

Titan Router V6 Firmware

Sending data to MyDevices platform

www.webdyn.com

Scenario Details

TITAN routers have all the typical functionalities of 4G/3G/2G routers, as well as a series of added features that make them one of the most feature-packed routers on the market.

One of the added features is the datalogger, where the TITAN router can store a number of types of records in its non-volatile memory in JSON format. These records can come from MODBUS readings, SERIAL data captures via the RS232 / RS485 ports, or GPS positions, etc. These JSON-type records are stored in the TITAN router's internal non-volatile memory and can subsequently be sent to remote platforms via protocols such as HTTP, HTTPS, MQTT, MQTTS, FTP and FTPS.

As mentioned, the TITAN router stores the JSON registers in its internal memory in a proprietary format by default. This can sometimes be a problem when communicating with platforms that expect to receive information in a certain format (i.e. a format other than JSON, the one used by the TITAN router).

In this application note, we will guide you through an entire example of how send to data to the wellknown MyDevices' Cayenne platform (https://cayenne.mydevices.com), which requires the sent JSONs to be in a special format.

In this particular application note, we will assume that 2 registers are to be read from 2 PLCs with Modbus communications connected to a Webdyn - EasyTunnel via their RS485 port.

More specifically, the aim is for the WebDyn-Easytunnel device to read the Modbus registers with addresses 30000 and 30001 from the PLC every minute. Register 30000 corresponds to the measured temperature, and register 30001 to the humidity level. The temperature and humidity readings must be sent in real time to a dashboard on the MyDevices' Cayenne platform. You must also be able to change the Modbus registers 340002 and 30003 of the PLC from the Cayenne platform, allowing you to write an analogue value between 0 and 255 to the registers 30002 and 30003.

1. WAN mobile configuration



The Webdyn - EasyTunnel must communicate with the My.Devices.com's Cayenne platform via 4G/3G/2G communications, so the "Mobile> Basic Settings" section must be configured correctly according to the SIM card used.

Mobile	► Mobile ► Basic Se	ettings		
• Basic Settings	Mobile WAN	Enabled (IP active)	~	Enable Wireless WAN interface
o Keep Unline	Sim Mode	SIM1	~	Sim selection
• Ethernet • Basic Settings				
Firewall	SIM1 APN:	movistar.es		SIM Card 1 APN
Authorized IPs	SIM1 Username:	MOVISTAR		SIM Card 1 username
Serial Settings	SIM1 Password:			SIM Card 1 password
Serial Port1-RS232 Serial Port2-RS485	SIM1 Pin:			SIM Card 1 PIN
• SSL Certificates	SIM1 Auth:	None	~	SIM card 1 authentication
External Devices Logger configuration ModBus Devices Generic Serial Device Temperature Sensor IEC102 Meter GPS Receiver	SIM2 APN: SIM2 Username: SIM2 Password: SIM2 Pin:			SIM Card 2 APN SIM Card 2 username SIM Card 2 password SIM Card 2 PIN
Plugins Generic	SIM2 Auth:	Auto	~	SIM card 2 authentication
 Other AT Command DynDns Private DynDns 	Network selection:	Auto (4G/3G/2G)	~	Network selection
Sms control Periodic Autoreset Time Servers Remote Console	DNS selection: DNS1:	Get DNS from Operator 8.8.8.8	~	Preferred DNS1
Snmp	DNS2:	8.8.4.4		Preferred DNS2

2. Configuring the RS485 serial port

The two PLCs will connect to 9600,8,N,1 via the RS485 serial port, so the "Serial Settings> Serial Port2-RS485" section must be configured by setting the parameters as shown below.

* Mobile	Serial Gateway	Com2 Settings				
Basic Settings	Baudrate:	9600 🗸	Baudrate of serial port			
 Keep Online 	Data bits:	8 🗸	Number of data bit			
Ethernet Basic Settings	Parity:	none 🗸	Parity			
🔶 Eirowall	Stop bits:	1 ~	Number of stop bits			
• Authorized IPs	Timeout ms:	50	msec without serial data before sending (default: 50)			
 Serial Settings Serial Port1-RS232 Serial Port2-RS485 SSL Certificates 	 Allow local embedo Allow remote embedo 	led AT commands edded AT commands	Ex.: <mtxtunnel>AT</mtxtunnel> Ex.: <mtxtunnelr>AT</mtxtunnelr>			
 External Devices Logger configuration ModBus Devices Generic Serial Device Temperature Sensor TC122 Motor 	Allow incoming GSM call (CSD Data Call) Only TCP Server and TCP Client functions or Nothing. 2G (CSD) network required. Provide the server of the server and					
• GPS Receiver	O Function: Serial - 1	IP Gateway (TCP Server)				
 Plugins Generic 	TCP Local Port:	20011	Listening TCP Port (1 65535)			
Other AT Command DynDns	Temporal client RS232 Temporal client Wakeup		Check if you need a temporal TCP Client when data is present at serial port. DDHHMM. Example: XX2200 starts a temporal client every day at 22:00			
Private DynDns	Temporal client time:	60	Seconds for temporal client			
• Sms control • Periodic Autoreset	Temporal client Random	0	Seconds. Random time for temporal client Wakeup			
Time Servers Remote Console Some	SSL/TLS enabled		SSL/TLS Enabled (SSL Certs needed)			

3. Configuring the Modbus section

In this configuration section, "External Devices > Modbus Devices", only the port that will be used to read the PLC must be configured. As you need to use an RS485 port, you must also use the COM2 port of the Webdyn-Easy-Tunnel.

