Vantron VT-M2M-BTA-DE ThingWorx Installation and Setup Guide

October 2015

Contents

Introduction

This document provides installation and usage instructions for setting up the client demo with the Vantron – VT-M2M-BTA-DE Gateway Device.

About the Vantron VT-M2M-BTA-DE

The VT-M2M-BTA-DE is a multi-port gateway device manufactured by Vantron Corporation. It provides Wi-Fi-connectivity, WLAN 3G connectivity, supports data encryption, controls serial communication with other remote devices or computers, and features an Intel ATOM E3845/E3827/E3815 processor and serial, Ethernet, and USB ports for connections

Installation

Setup of the VT-M2M-BTA-DE device to connect to ThingWorx EMS first requires a connection to the device from a computer via Serial cable.

> **Note**: This guide was written for a computer running Microsoft Windows. Modify procedures as needed for your environment.

Refer to the Troubleshooting section of this guide for help with frequently asked questions.

Compile the Vantron lvdemo Executable

This guide explains how to connect ThingWorx to the Vantron VT-M2M-BTA-DE gateway device using a custom executable that establishes a secure WebSocket connection to the ThingWorx Platform. (These instructions do not utilize the Edge Microserver.)

Prerequisites

You need access to a computer with Ubuntu 14.04 or later; earlier versions of Ubuntu have not been tested. You may to run a virtual machine with Ubuntu in order to compile the software.

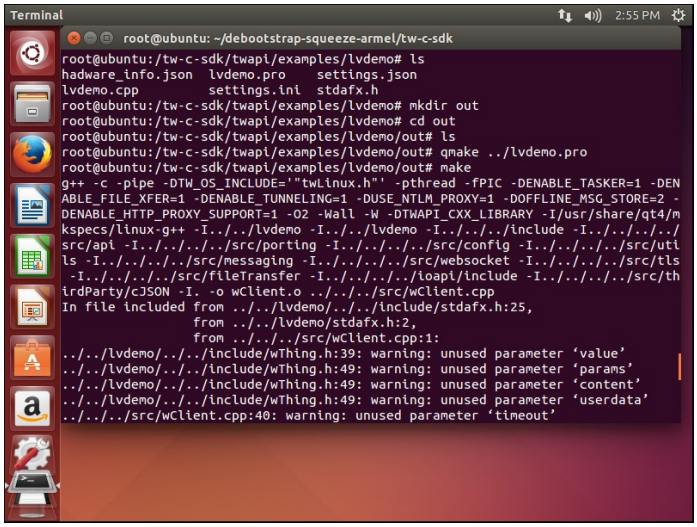
> **Note:** This guide was written using Ubuntu on a virtual machine. All screen shots and instructions assume an Ubuntu machine.

1. Copy each of the following files from this starter kit package to the Ubuntu machine:

   - toolchain file, *debootstrap-squeeze-i386.tar.bz2*
   - ThingWorx C SDK, *tw-c-sdk v1-1-1-38*
   - demo executable, *lvdemo_src*

2. Open a terminal in Ubuntu and type the following to gain root access:

```
sudo su:
```



Above: Ubuntu terminal window.

3. Type the following commands into the terminal window to pre-install two required packages:

```
apt-get install qemu-user-static
apt-get install qtcreator
```

4. Extract the toolchain file to an appropriate directory:

```
tar xjf debootstrap-squeeze-i386.tar.bz2 -C /root/
```

5. Combine the SDK and lvdemo_src files into the same directory, as follows (the file structures will be similar, but they will not be overwritten):
   a. Create a directory named "tw-c-sdk".
   b. Put all the files and directories within "ThingWorx-C-SDK-1-1-1-38/tw-c-sdk/" and all the files within "lvdemo_src/tw-c-sdk/" into the "tw-c-sdk" directory.
   c. Confirm that no files are overwritten.

