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Table of Contents

Contents

[1. Introduction 2](#_Toc472009576)

[1.1 Purpose 2](#_Toc472009577)

[2. Interface 2](#_Toc472009578)

[2.1 Internet Connectivity Status 3](#_Toc472009579)

[2.1.1 Unable connect to internet: 3](#_Toc472009580)

[2.1.2 GSM Modem hot plug notification: 3](#_Toc472009581)

[2.2 USB device status 3](#_Toc472009582)

[2.2.1 Check usb device connection status: 3](#_Toc472009583)

[2.3 Swilch application service status 3](#_Toc472009584)

[2.4 Wifi hotspot service restart 3](#_Toc472009585)

[2.5 Socket unbinding request 3](#_Toc472009586)

[2.6 Kernel update 4](#_Toc472009587)

[2.7 Application update 4](#_Toc472009588)

[2.8 Backup trigger 4](#_Toc472009589)

[2.8.1 Backup triggerfrom Application 4](#_Toc472009590)

[2.8.2 Backup triggerfrom Monitoring program 4](#_Toc472009591)

# Introduction

# Purpose

This document details the communication interfaces between monitoring program and application service in the Linux OS for the Bosch Milk analyzer or SWILCH Project as per the linux customization.docx and the reviewed SRS\_Linux Customization for IOT Gateway v 0 6.docx communicated through email to Avench.

# Interface

On Power up the monitoring program will initiate a server. The application Service will establish a TCP/IP Socket with the following IP ADRR 127.0.0.1(local Host) and socket no 9999 in order to communicate with the monitoring program

Each message will have request code and supporting data. Receiving program will send back the acknowledgement along with the request code once the request message is received. After processing the request receiving program will send back service status along with the service code. Following diagram indicates the same.

Sending Program

Receiving Program

Request

Acknowledgement

Solution

Acknowledgement

## There will be status check every 5 seconds.

## Error Communication - Application to Monitoring program

The following are the list of commands that the Application program initiates in order to indicate error/ status to monitoring program:

1. Unable to establish internet connection : **0x01**
2. Check USB device connection status : **0x02**
3. Application service Restart : **0x03**
4. Wi-Fi hotspot service restart : **0x04**
5. System restart : **0x05**
6. Socket unbinding request : **0x06**
7. Kernel Free to update Firmware : **0x07**
8. Ready to Update Application:**0x08**
9. Backup triggerfrom Application : **0x09**

**Note:** Acknowledgment triggered from monitoring program to Application Program is **0x80**.

## Error Communication - Monitoring to Application program

The following are the list of commands that the Application program initiates in order to indicate error/ status to monitoring program:

1. GSM Modem Not Connected: **0x81**
2. GSM Modem Connected with No Internet: **0x82**
3. GSM Modem Connected with Internet: **0x83**
4. GSM Modem hot plug notification: **0x84**
5. USB Device not connected: **0x85**
6. USB Device Connection refreshed: **0x86**
7. USB hot plug notification : **0x87**
8. Kernel update request: **0x88**
9. Application update request: **0x89**
10. Backup trigger from monitoring program: **0x8a**
11. Data backup done:**0x8b**
12. Disk Usage status: **0x8e**

84 and 87 are to be merged into one code .

**Note:** Acknowledgment triggered from Application program to monitoring Program is 0x00.

## Unable to establish internet connection: 0x01

When Application program is unable to establish internet connection it sends an **Error command 0x01** to monitoring program and the monitoring program **Acknowledges by sending 0x80** followed by the Error code (in this case 0x01) as shown below

Application Program

Monitoring Program

0x01

0x80, 0x01

Based on the type of error the monitoring program replies as below

### GSM Modem Not Connected: 0x81

The Monitoring program will check if GSM modem is connected for the request 0x01 and if it is not connected the monitoring program will send a command 0x81 to Application Program, The Application program will Acknowledge the command by sending 0x00 followed by the command sent by monitoring program ( in this case 0x81)

Application Program

Monitoring Program

0x81

0x00, 0x81

### GSM Modem Connected with No Internet: 0x82

The Monitoring program will check if GSM modem is connected and able to establish connection for the request 0x01 and if it is connected but unable to establish internet connection the monitoring program will send a command 0x82 to Application Program, The Application program will Acknowledge the command by sending 0x00 followed by the command sent by monitoring program (in this case 0x82)

Application Program

Monitoring Program

0x82

0x00, 0x82

### GSM Modem Connected with Internet: 0x83

The Monitoring program will check if GSM modem is connected and able to establish connection for the request 0x01 and if it is connected and able to establish internet connection the monitoring program will send a command 0x83 to Application Program, The Application program will Acknowledge the command by sending 0x00 followed by the command sent by monitoring program (in this case 0x83)

Application Program

Monitoring Program

0x83

0x00, 0x83

## GSM Modem hot plug notification: 0x84

Monitoring program should check and notify the application service if a gsm modem is connected to the system by sending command 0x84 for hot plug along with either 0x83 or 0x82 for internet connection status. The Application Acknowledges the same by sending 0x00 followed by 0x84 and 0x82 or 0x83 based on internet connection status