* Mobile • Status	External Devices	ModBus RTU / TCP	
 Basic Settings Keep Online 	Enabled:		Enable Modbus Devices
🌟 Ethernet	Serial Port:	Serial Port 2	 Select the connected serial port if needed
 Basic Settings 	Logger:		Check if logger must be used
 Firewall Authorized IPs 			Please, configure logger before using this option
• MAC Filter	SAVE CONFIG	VIEW LOG	
 Serial Settings Serial Port1-RS232 Serial Port2-RS485 SCI Cartificates 	Dou name / ID Add	de Command Start @ 1	Num word /bit Bog Tuno Basiad
• SSL Certificates	Dev. name / 1D Add	ur. Command Start @ r	Num word/bit key type Period
External Devices			
ModBus Devices	Device name / ID:		Insert the device name or ID
 Generic Serial Device Temperature Sensor 	Address:		Modbus RTU address or IP:port address
• IEC102 Meter • GPS Receiver	Command:	0x01	✓ Modbus read command
	Start:		Address of the first register
 Other AT Command 	Number Words / Bits:		Words for command 0x03/0x04. Bits for 0x01/0x02
 DynDns Private DynDns 	Reg Type:	WORD	 Type of registers for command 0x03/0x04
Sms control Periodic Autoreset	Period:	1	• Read period (minutes)

4. Configuring the MQTT section and the MyDevices' Cayenne platform

You must also correctly configure the "Other - Mqtt" section of the Titan-based device so that it can connect to the Cayenne platform. But first, you must go to the web platform to add the Webdyn-Easy-tunnel device and obtain the mqtt authentication attributes.

Once you have logged in to your https://cayenne.mydevices.com account, click on Add New >Device Widget,



Then, select the "Bring Your Own Thing" option.

Intelligent Router X	C Add Device myDevices Cayenne 🗙	+	
\leftrightarrow \rightarrow C \cong cayenne.mydevice	es.com/cayenne/dashboard/add		🖻 🖈 🕈 🖬 🥮 :
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Add new 🗸	Devices & Widgets	Single Board Computers	1
Commercialize your IoT solution using your own brand. Learn more	Search Q oewcss Single Board Computers MicroControllers Sensors	Raspberry P Microcontrollers	
	Actuators Extensions LoRa ADD DATA TO YOUR DASHBOARD	Arduino Sparfan ESP8266 Generic ESP8266	
Q Search Devices	Custom Widgets	Sensors	Motion

Once this is done, a display will appear like the one shown in the screenshot below, where you will need to copy the data related to the MQTT connection (marked in red below) in order to integrate them into the MQTT section of the Webdyn-Easy-Tunnel device. This display will continue to appear until the connection is established.

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Step 2: Connect your Device	
Arduino MQTT O 🚷 O	b9401ec0-a304-11ed-8d53-d7
Cayenne MQTT mbed 🛛 🧿 🖉	MQTT PASSWORD: c7ebc5738d9435ede1df5f11d0.
Embedded C 📀 🕐	CLIENT ID:
C++ • • •	d96e63c0-a5fe-11ed-b193-d97
Cayenne MQTT Python O	MQTT SERVER: MQTT PORT:
Node.JS 📀	mqtt.mydevices.com 1883
O View all SDKs on GitHub	Device 379e
NEED HELP?	€. Waiting for board to connect
	m/cayenne/dashboard/device/pending/d96e320-a5fe-11ed-b1 fix

In the "Other > Mqtt" configuration section of the Webdyn-EasyTunnel, you will use the configuration data obtained in the previous display.

* External Devices	Enabled:		Enable MQTT client
 ModBus Devices Generic Serial Device Temperature Sensor IEC102 Meter GPS Receiver 	MQTT Broker	tcp://mqtt.mydevices.com:18	Destination MQTT Broker. Examples: tcp://test.mosquitto.org:1883 ssl://test.mosquitto.org:8883 (certificate needed) ssl://test.mosquitto.org:8884 (certificates needed)
A	MQTT Username	b8401ec0-a304-11ed-8d53-c	MQTT Username (blank if not used)
OtherAT Command	MQTT Password	••••••	MQTT Password (blank if not used)
 DynDns Private DynDns 	MQTT ID	ad2561f0-a3c0-11ed-8d53-d	Device identification
Sms control Periodic Autoreset	MQTT Qos	1	MQTT Quality Of Service (0 2)
• Time Servers	MQTT Keepalive	60	Seconds for keepalive (30 3600)
Remote Console Snmp	MQTT Persistence		Data persistence
O lacars+ O Mqtt O Http / Https User Permissions Passwords Web UI	MQTT AT Topic MQTT AT Resp Topic		This topic will be subscribed for receiving AT Commands (usefull for individual device) This topic will be used for publishing the AT
• CA Certificates			This tonic will be subscribed for receiving AT

Once the section has been configured, restart the device from the "Other > Reboot" menu. Following the reboot, the device will connect to the MyDevices' Cayenne platform after a few seconds and will appear on the left-hand side of the screen. This will be called the "Webdyn-Easy-Tunnel".