6. Move the newly created "tw-c-sdk" directory into the "debootstrap-squeeze-i386" directory.

7. Using the `chroot` command, limit the compile environment to the "debootstrap-squeeze-i386" directory, which should now contain all of the files copied in steps 5 and 6.

```
chroot /root/debootstrap-squeeze-i386
```

8. Compile the ThingWorx C-SDK to obtain an intermediate file:

```
cd /tw-c-sdk/examples/SteamSensorWithFileTransferAndTunneling/linux/
make BUILD=release PLATFORM=gcc-linux-x86-32
cp /tw-c-sdk/build/obj/gcc-linux-x86-32/release/libTw.a /tw-c-sdk/twapi/
```

9. Build the lvdemo:

```
cd /tw-c-sdk/twapi/examples/lvdemo
mkdir out
cd out
qmake ../lvdemo.pro
make
```

10. Copy the new Executable file (*lvdemo*) to the VT-M2M-BTA-DE:
    a. Connect to the VT-M2M-BTA-DE device from your computer.
    b. Open a terminal program such as Putty.
    c. From the terminal program, connect to the Ubuntu machine and copy the file to the VT-M2M-BTA-DE using SCP.

Note: *Ensure that the "run.sh", "settings.json", and "lvdemo" and "so" directories are located under the same directory on the VT-M2M-BTA-DE device (preferably all in the /opt/lv-demo/ directory).*

Please see the next section for connecting to the Vantron device. Please note that you should NOT move on to section 3 of this guide until the *lvdemo* executable file has been copied to the VT-M2M-BTA-DE device.

Connect the VT-M2M-BTA-DE to a local machine and peripheral

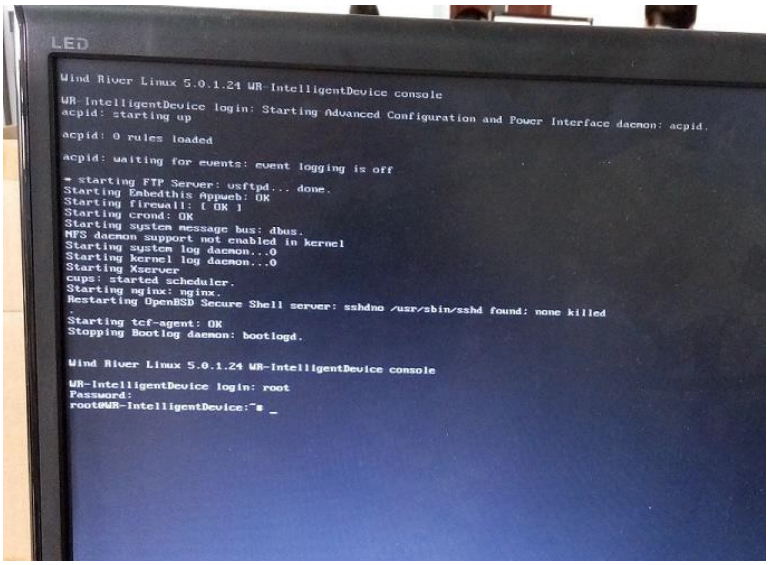
1. Insert a network cable to the VT-M2M-BTA-DE device. Ensure that the VT-M2M-BTA-DE device is connected to a cable which has an internet connection. In this sample, ETH1 port is preferred.

   Note: ETH1 port is "eth0" in OS, ETH2 port is "eth1" in OS. The "eth0" port is set to obtain an IP address automatically via DHCP. The static IP address of "eth1" is 192.168.1.1.

