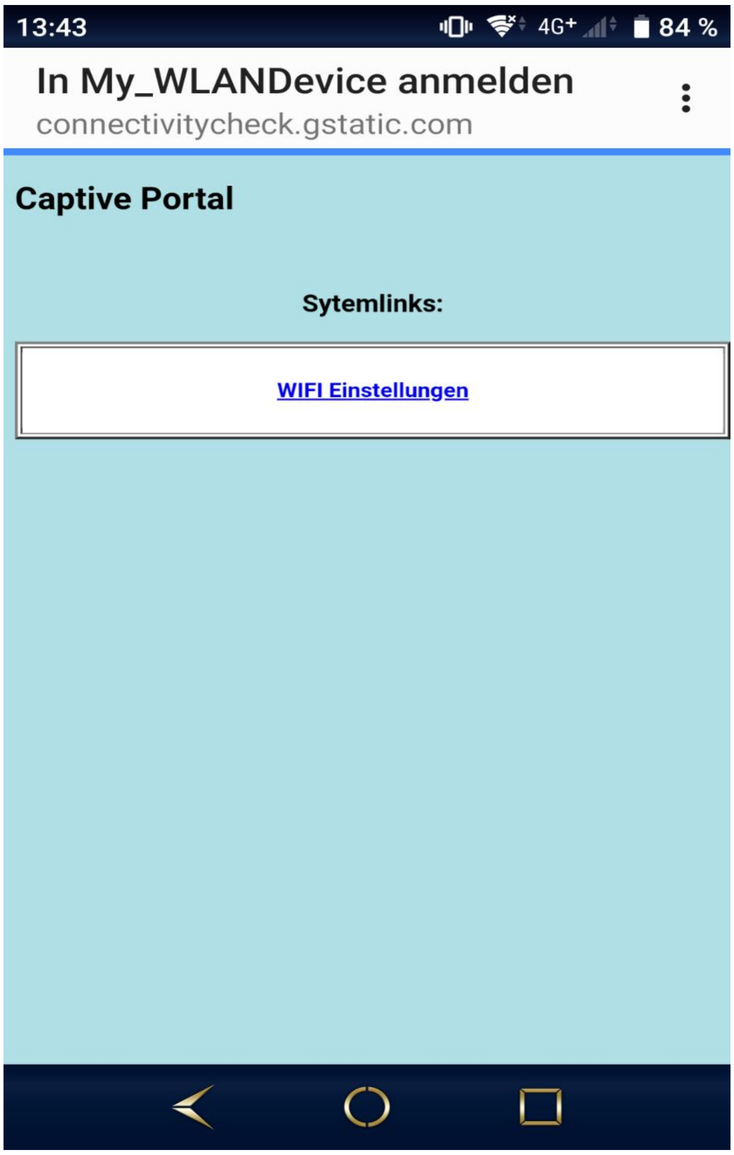
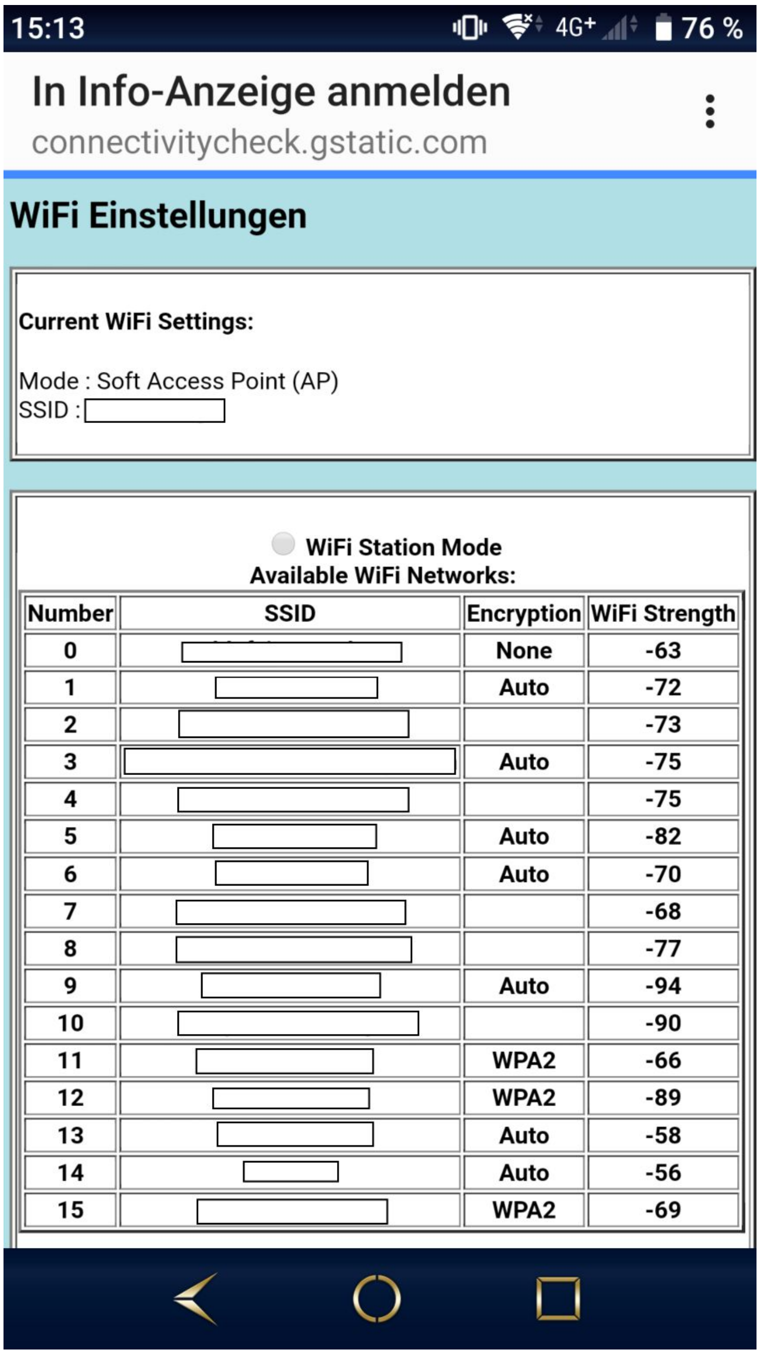
Eigenes Captive Portal mit dem ESP 8266

Hallo und willkommen zu einem Sonderblog. Heute solle es mal nicht um ein fertiges Projekt gehen, sondern um eine Hilfe für viele eigene Projekte rund um das Thema WLAN Zugangsdaten und ESP8266. Häufig besteht bei eigenen Projekten das Problem, das WLAN Zugangsdaten fest im eigenen Code programmiert werden aber dadurch nicht mehr nachträglich geändert werden können oder der ESP seine WLAN Zugangsdaten „vergisst" sobald ein Reboot erfolgt. Beides ist für eine gewisse Flexibilität bei der Konfiguration problematisch. Die Lösung dafür ist, die WLAN Zugangsdaten im internen EEPROM abzulegen und dafür zu sorgen, dass diese jederzeit, auch zur Laufzeit der Firmware, diese änderbar sind.

Dazu baut der ESP mit unserem nachfolgendem Captive Portal Code im ersten Schritt ein Captive-Portal auf, ein WLAN mit dem Namen „My_WLANDevice" und dem Passwort „12345678" auf. Mit diesem können wir uns mit unserem Handy verbinden, und werden dann von dem Handy automatisch auf die Captive Portal Webseite geleitet. Diese sieht wie folgt aus:



Auf dieser können wir nun dem System-Link „WiFi Einstellungen“ klicken, und gelangen nun auf eine umfangreiche WLAN Konfigurationsseite, mit der wir nun sowohl ein Netz, mit dem sich der ESP verbinden soll, auswählen können:



WiFi Einstellungen

Current WiFi Settings:

Mode : Soft Access Point (AP)
SSID : [redacted]

○ **WiFi Station Mode**
Available WiFi Networks:

Number	SSID	Encryption	WiFi Strength
0	[redacted]	None	-63
1	[redacted]	Auto	-72
2	[redacted]		-73
3	[redacted]	Auto	-75
4	[redacted]		-75
5	[redacted]	Auto	-82
6	[redacted]	Auto	-70
7	[redacted]		-68
8	[redacted]		-77
9	[redacted]	Auto	-94
10	[redacted]		-90
11	[redacted]	WPA2	-66
12	[redacted]	WPA2	-89
13	[redacted]	Auto	-58
14	[redacted]	Auto	-56
15	[redacted]	WPA2	-69

Das hier ausgewählte Funknetz und das eingegebene Passwort werden im EEPROM gespeichert. Beim nächsten Boot versucht sich der ESP mit diesem Netzwerk zu verbinden. Scheitert der Versuch, weil das Netzwerk z.B nicht mehr erreichbar ist, oder das Passwort geändert wurde, schaltet der ESP zurück in den Access Point Modus und wartet auf eine Neukonfiguration.

