Guide to deploying IoT-Sistem-Za-Kontrolu-Ulaza solution

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Contents

1 Introduction

This is a detailed guide on deploying the solution in the IoT-Sistem-Za-Kontrolu-Ulaza repository[1].

In this project you will learn how to use Microsoft Azure IoT Edge on a Raspberry Pi Model 3 B as an edge device with sensors attached to it. This project can be used as a base for larger Azure IoT Edge projects or as a Proof of Concept for Azure IoT Edge with real sensors.

This guide will cover setting up Azure services, installing the latest Raspian OS on the Raspberry Pi device and configuring the device as a IoT Edge device, connecting sensors and actuators and, finally, building and deploying the solution on your Edge device.

We are using a fresh installation of Raspberry Pi OS as the operating system but it might work with a not so fresh installation of Raspberry Pi. You can follow the Raspberry Pi OS installation guide in the next section.

2 Raspberry Pi device setup

This section will cover installing Raspberry pi OS (previous Raspbian) on your Raspberry Pi. After completing this section you will have a Raspberry Pi device up and running.

2.1 Installing Raspberry Pi OS

To get started with your Raspberry Pi computer you'll need A computer monitor, or television and a computer keyboard and mouse. Most monitors should work as a display for the Raspberry Pi, but for best results, you should use a display with HDMI input. You'll also need a appropriate display cable, to connect your monitor to your Raspberry Pi.

Finally you'll need an SD card. It is recommend to use a micro SD card with a minimum of 8GB, and to use an Imager to install an operating system onto it.

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[1]`https://github.com/StokicDusan/IoT-Sistem-Za-Kontrolu-Ulaza`

Raspberry Pi recommend the use of Raspberry Pi Imager[2] to install an operating system on your SD card. You will need another computer with an SD card reader to install the image. After installing the imager:

- Connect an SD card reader with the SD card inside.

- Open Raspberry Pi Imager and choose the recommended Raspberry Pi OS (32-bit) from the list presented.

- Choose the SD card you wish to write your image to.

After placing the SD card in your Raspberry Pi device, start it and begin the setup. Upon booting the device, you will be met with the welcome screen like in figure 1 and start the setup.
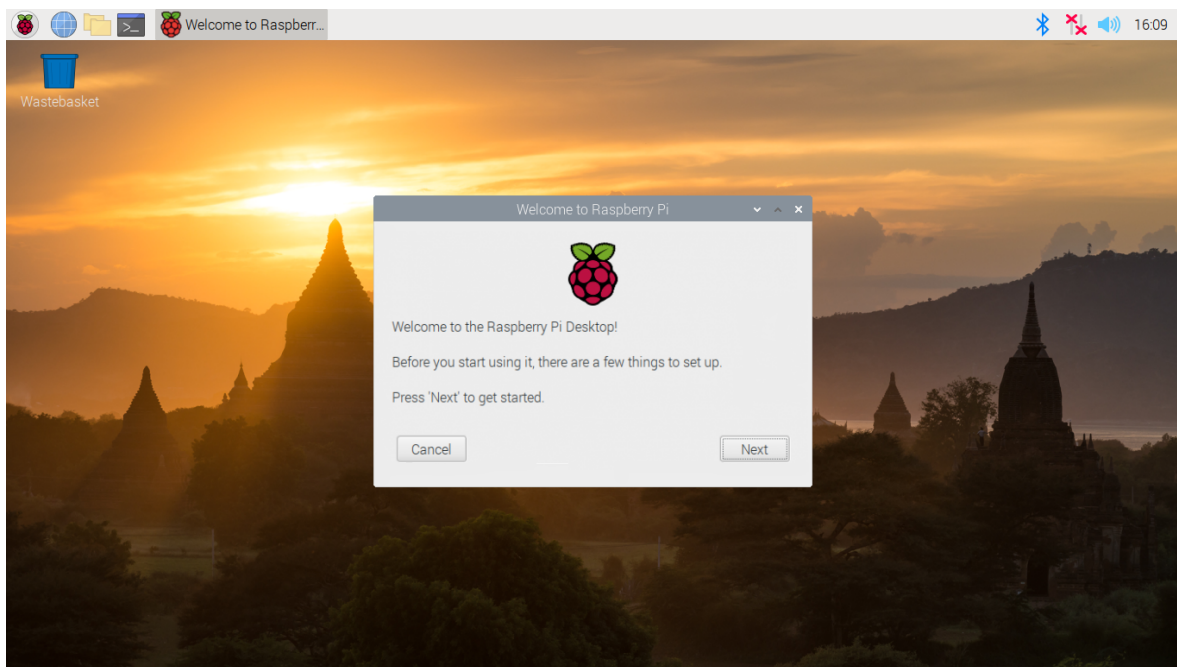

Figure 1: Welcome screen after booting your Raspberry pi device for the first time

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[2]https://www.raspberrypi.org/software/

2.2   Raspberry Pi quick start

Now we have all the hardware and software in place and ready to start.
Booting your Raspberry pi device for the first time, you can go through initial setup of the device. Connect your device to a Wi-Fi network and be sure to change the default password for your device. It is also recommended to update your software.