2. Connect the VGA display to VT-M2M-BTA-DE.

3. Connect the USB keyboard to VT-M2M-BTA-DE.

4. Login to the device. Enter **root** as the login username, and **root** as the password (default).

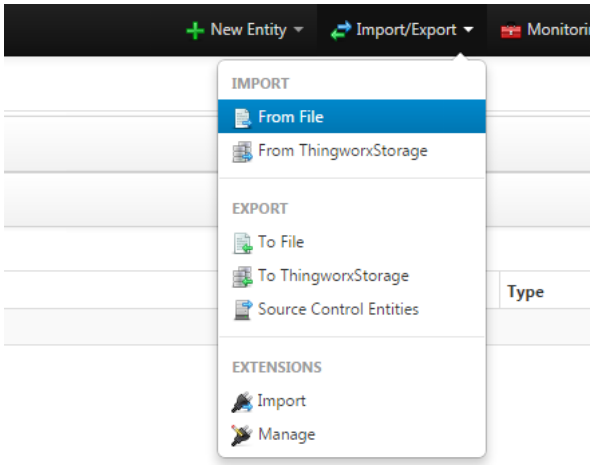


Configuration and Setup

This starter kit includes a zip file containing the entities associated with the Vantron Demo ThingWorx mashup. You need to set up those entities in your ThingWorx Platform.

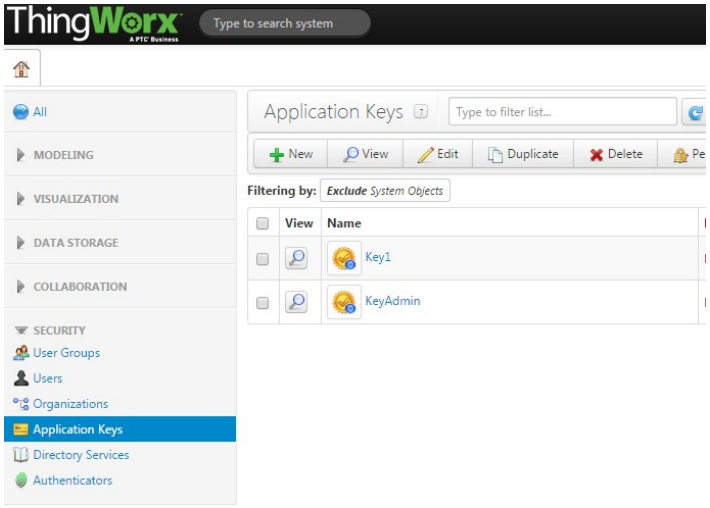
Import Demo Entities into your ThingWorx Platform

1. Log into your ThingWorx Platform (Composer 6.0 or later), and import the entities as a whole package.



2. Note the URL and port of your ThingWorx Platform server.

3. Create an Application Key on the ThingWorx server. Make note of the Application Key (or "AppKey") as you will need to use it again later in this guide.

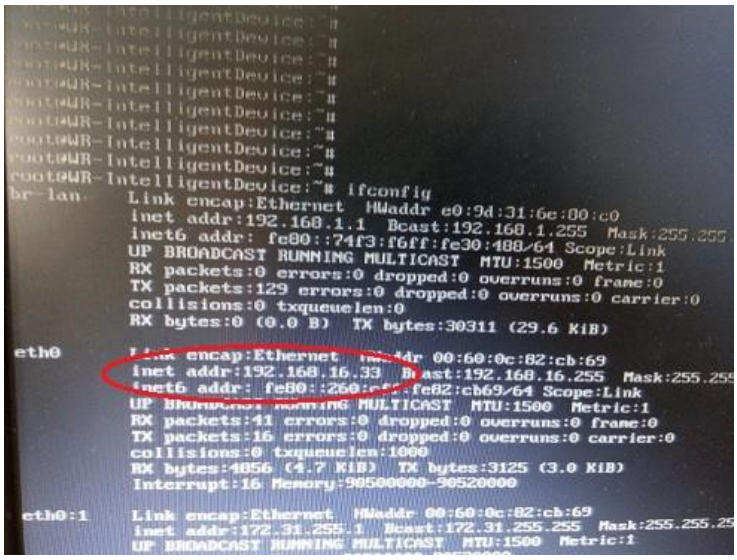


Set up a WebSocket Connection

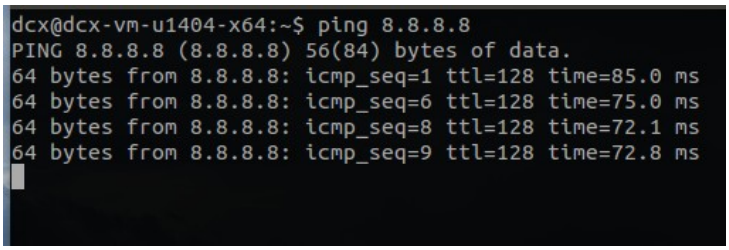
1. On the VT-M2M-BTA-DE, via Putty or a similar Linux terminal program, type:

   `ifconfig`

   This should return the inet address of the Ethernet connection.