Der Code für das Captive Portal lautet:

```
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>
#include <ESP8266mDNS.h>
#include <DNSServer.h>
#include <EEPROM.h>

static const byte WiFiPwdLen = 25;
static const byte APSTANameLen = 20;

static const uint8_t D0   = 16;
static const uint8_t D1   = 5;
static const uint8_t D2   = 4;
static const uint8_t D3   = 0;
static const uint8_t D4   = 2;
static const uint8_t D5   = 14;
static const uint8_t D6   = 12;
static const uint8_t D7   = 13;
static const uint8_t D8   = 15;
static const uint8_t D9   = 3;
static const uint8_t D10  = 1;

struct WiFiEEPromData
  {
    bool APSTA = true; // Access Point or Sation Mode - true AP Mode
    bool PwDReq = false; // PasswordRequired
    bool CapPortal = true ; //CaptivePortal on in AP Mode
    char APSTAName[APSTANameLen]; // STATION /AP Point Name TO
cONNECT, if definded
    char WiFiPwd[WiFiPwdLen]; // WiFiPAssword, if definded
    char ConfigValid[3]; //If Config is Vaild, Tag "TK" is required"
  };

static const short int BUILTIN_LED0 = D0; //GPIO0
/* hostname for mDNS. Should work at least on windows. Try http://esp8266.local
*/
const char *ESPHostname = "ESP";

// DNS server
const byte DNS_PORT = 53;
DNSServer dnsServer;

//Conmmon Paramenters
bool SoftAccOK  = false;

// Web server
ESP8266WebServer server(80);

/* Soft AP network parameters */
```

```
IPAddress apIP(172, 20, 0, 1);
IPAddress netMsk(255, 255, 255, 0);


/** Should I connect to WLAN asap? */
boolean connect;

/** Last time I tried to connect to WLAN */
//long lastConnectTry = 0;
unsigned long currentMillis = 0;
unsigned long startMillis;
const short period = 10;  // Sleep after this Minutes of inactivity


/** Current WLAN status */
short status = WL_IDLE_STATUS;

WiFiEEPromData MyWiFiConfig;
String temp ="";

void setup()
{

  bool ConnectSuccess = false;
  bool CreateSoftAPSucc  = false;
  bool CInitFSSystem  = false;
  bool CInitHTTPServer  = false;
  byte len;
  pinMode(D0, OUTPUT); // Initialize the BUILTIN_LED1 pin as an output
  Serial.begin(9600);
  Serial.println();
  WiFi.hostname(ESPHostname); // Set the DHCP hostname assigned to ESP
station.
