

The Amphisbaena Two-Platform Node

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Motivation

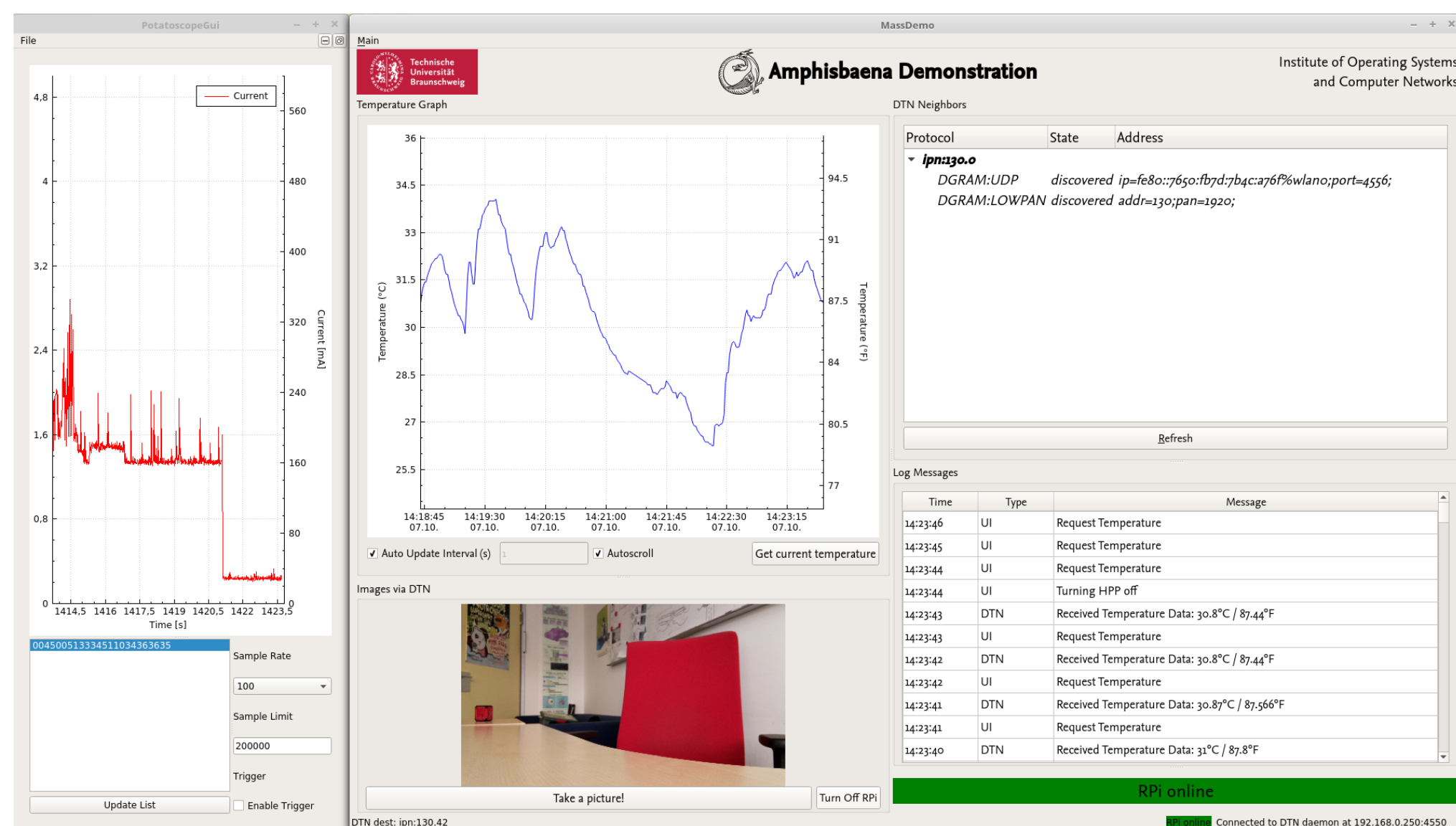
The **Amphisbaena Two-Platform Node** is designed to run autonomously in remote areas. It consists of a low-power platform being able to collect sensor data and communicate via IEEE802.15.4. A single board computer (**Raspberry Pi 3**) equipped with a WLAN interface. The computer can be woken up if high power tasks have to be conducted or if large amounts of data have to be transferred which is unfeasible for the low power radio.

As a communication stack (e.g., to transmit collected sensor data to mobile nodes), a Delay-Tolerant-Networking (DTN) stack is used. To neighbors, both platforms seem to be a single node with two radio links (IEEE802.15.4 and UDP if the SBC has been powered up).