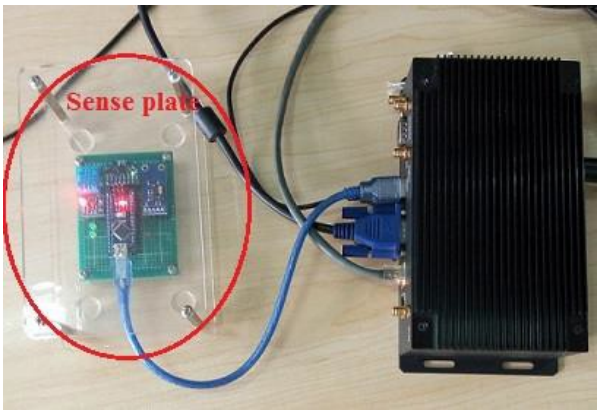


2. Verify an internet connect. Type "`ping 8.8.8.8`" or some other public Internet address.



The following steps are needed for testing out how the data gathered from the VT-M2M-BTA-DE device is reported. These steps are to be used with a sense plate or similar sensor connected to the VT-M2M-BTA-DE via USB cable.

3. Connect the Sense plate by USB cable to the VT-M2M-BTA-DE device.



4. Go to the target catalog directory by typing the following:

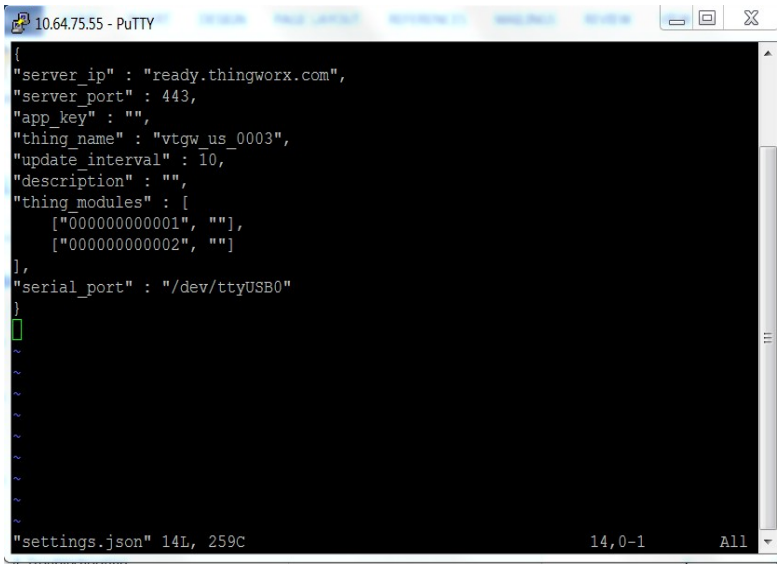
   `cd /opt/lv-demo`

5. Configure the IP address and port number of the ThingWorx Platform to which you're connecting (the one providing the Vantron Mashup) by editing the *settings.json* file in this directory. Modify it using the "vi settings.json" command in Linux.

   In the example to the right, you see the Platform is set to connect to: *ready.thingworx.com:443*.

   Note: check if the serial_port is set to the path of your serial connection.