  if (loadCredentials()) // Load WLAN credentials for WiFi Settings
  {
   // Valid Credentials found.
     if (MyWiFiConfig.APSTA == true)  // AP Mode
      {
        //Serial.println("AP Mode");
        //Serial.println(MyWiFiConfig.APSTA);
        len = strlen(MyWiFiConfig.APSTAName);
        MyWiFiConfig.APSTAName[len+1] = '\0';
        len = strlen(MyWiFiConfig.WiFiPwd);
        MyWiFiConfig.WiFiPwd[len+1] = '\0';
        CreateSoftAPSucc = CreateWifiSoftAP();
      } else
      {
        //Serial.println("STA Mode");
        len = strlen(MyWiFiConfig.APSTAName);
        MyWiFiConfig.APSTAName[len+1] = '\0';
        len = strlen(MyWiFiConfig.WiFiPwd);
```

```
       MyWiFiConfig.WiFiPwd[len+1] = '\0';
       len = ConnectWifiAP();
       if ( len == 3 ) { ConnectSuccess = true; } else { ConnectSuccess = false; }
      }
  } else
  { //Set default Config - Create AP
     Serial.println("DefaultWiFi Cnf");
     SetDefaultWiFiConfig ();
     CreateSoftAPSucc = CreateWifiSoftAP();
     saveCredentials();
     // Blink
     digitalWrite(D0, LOW); // Pull to LOW _Led ON
     delay(500);
     digitalWrite(D0, HIGH);
     delay(500);
     digitalWrite(D0, LOW); // Pull to LOW _Led ON
     delay(500);
     digitalWrite(D0, HIGH);
     delay(500);
     digitalWrite(D0, LOW); // Pull to LOW _Led ON
  }
  if ((ConnectSuccess or CreateSoftAPSucc) and CInitFSSystem)
    {
      InitalizeHTTPServer();
      digitalWrite(D0, LOW); // Pull to LOW _Led ON
      Serial.println("OK");
    }
    else
    {
      Serial.setDebugOutput(true); //Debug Output for WLAN on Serial Interface.
      Serial.print("Err");
      SetDefaultWiFiConfig ();
      CreateSoftAPSucc = CreateWifiSoftAP();
      saveCredentials();
      InitalizeHTTPServer();
    }
startMillis = millis();  //initial start time
}

void InitalizeHTTPServer()
 {
  bool initok = false;
  /* Setup web pages: root, wifi config pages, SO captive portal detectors and not
found. */
  server.on("/", handleRoot);
  server.on("/wifi", handleWifi);
  if (MyWiFiConfig.CapPortal) { server.on("/generate_204", handleRoot); } //Android
captive portal. Maybe not needed. Might be handled by notFound handler.
  if (MyWiFiConfig.CapPortal) { server.on("/favicon.ico", handleRoot); }   //Another
Android captive portal. Maybe not needed. Might be handled by notFound handler.
Checked on Sony Handy
```

```
  if (MyWiFiConfig.CapPortal) { server.on("/fwlink", handleRoot); }  //Microsoft
captive portal. Maybe not needed. Might be handled by notFound handler.
  //server.on("/generate_204", handleRoot);  //Android captive portal. Maybe not
needed. Might be handled by notFound handler.
  //server.on("/favicon.ico", handleRoot);    //Another Android captive portal. Maybe
not needed. Might be handled by notFound handler. Checked on Sony Handy
  //server.on("/fwlink", handleRoot);   //Microsoft captive portal. Maybe not needed.
Might be handled by notFound handler.
  server.onNotFound ( handleNotFound );
  // Speicherung Header-Elemente anfordern
  // server.collectHeaders(Headers, sizeof(Headers)/ sizeof(Headers[0]));
  server.begin(); // Web server start
 }

boolean CreateWifiSoftAP()
{
  WiFi.disconnect();
  Serial.print("SoftAP ");
  WiFi.softAPConfig(apIP, apIP, netMsk);
  if (MyWiFiConfig.PwDReq)
    {
      SoftAccOK  =   WiFi.softAP(MyWiFiConfig.APSTAName,
MyWiFiConfig.WiFiPwd); // Passwortlänge mindestens 8 Zeichen !