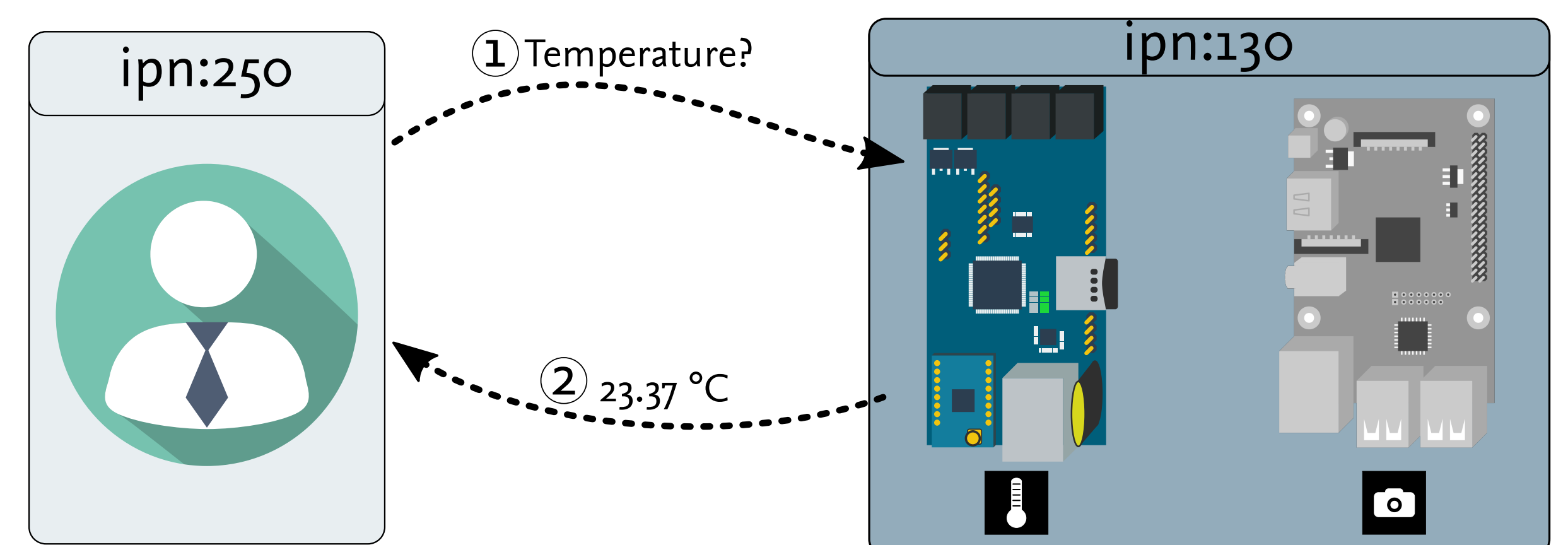
The Demo Application

In the application shown, the user can interact with an Amphisbaena-based system. From a client (Raspberry Pi with IEEE802.15.4-Radio), temperature values as well as images can be requested from the system.

A temperature sensor is attached to the Amphisbaena-board which can answer with the according value. In order to take a picture, a second Raspberry Pi has to be powered up. The current consumption can be seen in real-time.

