for the WIFI and the Bluetooth Low Energy shields.
6. Implement a client (in a smartphone), that sends http requests and exchange data at local level by using Bluetooth Smart.
7. Verify that the system is properly working.

real example



Connected appliances have the potential to be better designed, with new features, new services, and even new business models. **Cloudwash** is a prototype washing machine, which has been created to explore how connectivity will change the appliances in homes, and to figure out what new features will be possible.

EXTENSIONS

- The proposed hardware and software architecture can be used with other appliances, e.g., a coffee machine.
- The WIFI and the Bluetooth low energy shields can be easily replaced by other boards.
- Apps for different operating systems can be easily written, if APIs for managing http clients and Bluetooth Smart communications are available.

Security

Bluetooth Core Specification ensures that the communication is always secure and protected.

Google Cloud Engine allows apps to be extended with several features that ensure a secure data exchange.

Scalability

Google Cloud Engine allows to design scalable applications and Bluetooth Smart allows to control many devices at the same time.

Many appliances can be controlled using the same App.

Portability

Bluetooth Core Specification version 4.2 is a communication standard which is being widely adopted by manufactures.

Thanks to Google App Engine, data are easily exchanged and stored by using the HTTP protocol.