    } else
    {
      SoftAccOK  =  WiFi.softAP(MyWiFiConfig.APSTAName); // Access Point
WITHOUT Password
      // Overload Function:; WiFi.softAP(ssid, password, channel, hidden)
    }
  delay(600); // Without delay I've seen the IP address blank
  if (SoftAccOK)
  {
  Serial.println("OK");
  Serial.println(MyWiFiConfig.APSTAName);
  Serial.println(MyWiFiConfig.WiFiPwd);
  /* Setup the DNS server redirecting all the domains to the apIP */
  dnsServer.setErrorReplyCode(DNSReplyCode::NoError);
  dnsServer.start(DNS_PORT, "*", apIP);
  } else
  {
  Serial.println("err");
  Serial.println(MyWiFiConfig.APSTAName);
  Serial.println(MyWiFiConfig.WiFiPwd);
  }
  return SoftAccOK;
}


byte ConnectWifiAP()
{
  // Serial.println("Initalizing Wifi Client.");
  byte connRes = 0;
  byte i = 0;
  WiFi.disconnect();
  WiFi.softAPdisconnect(true); // Function will set currently configured SSID and
password of the soft-AP to null values. The parameter  is optional. If set to true it
will switch the soft-AP mode off.
  WiFi.begin(MyWiFiConfig.APSTAName, MyWiFiConfig.WiFiPwd);
  connRes  = WiFi.waitForConnectResult();
  delay(500);
  while (( connRes == 0 ) and (i != 10))  //if connRes == 0  "IDLE_STATUS - change
Statius"
    {
      connRes  = WiFi.waitForConnectResult();
      delay(1000);
      i++;
      Serial.println(".");
      // statement(s)
    }
  while (( connRes == 1 ) and (i != 10))  //if connRes == 1  NO_SSID_AVAILin -
SSID cannot be reached
    {
      connRes  = WiFi.waitForConnectResult();
      delay(1000);
      i++;
      Serial.println(".");
      // statement(s)
    }
  if (connRes == 3 ) {
                      Serial.print("STA ");
                      WiFi.setAutoReconnect(true); // Set whether module will attempt to
reconnect to an access point in case it is disconnected.
                      // Setup MDNS responder
                          if (!MDNS.begin(ESPHostname)) {
                              Serial.println("Err: MDNS");
                              } else { MDNS.addService("http", "tcp", 80); }
                     }
  if (connRes == 4 ) {
                     Serial.println("STA Pwd Err");
                     //Serial.print("PwLen:");
                     //Serial.println(strlen(MyWiFiConfig.WiFiPwd));
                     //Serial.print("PwSize");
                     //Serial.println(sizeof(MyWiFiConfig.WiFiPwd));
                     Serial.println(MyWiFiConfig.APSTAName);
                     Serial.println(MyWiFiConfig.WiFiPwd);
                     WiFi.disconnect();
                     }
  // if (connRes == 6 ) { Serial.println("DISCONNECTED - Not in station mode"); }
  // WiFi.printDiag(Serial);
return connRes;
}
```

```
bool loadCredentials()
{
 bool RetValue;
 EEPROM.begin(512);
 EEPROM.get(0, MyWiFiConfig);
 EEPROM.end();
 if (String(MyWiFiConfig.ConfigValid) = String("TK"))
  {
    RetValue = true;
  } else
  {
    RetValue = false; // WLAN Settings not found.
  }
  return RetValue;
}


/** Store WLAN credentials to EEPROM */

bool saveCredentials()
{
bool RetValue;
// Check logical Errors
RetValue = true;
if  (MyWiFiConfig.APSTA == true ) //AP Mode
  {
   if (MyWiFiConfig.PwDReq and (sizeof(String(MyWiFiConfig.WiFiPwd)) < 8))
    {
      RetValue = false;  // Invalid Config
    }
   if (sizeof(String(MyWiFiConfig.APSTAName)) < 1)
    {
      RetValue = false;  // Invalid Config
    }
  } else //Station Mode
  {
  }
  // End Check logical Errors
if (RetValue)
  {
  EEPROM.begin(512);
  for (int i = 0 ; i < sizeof(MyWiFiConfig) ; i++)
     {
      EEPROM.write(i, 0);
     }
  strncpy( MyWiFiConfig.ConfigValid , "TK", sizeof(MyWiFiConfig.ConfigValid) );
  EEPROM.put(0, MyWiFiConfig);
  EEPROM.commit();
  EEPROM.end();
  }
  return RetValue;
```

```
}

void SetDefaultWiFiConfig ()
{
   byte len;