Application Program

Monitoring Program

0x84, 0x82/0x83

0x00, 0x84, 0x82/0x83

## Check USB device connection status: 0x02

When Application program is unable to establish USB connection for a particular device it sends an **Error command 0x02 followed by 2 bytes of Vendor ID and 2 bytes of Product ID** to monitoring program and the monitoring program **Acknowledges by sending 0x80** followed by the command code code (in this case 0x02 and 2 bytes of Vendor ID and 2 bytes of Product ID) as shown below

Application Program

Monitoring Program

0x02, 0x00, 0x00, 0x01, 0x01

0x80, 0x02, 0x00, 0x00, 0x01, 0x01

Based on the type of error the monitoring program replies as below

### USB Device not connected: 0x85

When the monitoring program determines that a particular USB device with vendor id and product id is not connected based on the previous command of 0x02( which includes vendor id and product id), The monitoring program sends the command 0x85. The application program responds by sending Ack 0x00 followed by the command 0x85

Application Program

Monitoring Program

0x85

0x00, 0x85

### USB Device Connection refreshed: 0x86

When the monitoring program determines that a particular USB device with vendor id and product id is connected based on the previous command of 0x02( which includes vendor id and product id), The monitoring program refreshes the USB device sends the command 0x86. The application program responds by sending Ack 0x00 followed by the command 0x86

Application Program

Monitoring Program

0x86

0x00, 0x86

## USB hot plug notification: 0x87

Monitoring program should check and notify the application service if a new USB device is connected to the system by sending command 0x87 along with 2 bytes of vendor id and 2 bytes of product. The Application acknowledges the same by sending 0x00 followed by 0x87

Application Program

Monitoring Program

0x87, 0x00, 0x00, 0x01, 0x01

0x00, 0x87

## Application service Restart: 0x03

The Application service when it is required to restart itself, will send the command 0x03 to monitoring program, the monitoring program will Ack this by sending 0x80 followed by 0x03

Application Program

Monitoring Program

0x03

0x80, 0x03

## Wi-Fi hotspot service restart: 0x04

The Application service when it is required to restart Wi-Fi service , it will send the command 0x04 to monitoring program, the monitoring program will Ack this by sending 0x80 followed by 0x04

Application Program

Monitoring Program

0x04

0x80, 0x04

## System restart: 0x05

The Application service when it is required to restart the system, it will send the command 0x05 to monitoring program, the monitoring program will Ack this by sending 0x80 followed by 0x05

Application Program

Monitoring Program

0x05

0x80, 0x05

## Socket unbinding request: 0x06

The Application service when it is required to unbind a socket, it will send the command 0x06 followed by 4 bytes of IP address to monitoring program, the monitoring program will Ack this by sending 0x80 followed by 0x06

Application Program

Monitoring Program

0x06, 0x01, 0x02,0x03,0x04

0x80, 0x06

## Kernel update request: 0x88

The monitoring program will request the application program to update the kernel by sending the command 0x88 and also the source of updating file 0x01 – USB Drive, 0x02 – Local Wi-fi SSH, 0x03 – Server SSH.The application program will Ack this by sending 0x00 followed by 0x88

Application Program

Monitoring Program

0x88, 0x01

0x00, 0x88

When the Application completes its tasks and then when ready to release the kernel for firmware update, it will send the following command

## Kernel Free to update Firmware: 0x07

Application Program

Monitoring Program

0x07

0x80, 0x07

## Application update request: 0x89

The monitoring program will request the application program to update the application by sending the command 0x89 and also the source of updating file 0x01 – USB Drive, 0x02 – Local Wi-fi SSH, 0x03 – Server SSH, The application program will Ack this by sending 0x00 followed by 0x89

Application Program

Monitoring Program

0x89, 0x01

0x00, 0x89

When the Application completes its tasks and then when ready to update the, it will send the following command

## Ready to Update Application: 0x08

Application Program

Monitoring Program

0x08

0x80, 0x08

## Backup trigger from monitoring program: 0x8a

Monitoring program will request permission from application for backup data via the command 0x8a, The Application program will Ack the same via 0x00 followed by the command 0x8a

Application Program

Monitoring Program

0x8a

0x00, 0x8a

Application will grant the permission when it is ready for backup data via the following commands. The following commands are also used by application to trigger Backup from its end

## Backup trigger from Application: 0x09

The Application sends this command to monitoring program to back up data, The Monitoring program sends an Ack along with the command 0x09

Application Program

Monitoring Program

0x09

0x80, 0x09

Once the Backup is done the monitoring program sned the following command

## Data backup done: 0x8b

The monitoring program will perform back and inform application program via the command 0x8b and the Application program will ACK by sending 0x00 along with command 0x8b

Application Program

Monitoring Program

0x8b

0x00, 0x8b

## Disk Usage status: 0x8e

Monitoring program will send a message to application service indicating current disk usage in percentage via the command 0x8e followed by percentage data. The Application program will Ack the command with 0x00 followed by the command 0x8e

Application Program

Monitoring Program

0x8e, 0x50

0x00, 0x8e