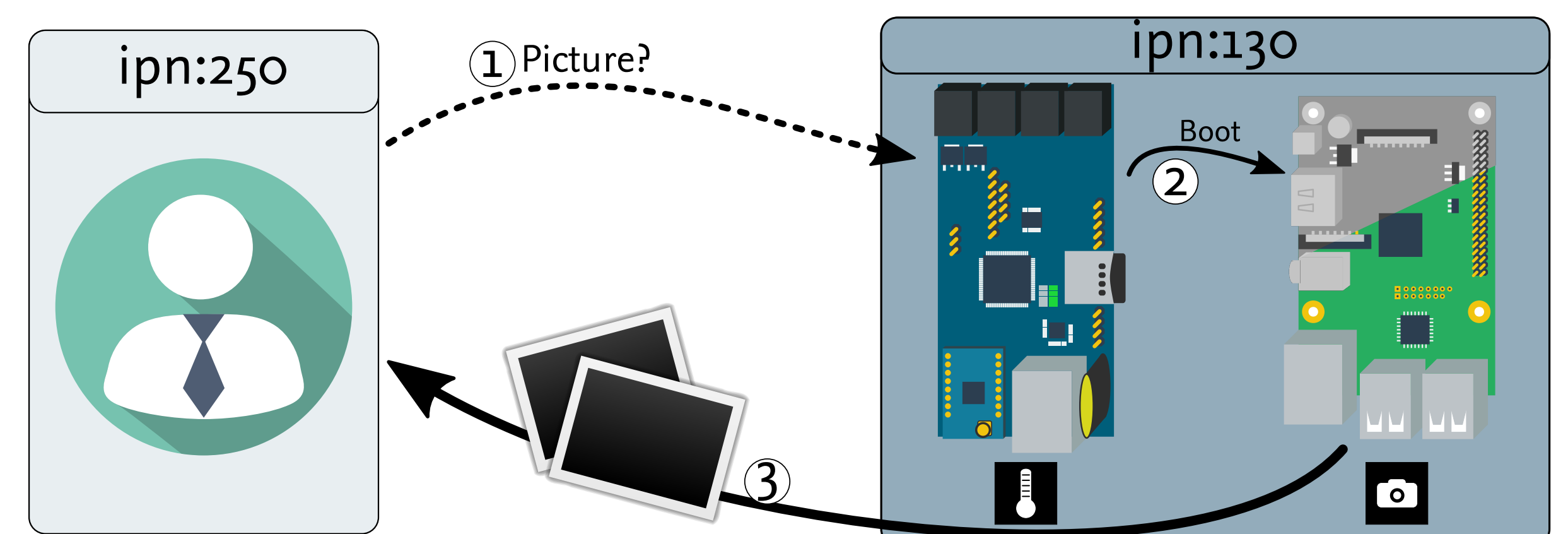


Case 1: Raspberry Pi Powered Off, Temperature Requested



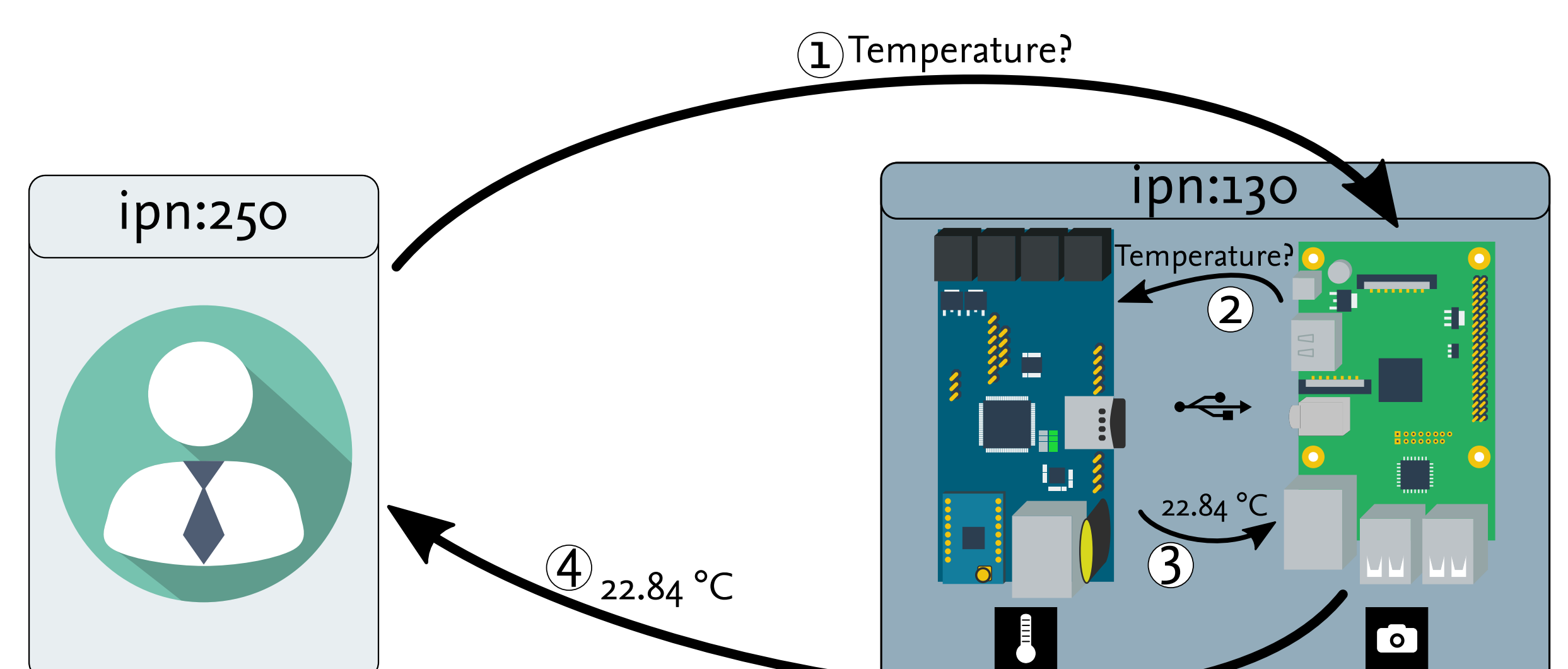
- ① Client requests Temperature via IEEE802.15.4 - Bundle sent to Amphisbaena
- ② Amphisbaena reads local sensor and answers via IEEE 802.15.4

Case 2: Raspberry Pi Powered Off, Picture Requested



- ① Client requests picture via IEEE802.15.4 - Bundle sent to Amphisbaena
- ② Amphisbaena cannot take picture and boots Raspberry Pi
- ③ Raspberry Pi takes picture and sends it via WLAN to client

Case 3: Raspberry Pi Available, Temperature Requested



- ① Client requests temperature via WLAN - bundle sent to Raspberry Pi
- ② Raspberry Pi has no sensor and requests value via USB from Amphisbaena
- ③ Temperature is sent to Raspberry Pi
- ④ Answer bundle is sent via WLAN to client