   MyWiFiConfig.APSTA = true;
   MyWiFiConfig.PwDReq = true;  // default PW required
   MyWiFiConfig.CapPortal = true;
   strncpy( MyWiFiConfig.APSTAName, "My_WLANDevice",
sizeof(MyWiFiConfig.APSTAName) );
   len = strlen(MyWiFiConfig.APSTAName);
   MyWiFiConfig.APSTAName[len+1] = '\0';
   strncpy( MyWiFiConfig.WiFiPwd, "12345678", sizeof(MyWiFiConfig.WiFiPwd) ); //
no password
   len = strlen(MyWiFiConfig.WiFiPwd);
   MyWiFiConfig.WiFiPwd[len+1] = '\0';
   strncpy( MyWiFiConfig.ConfigValid, "TK", sizeof(MyWiFiConfig.ConfigValid) );
   len = strlen(MyWiFiConfig.ConfigValid);
   MyWiFiConfig.ConfigValid[len+1] = '\0';
   Serial.println("RstWiFiCrd");
}

/** Is this an IP? */
boolean isIp(String str) {
  for (int i = 0; i < str.length(); i++) {
    int c = str.charAt(i);
    if (c != '.' && (c < '0' || c > '9')) {
      return false;
    }
  }
  return true;
}

String GetEncryptionType(byte thisType) {
  String Output = "";
   // read the encryption type and print out the name:
   switch (thisType) {
     case ENC_TYPE_WEP:
       Output = "WEP";
       return Output;
       break;
     case ENC_TYPE_TKIP:
       Output = "WPA";
       return Output;
       break;
     case ENC_TYPE_CCMP:
       Output = "WPA2";
       return Output;
       break;
     case ENC_TYPE_NONE:
       Output = "None";
      return Output;
      break;
    case ENC_TYPE_AUTO:
      Output = "Auto";
      return Output;
     break;
  }
}

/** IP to String? */
String toStringIp(IPAddress ip) {
  String res = "";
  for (int i = 0; i < 3; i++) {
    res += String((ip >> (8 * i)) & 0xFF) + ".";
  }
  res += String(((ip >> 8 * 3)) & 0xFF);
  return res;
}


String formatBytes(size_t bytes) {            // lesbare Anzeige der Speichergrößen
   if (bytes < 1024) {
     return String(bytes) + " Byte";
   } else if (bytes < (1024 * 1024)) {
     return String(bytes / 1024.0) + " KB";
   } else if (bytes < (1024 * 1024 * 1024)) {
     return String(bytes / 1024.0 / 1024.0) + " MB";
   }
 }






void handleRoot() {
//  Main Page:
// FSInfo fs_info;
 temp = "";
 short PicCount = 0;
 byte ServArgs = 0;

//Building Page
  // HTML Header
  server.sendHeader("Cache-Control", "no-cache, no-store, must-revalidate");
  server.sendHeader("Pragma", "no-cache");
  server.sendHeader("Expires", "-1");
  server.setContentLength(CONTENT_LENGTH_UNKNOWN);
// HTML Content
  server.send ( 200, "text/html", temp );   // Speichersparen - Schon mal dem Cleint
senden
```

```
  temp = "";
  temp += "<!DOCTYPE HTML><html lang='de'><head><meta charset='UTF-
8'><meta name= viewport content='width=device-width, initial-scale=1.0,'>";
  server.sendContent(temp);
  temp = "";
  temp += "<style type='text/css'><!-- DIV.container { min-height: 10em; display:
table-cell; vertical-align: middle }.button {height:35px; width:90px; font-size:16px}";
  server.sendContent(temp);
  temp = "";
  temp += "body {background-color: powderblue;}</style>";
  temp += "<head><title>Captive Portal</title></head>";
  temp += "<h2>Captive Portal</h2>";
  temp += "<body>";
  server.sendContent(temp);
  temp = "";
  temp += "<br><table border=2 bgcolor = white width = 500 cellpadding =5
><caption><p><h3>Sytemlinks:</h2></p></caption>";
  temp += "<tr><th><br>";
  temp += "<a href='/wifi'>WIFI Einstellungen</a><br><br>";
  temp += "</th></tr></table><br><br>";
  // temp += "<footer><p>Programmed and designed by: Tobias
Kuch</p><p>Contact information: <a
href='mailto:tobias.kuch@googlemail.com'>tobias.kuch@googlemail.com</a>.</p>
</footer>";
  temp += "</body></html>";
  server.sendContent(temp);
  temp = "";
  server.client().stop(); // Stop is needed because we sent no content length
}



void handleNotFound() {
   if (captivePortal())
     { // If caprive portal redirect instead of displaying the error page.