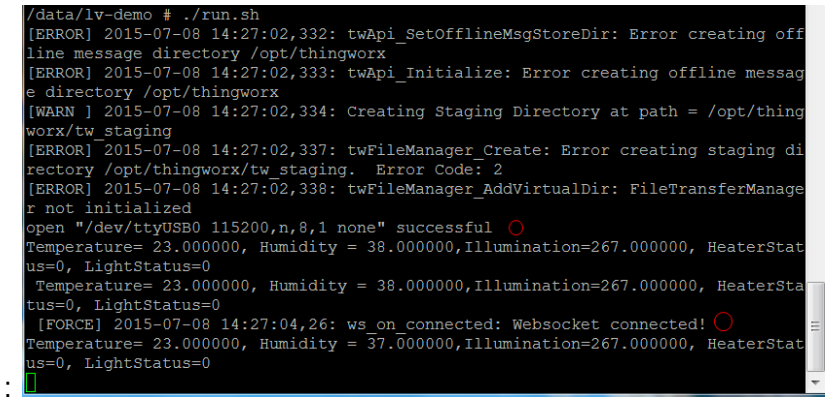
   Be sure to supply the correct Application Key as well. If you haven't already created one, it may be generated in the ThingWorx Platform from the Application Key section in the Home Composer screen.



6. To start the data-reporting demo program, run the *run.sh* file by typing the following command:

   ```
   bash run.sh
   ```

If the program executes properly and the configuration is correct, you should see an output in the terminal window similar to this:

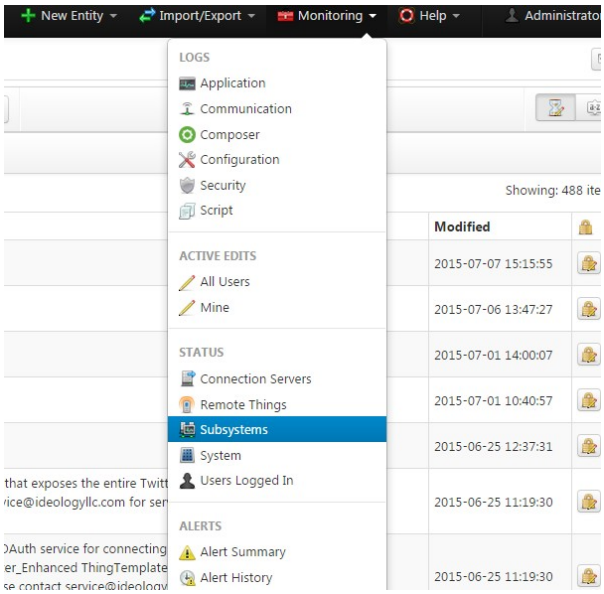


It is important that you see the "Websocket_connected!" output (indicated in the previous screen shot) to confirm a successful connection to ThingWorx Platform. Assuming you have a successful connection, continue with the next step in this procedure.

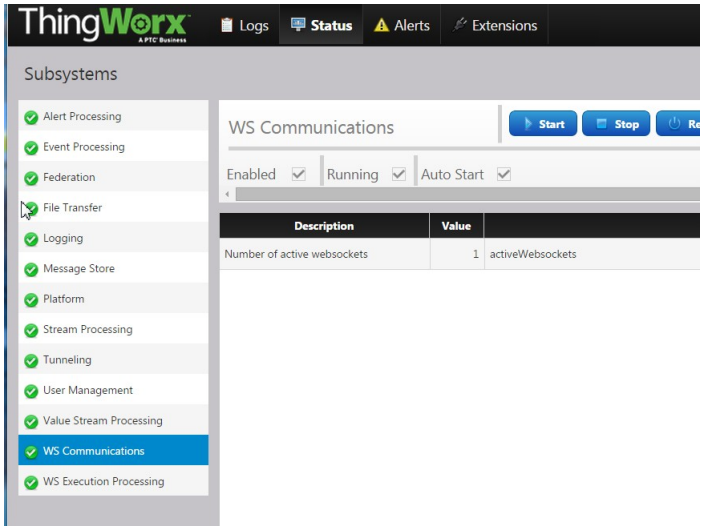
Note: Ensure that the hardware clock is set to the right system time.