After completing the setup open the terminal and type:

```
$ sudo raspi-setup
```

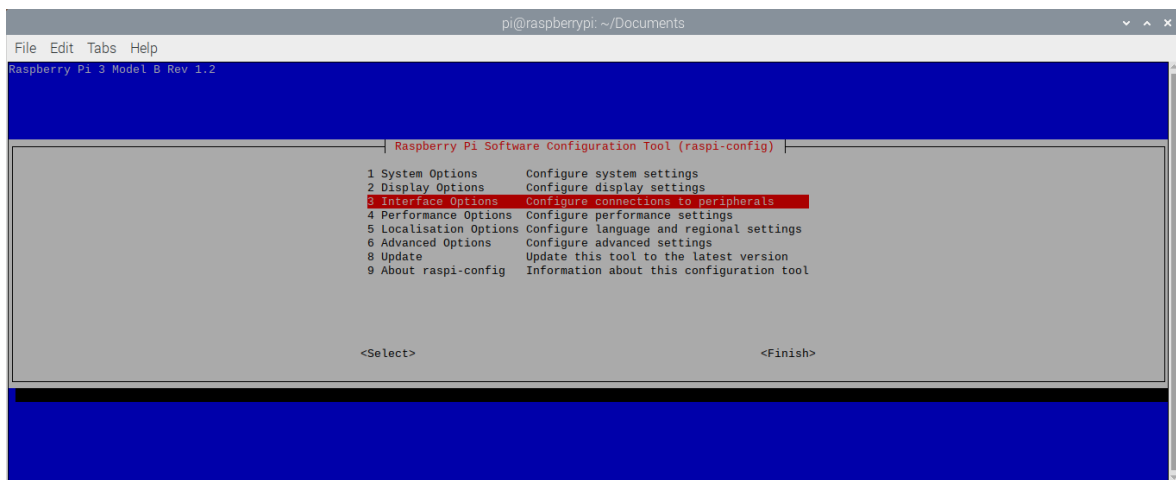This command should open the software configuration tool like in figure 2.

Figure 2: Raspberry pi software configuration tool

From here you can enable the camera interface by navigating through
Interface Options>Camera and choose **Enable**. Do the same for **SSH** and **I2C**.

From now on you can access the Raspberry Pi remotely. I am using Putty[3] as the SSH utility to connect to the Raspberry Pi shell. Returning back to the terminal you can issue the

```
$ ifconfig
```

command to see the IP address of your Raspberry Pi. You will connect to this IP address in Putty to connect to the Raspberry Pi (if you have not changed the default password you can use pi as the login name and raspberry as the password.)

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[3]https://www.putty.org/

3   Create Azure resources

IoT Edge runtime, we will be installing on Raspberry Pi in the next section, will communicate to an IoT Hub in Azure. This IoT Hub needs to be created and initialized in Azure platform as well as other resources needed for this solution. It is possible to create these resources on the Azure portal or through command line tool package, Azure CLI, provided by Microsoft. Here we will use the Azure portal.

4   Install IoT Edge on Raspberry Pi

This section will cover the installation of Azure IoT Edge runtime on your Raspberry Pi device as well as connecting the Edge device to the IoT Hub in Azure.

4.1   SSH into your Raspberry Pi

Now that you have enabled SSH and found out your IP address you can go ahead and SSH into your Raspberry Pi from any other computer. You'll also need the username and the password for the Raspberry Pi.
Default Username and Password are:

- username: pi

- password: raspberry

If you have changed the default password then use the new password instead of the above.

On a successful login you'll be presented with the terminal of your Raspberry Pi. Now you can any commands on your Raspberry Pi through this terminal remotely (within the current network) without having to access your Raspberry Pi physically.

References

[1] Microsoft. *Azure IoT Edge documentation.*

[2] Microsoft. Install or uninstall azure iot edge for linux. `https://docs.microsoft.com/en-us/azure/iot-edge/how-to-install-iot-edge?view=iotedge-2018-06`.

[3] Microsoft. Register an iot edge device in iot hub. `https://docs.microsoft.com/en-us/azure/iot-edge/how-to-register-device?view=iotedge-2018-06`.

[4] Microsoft. Understand iot edge automatic deployments. `https://docs.microsoft.com/en-us/azure/iot-edge/module-deployment-monitoring?view=iotedge-2020-11`.

[5] Raspberry Pi. Setting up your raspberry pi. `https://www.raspberrypi.org/documentation/computers/getting-started.html`.