       return;
     }

   temp = "";
   // HTML Header
   server.sendHeader("Cache-Control", "no-cache, no-store, must-revalidate");
   server.sendHeader("Pragma", "no-cache");
   server.sendHeader("Expires", "-1");
   server.setContentLength(CONTENT_LENGTH_UNKNOWN);
   // HTML Content
   temp += "<!DOCTYPE HTML><html lang='de'><head><meta charset='UTF-
8'><meta name= viewport content='width=device-width, initial-scale=1.0,'>";
   temp += "<style type='text/css'><!-- DIV.container { min-height: 10em; display:
table-cell; vertical-align: middle }.button {height:35px; width:90px; font-size:16px}";
   temp += "body {background-color: powderblue;}</style>";
   temp += "<head><title>File not found</title></head>";
   temp += "<h2> 404 File Not Found</h2><br>";
   temp += "<h4>Debug Information:</h4><br>";
   temp += "<body>";
   temp += "URI: ";
   temp += server.uri();
   temp += "\nMethod: ";
   temp+= ( server.method() == HTTP_GET ) ? "GET" : "POST";
   temp += "<br>Arguments: ";
   temp += server.args();
   temp += "\n";
     for ( uint8_t i = 0; i < server.args(); i++ ) {
       temp += " " + server.argName ( i ) + ": " + server.arg ( i ) + "\n";
       }
   temp += "<br>Server Hostheader: "+ server.hostHeader();
   for ( uint8_t i = 0; i < server.headers(); i++ ) {
       temp += " " + server.headerName ( i ) + ": " + server.header ( i ) + "\n<br>";
       }
   temp += "</table></form><br><br><table border=2 bgcolor = white width = 500
cellpadding =5 ><caption><p><h2>You may want to browse
to:</h2></p></caption>";
   temp += "<tr><th>";
   temp += "<a href='/'>Main Page</a><br>";
   temp += "<a href='/wifi'>WIFI Settings</a><br>";
   temp += "</th></tr></table><br><br>";
   //temp += "<footer><p>Programmed and designed by: Tobias
Kuch</p><p>Contact information: <a
href='mailto:tobias.kuch@googlemail.com'>tobias.kuch@googlemail.com</a>.</p>
</footer>";
   temp += "</body></html>";
   server.send ( 404, "", temp );
   server.client().stop(); // Stop is needed because we sent no content length
   temp = "";

}




/** Redirect to captive portal if we got a request for another domain. Return true in
that case so the page handler do not try to handle the request again. */
boolean captivePortal() {
  if (!isIp(server.hostHeader()) && server.hostHeader() !=
(String(ESPHostname)+".local")) {
   // Serial.println("Request redirected to captive portal");
   server.sendHeader("Location", String("http://") +
toStringIp(server.client().localIP()), true);
   server.send ( 302, "text/plain", ""); // Empty content inhibits Content-length
header so we have to close the socket ourselves.
   server.client().stop(); // Stop is needed because we sent no content length
   return true;
  }
  return false;
}



/** Wifi config page handler */
void handleWifi()
 {
  //  Page: /wifi
  byte i;
  byte len ;
  temp = "";
  // Check for Site Parameters
      if (server.hasArg("Reboot") )  // Reboot System
       {
         temp = "Rebooting System in 5 Seconds..";
         server.send ( 200, "text/html", temp );
         delay(5000);
         server.client().stop();
         WiFi.disconnect();
         delay(1000);
         pinMode(D6, OUTPUT);
         digitalWrite(D6, LOW);
       }
      if (server.hasArg("WiFiMode") and (server.arg("WiFiMode") == "1")  )  // STA
Station Mode Connect to another WIFI Station
       {
        startMillis = millis(); // Reset Time Up Counter to avoid Idle Mode whiole
operating
        // Connect to existing STATION
        if ( sizeof(server.arg("WiFi_Network")) > 0  )
          {
            Serial.println("STA Mode");
            MyWiFiConfig.APSTA = false; // Access Point or Station Mode - false
Station Mode
            temp = "";
            for ( i = 0; i < APSTANameLen;i++) { MyWiFiConfig.APSTAName[i] =  0; }
            temp = server.arg("WiFi_Network");
            len =  temp.length();
            for ( i = 0; i < len;i++)
            {
                  MyWiFiConfig.APSTAName[i] =  temp[i];
            }
         //   MyWiFiConfig.APSTAName[len+1] = '\0';
            temp = "";

            for ( i = 0; i < WiFiPwdLen;i++)  { MyWiFiConfig.WiFiPwd[i] =  0; }
            temp = server.arg("STAWLanPW");
            len =  temp.length();
            for ( i = 0; i < len;i++)
              {
```

```
             if (temp[i] > 32) //Steuerzeichen raus
              {
               MyWiFiConfig.WiFiPwd[i] =  temp[i];
              }
           }
      //    MyWiFiConfig.WiFiPwd[len+1] = '\0';
          temp = "WiFi Connect to AP: -";
          temp += MyWiFiConfig.APSTAName;
          temp += "-<br>WiFi PW: -";
          temp += MyWiFiConfig.WiFiPwd;
          temp += "-<br>";
          temp += "Connecting to STA Mode in 2 Seconds..<br>";
          server.send ( 200, "text/html", temp );
          server.sendContent(temp);
          delay(2000);
          server.client().stop();
          server.stop();
          temp = "";
          WiFi.disconnect();