7. Navigate to the URI of the ThingWorx Platform server, configured in *settings.json* earlier, and do the following:

   a. Click the Monitoring drop-down and select **Subsystems**.

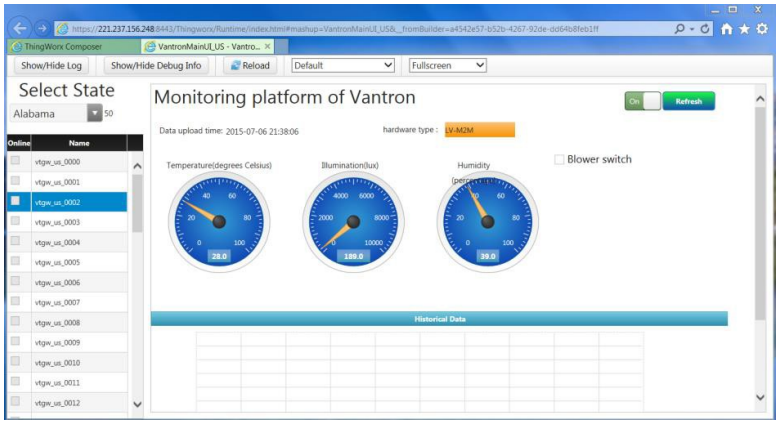


   b. Click **WS Communications** and then click **Refresh Now**. In the displayed list, you will see an active WebSocket or an *additional* WebSocket.



8. Navigate to the "VantronMainUI_US" mashup (if included) and choose the monitor name on the left that matches that specified earlier in the *settings.json* file.

   You will see a mashup with reported data similar to the following:



This completes the setup of the Vantron VT-M2M-BTA-DE device with a demo data-acquisition program named lvdemo.

You may write and copy your own executable programs to interface with ThingWorx Platform using the TW C SDK, to suit your needs.

Troubleshooting

	Problem	Solution(s)
1	Encounter "No such file" error when attempting to copy the MicroServer folder to the VT-M2M-BTA-DE device.	Ensure that the Microserver directory downloaded from the PTC Downloads site is located in the proper directory of the terminal program you are using; otherwise, reference it as appropriate. For Cygwin, ensure the MicroServer directory is located in the *home/username/* directory.
2	The VT-M2M-BTA-DE board cannot connect to the internet via Ethernet cable.	1. Verify that the Ethernet cable is connected to a port with a valid Internet connection (verify with another computer). 2. Verify that the VT-M2M-BTA-DE board is configured to manually set an IP address. 3. Verify that the default gateway for the VT-M2M-BTA-DE board is correct.
3	Error while attempting to open a WebSocket connection (VT-M2M-BTA-DE device).	1. Confirm that the VT-M2M-BTA-DE device has access to the Internet. 2. Confirm the accuracy of the IP address and port numbers in the *settings.json* file. 3. Confirm the appKey authenticity in the *settings.json* file. 4. Confirm that ThingWorx Platform at the IP address specified in the *settings.json* file is up and running. 5. Ensure that you have a valid certificate for an SSL connection to the server running ThingWorx. 6. Check the hardware time and ensure that it shows the correct local time zone.
4	The run.sh program does not execute on the VT-M2M-BTA-DE device.	1. Ensure that the "lvdemo", "settings.json", "run.sh", and "so" directories (containing libraries) are all located within the */data/lv-demo/* folder on the VT-M2M-BTA-DE device 2. Ensure that the "run.sh" directory references the correct filename of the *lvdemo* executable. Use the "vi" command to check and update the filename of the *lvdemo* as appropriate. 3. Ensure you have compiled the executable using the latest version of the C-SDK.

Compatibility

This guide has been tested for compatibility with the Vantron VT-M2M-BTA-DE and the following ThingWorx Platform and operating system:

ThingWorx Platform Version	OS
ThingWorx 6.0.1	Windows 7, Service Pack 1

Revision History

Date	Revision
10/22/2015	Initial Release