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COPPERCLOUD TRAINING MANUAL

IOT DEVELOPMENT: INSTALLATION OF PC TOOL

1. INTRODUCTION

This document lists the tools to be installed on a local development environment for building and testing IOT solutions, before deploying the solution on a cloud environment.

All Tools recommended in this Training Manual are Free & Open Source Software (FOSS)

ⓘ *The instructions in this document are designed for a Windows 10/11 dev env.*

2. TOOLS TO BE INSTALLED

A. The following software need to be installed on the local development computer:
   a) Arduino IDE with support for NodeMCU board
   b) MQTTBox (Messaging Client)
   c) Node Red – Visual Programming tool for IOT
   d) SQLite database & client

B. The following apps need to be installed on development mobile:
   a) IOT MQTT Panel app (Android)

C. The following tools can be accessed over the Cloud directly, and don't need to be installed on local env:
   a) MQTT (Mosquitto) Server
   b) MySQL database
   c) Grafana Visualization Server

3. INSTALLATION INSTRUCTIONS:

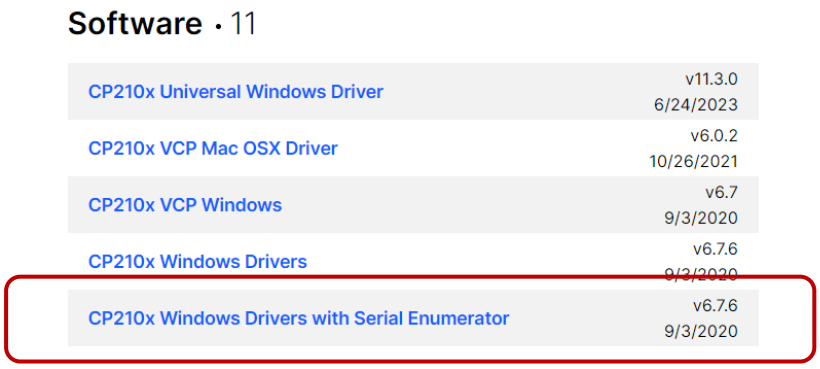
A. Arduino IDE Setup for ESP8266 IOT MicroController

1. Install Arduino IDE from https://www.arduino.cc/en/Main/Software
2. Open you IDE and click on "File -> Preferences"
3. In "Additional Boards Manager URLs" add this line:

   http://arduino.esp8266.com/stable/package_esp8266com_index.json

   and click on "OK":
4. Go to "Tools -> Board -> Boards Manager", type "ESP8266" and install it
5. Download and install the CP210x driver from the following location:

   https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers?tab=downloads

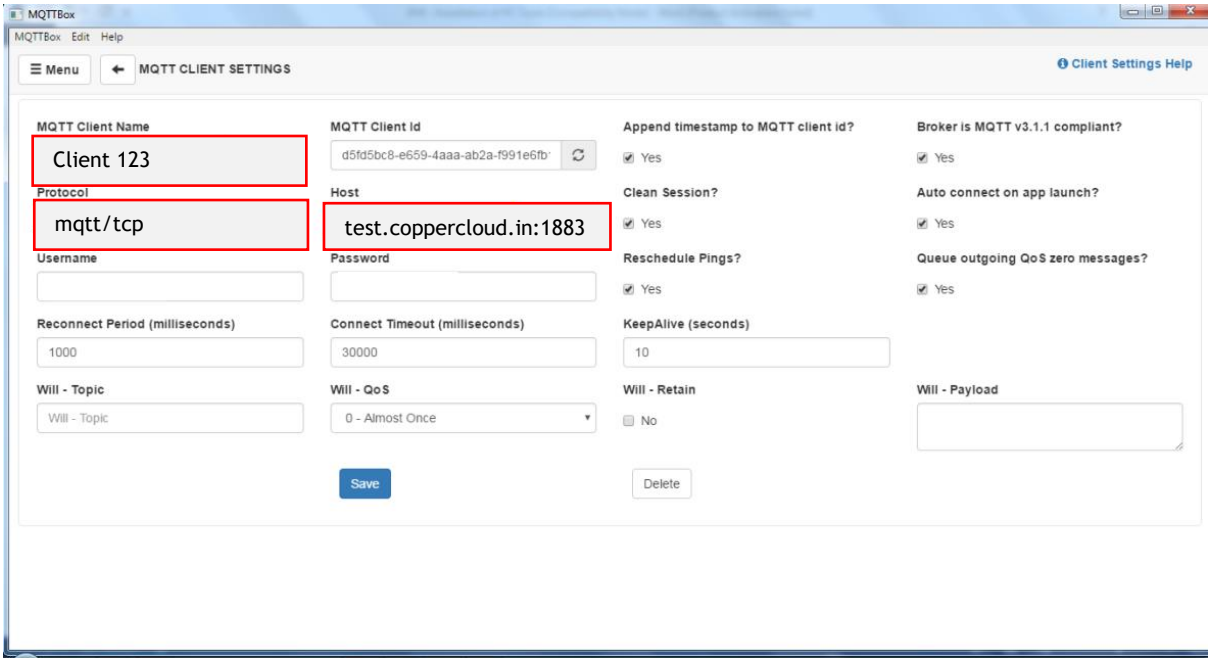


6. Test your setup by connecting NodeMCU (from IOT kit) to a USB port on the computer, changing target board to “NodeMCU 1.0”, selecting the appropriate port, and checking board information *(if board information is retrieved, then you can start uploading code to the NodeMCU)*.

B. Install MQTTBox (MQTT Client):

1. Download and install MQTT Box from the following location:

   https://mqttbox.en.softonic.com/
2. Create a new client within MQTT Box with the following setup details:
   - **MQTT Client Name:** Name to identify MQTT client and display on dashboard. It can be any string value. e.g: client_test_1
   - **Protocol:** Network protocol used by MQTT client to connect with MQTT broker. Select: **mqtt/tcp**
   - **Host:** MQTT host to connect. For this workshop, the host:port will be: **test.coppercloud.in:1883**



C. Install Node Red (IOT Orchestration/Middleware Tool [No-Code/Low-Code]):

1. Install IBM Node Red as per the following instructions:
   https://nodered.org/docs/getting-started/windows
2. Run Node Red as follows:

```
C:\Users\dell>node-red
2 Jul 17:04:45 - [info]

Welcome to Node-RED
===================

2 Jul 17:04:45 - [info] Node-RED version: v3.0.2
2 Jul 17:04:45 - [info] Node.js  version: v18.15.0
2 Jul 17:04:45 - [info] Windows_NT 10.0.22621 x64 LE
2 Jul 17:04:49 - [info] Loading palette nodes
2 Jul 17:04:49 - [info] Settings file  : C:\Users\dell\.node-red\settings.js
2 Jul 17:04:49 - [info] Context store  : 'default' [module=memory]
2 Jul 17:04:49 - [info] User directory : C:\Users\dell\.node-red
2 Jul 17:04:49 - [warn] Projects disabled : editorTheme.projects.enabled=false
2 Jul 17:04:49 - [info] Flows file     : C:\Users\dell\.node-red\flows.json
2 Jul 17:04:49 - [info] Creating new flow file
2 Jul 17:04:49 - [warn]

---------------------------------------------------------------------
```

(Closing the command window will shut down the local Node Red server)

3. *Open http://localhost:1880 in your browser to validate that the installation has been successful:*

D. Install SQLite database:

1. Install SQLite database as per the following instructions:

Precompiled Binaries for Windows

sqlite-dll-win32-x86-3420000.zip (570.83 KiB)	32-bit DLL (x86) for SQLite version 3.42.0. (SHA3-256: 5edbd7244c91cae59dedfea6cdea6f9683116b034a0d18495e2aeb4a9592c87a)
sqlite-dll-win64-x64-3420000.zip (1.16 MiB)	64-bit DLL (x64) for SQLite version 3.42.0. (SHA3-256: 2425efa95556793a20761dfdab0d3b56a52e61716e8bb65e6a0a3590d41c97c0)
sqlite-tools-win32-x86-3420000.zip (1.93 MiB)	A bundle of command-line tools for managing SQLite database files, including the command-l sqlite3_analyzer.exe program. (SHA3-256: 93d10287cd1a20dce57bb671bcd620cc827c3a316660326338cff0478514e6ee)

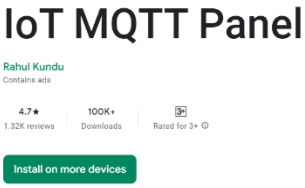
2. Install SQLite DB Browser from the following location:

   https://sqlitebrowser.org/dl/

E. Install IOT MQTT Panel App (on Android Mobiles):

1. Install IOT MQTT Panel App on your Android mobile using this link:

   https://play.google.com/store/apps/details?id=snr.lab.iotmqttpanel.prod



ANNEXURE1: REFERENCE CHART FOR FOSS TOOLS FOR IOT DEVELOPMENT