          WiFi.softAPdisconnect(true);
          delay(500);
         // ConnectWifiAP
         bool SaveOk = saveCredentials();
             pinMode(D6, OUTPUT);
          digitalWrite(D6, LOW);
          i = ConnectWifiAP();
          delay(700);
          if (i != 3) // 4: WL_CONNECT_FAILED - Password is incorrect 1:
WL_NO_SSID_AVAILin - Configured SSID cannot be reached
           {
             Serial.print("Err STA");
             Serial.println(i);
             server.client().stop();
             delay(100);
             WiFi.setAutoReconnect (false);
             delay(100);
             WiFi.disconnect();
             delay(1000);
             pinMode(D6, OUTPUT);
             digitalWrite(D6, LOW);
             return;
           } else
           {
             // Safe Config
             bool SaveOk = saveCredentials();
             InitalizeHTTPServer();
             return;
           }
        }
     }
     if (server.hasArg("WiFiMode") and (server.arg("WiFiMode") == "2")  )  //
Change AP Mode
      {
       startMillis = millis(); // Reset Time Up Counter to avoid Idle Mode whiole
operating
       // Configure Access Point
       temp = server.arg("APPointName");
       len =  temp.length();
       temp =server.arg("APPW");
       if (server.hasArg("PasswordReq"))
          {
           i =  temp.length();
          } else { i = 8; }

       if (  ( len > 1 ) and (server.arg("APPW") == server.arg("APPWRepeat")) and ( i
> 7)          )
        {
          temp = "";
          Serial.println("APMode");
          MyWiFiConfig.APSTA = true; // Access Point or Sation Mode - true AP
Mode

          if (server.hasArg("CaptivePortal"))
          {
            MyWiFiConfig.CapPortal = true ; //CaptivePortal on in AP Mode
          } else { MyWiFiConfig.CapPortal = false ; }

          if (server.hasArg("PasswordReq"))
          {
            MyWiFiConfig.PwDReq = true ; //Password Required in AP Mode
          } else { MyWiFiConfig.PwDReq = false ; }

          for ( i = 0; i < APSTANameLen;i++) { MyWiFiConfig.APSTAName[i] =  0; }
          temp = server.arg("APPointName");
          len =  temp.length();
          for ( i = 0; i < len;i++) { MyWiFiConfig.APSTAName[i] =  temp[i]; }
          MyWiFiConfig.APSTAName[len+1] = '\0';
          temp = "";
          for ( i = 0; i < WiFiPwdLen;i++)  {  MyWiFiConfig.WiFiPwd[i] =  0; }
          temp = server.arg("APPW");
          len =  temp.length();
          for ( i = 0; i < len;i++)  { MyWiFiConfig.WiFiPwd[i] =  temp[i];  }
          MyWiFiConfig.WiFiPwd[len+1] = '\0';
          temp = "";
          if (saveCredentials()) // Save AP ConfigCongfig
            {
                  temp = "Daten des AP Modes erfolgreich gespeichert. Reboot
notwendig.";
            } else  { temp = "Daten des AP Modes fehlerhaft.";  }
        } else if (server.arg("APPW") != server.arg("APPWRepeat"))
             {
```

```
            temp = "";
            temp = "WLAN Passwort nicht gleich. Abgebrochen.";
           } else
           {
            temp = "";
            temp = "WLAN Passwort oder AP Name zu kurz. Abgebrochen.";
           }
      // End WifiAP
      }
  // HTML Header
  server.sendHeader("Cache-Control", "no-cache, no-store, must-revalidate");
  server.sendHeader("Pragma", "no-cache");
  server.sendHeader("Expires", "-1");
  server.setContentLength(CONTENT_LENGTH_UNKNOWN);
// HTML Content
  temp += "<!DOCTYPE HTML><html lang='de'><head><meta charset='UTF-
8'><meta name= viewport content='width=device-width, initial-scale=1.0,'>";
  server.send ( 200, "text/html", temp );
  temp = "";
  temp += "<style type='text/css'><!-- DIV.container { min-height: 10em; display:
table-cell; vertical-align: middle }.button {height:35px; width:90px; font-size:16px}";
  temp += "body {background-color: powderblue;}</style><head><title>Smartes
Tuerschild - WiFi Settings</title></head>";
  server.sendContent(temp);
  temp = "";
  temp += "<h2>WiFi Einstellungen</h2><body><left>";
  temp += "<table border=2 bgcolor = white width = 500 ><td><h4>Current WiFi
Settings: </h4>";
  if (server.client().localIP() == apIP) {
     temp += "Mode : Soft Access Point (AP)<br>";
     temp += "SSID : " + String (MyWiFiConfig.APSTAName) + "<br><br>";
  } else {
     temp += "Mode : Station (STA) <br>";
     temp += "SSID  :  "+ String (MyWiFiConfig.APSTAName) + "<br>";
     temp += "BSSID :  " + WiFi.BSSIDstr()+ "<br><br>";
  }
  temp += "</td></table><br>";
  server.sendContent(temp);
  temp = "";
  temp += "<form action='/wifi' method='post'>";
  temp += "<table border=2 bgcolor = white width = 500><tr><th><br>";
  if (MyWiFiConfig.APSTA == 1)
    {
      temp += "<input type='radio' value='1' name='WiFiMode' > WiFi Station
Mode<br>";
    } else
    {
      temp += "<input type='radio' value='1' name='WiFiMode' checked > WiFi
Station Mode<br>";
    }
  temp += "Available WiFi Networks:<table border=2 bgcolor = white
></tr></th><td>Number </td><td>SSID  </td><td>Encryption </td><td>WiFi
Strength </td>";
  server.sendContent(temp);
  temp = "";
  WiFi.scanDelete();
  int n = WiFi.scanNetworks(false, false); //WiFi.scanNetworks(async,
show_hidden)
  if (n > 0) {
    for (int i = 0; i < n; i++) {
    temp += "</tr></th>";
    String Nrb = String(i);
    temp += "<td>" + Nrb + "</td>";
    temp += "<td>" + WiFi.SSID(i) +"</td>";

    Nrb = GetEncryptionType(WiFi.encryptionType(i));
    temp += "<td>"+ Nrb + "</td>";
    temp += "<td>" + String(WiFi.RSSI(i)) + "</td>";
    }
  } else {
    temp += "</tr></th>";
    temp += "<td>1 </td>";
    temp += "<td>No WLAN found</td>";
    temp += "<td> --- </td>";
    temp += "<td> --- </td>";
  }
  temp += "</table><table border=2 bgcolor = white ></tr></th><td>Connect to
WiFi SSID: </td><td><select name='WiFi_Network' >";
if (n > 0) {
    for (int i = 0; i < n; i++) {
    temp += "<option value='" + WiFi.SSID(i) +"'>" + WiFi.SSID(i) +"</option>";
    }
  } else {
    temp += "<option value='No_WiFi_Network'>No WiFiNetwork found !/option>";
  }
  server.sendContent(temp);
  temp = "";
  temp += "</select></td></tr></th></tr></th><td>WiFi Password: </td><td>";
  temp += "<input type='text' name='STAWLanPW' maxlength='40' size='40'>";
  temp += "</td></tr></th><br></th></tr></table></table><table border=2 bgcolor =
white width = 500 ><tr><th><br>";
  server.sendContent(temp);
  temp = "";
  if (MyWiFiConfig.APSTA == true)
    {
      temp += "<input type='radio' name='WiFiMode' value='2' checked> WiFi
Access Point Mode <br>";
    } else
    {
      temp += "<input type='radio' name='WiFiMode' value='2' > WiFi Access Point
Mode <br>";
```

```
    }
  temp += "<table border=2 bgcolor = white ></tr></th> <td>WiFi Access Point
Name: </td><td>";
  server.sendContent(temp);
  temp = "";
  if (MyWiFiConfig.APSTA == true)
    {
      temp += "<input type='text' name='APPointName'
maxlength='"+String(APSTANameLen-1)+"' size='30' value='" +
String(MyWiFiConfig.APSTAName) + "'></td>";
    } else
    {
      temp += "<input type='text' name='APPointName'
maxlength='"+String(APSTANameLen-1)+"' size='30' ></td>";
    }
  server.sendContent(temp);
  temp = "";
  if (MyWiFiConfig.APSTA == true)
    {
      temp += "</tr></th><td>WiFi Password: </td><td>";
      temp += "<input type='password' name='APPW'
maxlength='"+String(WiFiPwdLen-1)+"' size='30' value='" +
String(MyWiFiConfig.WiFiPwd) + "'> </td>";
      temp += "</tr></th><td>Repeat WiFi Password: </td>";
      temp += "<td><input type='password' name='APPWRepeat'
maxlength='"+String(WiFiPwdLen-1)+"' size='30' value='" +
String(MyWiFiConfig.WiFiPwd) + "'> </td>";
    } else
    {
      temp += "</tr></th><td>WiFi Password: </td><td>";
      temp += "<input type='password' name='APPW'
maxlength='"+String(WiFiPwdLen-1)+"' size='30'> </td>";
      temp += "</tr></th><td>Repeat WiFi Password: </td>";
      temp += "<td><input type='password' name='APPWRepeat'
maxlength='"+String(WiFiPwdLen-1)+"' size='30'> </td>";
    }
      temp += "</table>";
  server.sendContent(temp);
  temp = "";
  if (MyWiFiConfig.PwDReq)
    {
      temp += "<input type='checkbox' name='PasswordReq' checked> Password for
Login required. ";
    } else
    {
      temp += "<input type='checkbox' name='PasswordReq' > Password for Login
required. ";
    }
  server.sendContent(temp);
  temp = "";
  if (MyWiFiConfig.CapPortal)
```

```
    {
      temp += "<input type='checkbox' name='CaptivePortal' checked> Activate
Captive Portal";
    } else
    {
      temp += "<input type='checkbox' name='CaptivePortal' > Activate Captive
Portal";
    }
  server.sendContent(temp);
  temp = "";
  temp += "<br></tr></th></table><br> <button type='submit' name='Settings'
value='1' style='height: 50px; width: 140px' autofocus>Set WiFi Settings</button>";
  temp += "<button type='submit' name='Reboot' value='1' style='height: 50px;
width: 200px' >Reboot System</button>";
  server.sendContent(temp);
  temp = "";
  temp += "<button type='reset' name='action' value='1' style='height: 50px; width:
100px' >Reset</button></form>";
  temp += "<table border=2 bgcolor = white width = 500 cellpadding =5
><caption><p><h3>Sytemlinks:</h2></p></caption><tr><th><br>";
  server.sendContent(temp);
  temp = "";
  temp += "<a href='/'>Main Page</a><br><br></th></tr></table><br><br>";
  //temp += "<footer><p>Programmed and designed by: Tobias
Kuch</p><p>Contact Information: <a
href='mailto:tobias.kuch@googlemail.com'>tobias.kuch@googlemail.com</a>.</p>
</footer>";
  temp += "</body></html>";
  server.sendContent(temp);
  server.client().stop(); // Stop is needed because we sent no content length
  temp = "";
}

#define SD_BUFFER_PIXELS 20

void loop()
 {
 if (SoftAccOK)
  {
    dnsServer.processNextRequest(); //DNS
  }
  //HTTP
  server.handleClient();
  yield();
}
```

Ich wünsche viel Spaß beim testen des Captive Portals und bei der Implementierung in eigene Projekte.