You must now add 3 Widgets: one for the temperature sensor, one for the humidity sensor and two others to remotely change the value of the PLC registers 30002 and 30003. Click again on "Add new > Device/ Widget".

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Add new Device/Widget Event Trigger Project	Data	What's	next?	Webdyn-Ea	sy-Tunnel 👩	

Then, select "Custom Widgets" > "Display Widget", as shown in the screenshot below, and select / fill in the indicated data. Please note that the Cayenne platform will use channel "1" for the temperature sensor.

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Cayenne Powered by myDevices	matrix +				다. Create App Community Docs User Menu
Add new Commercialize your loT solution using your own brand. Learn more	Devices & Widgets Search Q	₿ 74°	Value Display Widget Example	>	Enter Settings
C Webdyn-Easy-Tunnel	Single Board Computers > MicroControllers >	\sim	Line Chart Display Widget Example	>	Value Display Widget
	Sensors v Actuators v Extensions v	\frown	Gauge Display Widget Example	>	Sensor
	LORA	1	2 State Display Widget Example	>	Data Temperature
	CAYENNE API Bring Your Own Thing	>	Button Controller Widget Example	>	Channel 1 Choose Icon Tempo Probe
			Slider Controller Widget Example	>	Step 1: Code
Q Search Devices					Add Widget

Finally, click on the "Add Widget" button and the newly created widget will appear on screen.

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Add new 🗸 🗸	In Overview Seta	Webdy	n-Easy-1	ſunnel	٠	
Commercialize your loT solution using your own brand. Learn more Webdyn-Easy-Tunnel	Temperature Image: Celsius					
Q Search Devices	Last data packet sent: February 6, 2023 11:22:08 AM					

Now, repeat the same process for the humidity widget, assigning channel 2 in this instance.

S Intelligent Router ×	Add Device myDevices Cayenne	× +				✓ - □ X
Cayenne Powered by myDevices	matrix +					Create App Community Docs User Menu
Add new Commercialize your IoT solution using your own brand. Learn more Webdyn-Easy-Tunnel Temperature	Devices & Widgets Search Devices Single Board Computers MicroControllers Sensors Actuators	Devices & Widgets Search Q DEVECS Single Board Computers MicroControllers > Sensors •		Value Display Widget Example Line Chart Display Widget Example Gauge	>	Enter Settings Value Display Widget Name Humidity
	Extensions LoRa Custom Widgets	, , ,	1	Display Widget Example 2 State Display Widget Example	>	C Webdyn-Lasy-Tunnel
	CAVEINE API Bring Your Own Thing	8	 Image: A start of the start of	Button Controller Widget Example	>	Channel 2 Overai Iton Humidity
0 (Controller Widget Example		Step 1: Code Add Widget

Click on the "Add Widget" button and the newly created widget will appear on screen.

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Commercialize your IoT solution using your own brand. Learn more	Temperature Humidity				
Webdyn-Easy-Tunnel	In → → − Celsius Percent (1)				
Q Search Devices	Last data packet sent: February 6, 2023 11:42:29 AM				

Then, add the widget to write an analogue value between 0 and 255 in register 30002 of the PLC. This widget will be assigned channel 3.

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Commercialize your IoT solution using your own brand. Learn more	DEVICES					Controller Widget
Webdyn-Easy-Tunnel Humidity Temperature	MicroControllers	>	\sim	Line Chart Display Widget Example	>	Nume Modbus 30002
Ci renpetatore	Sensors	*		Gauge Display Widget	>	C Webdyn-Easy-Tunnel
	Extensions	×		cxample		Sensor
	ADD DATA TO YOUR DASHBOARD	-	1	2 State Display Widget Example	>	Data Analog Actuator
	Custom Widgets	Ć		Button Controller Widget	>	Unit Channel a
	Bring Your Own Thing			Slider Controller Widget	>	Slider Min Value (optional) 0 Slider Max Value (optional) 255
				Example		Step 1: Code
Q Search Devices			(次)	Motion Example	>	Add Widget

Then, add the widget to write an analogue value between 0 and 255 in register 30003 of the PLC. This widget will be assigned channel 4.



At this point, the dashboard display will look like this:

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Add new 🗸	Overview	Data					Webdyn-Ea	isy-Tunne	•
Commercialize your loT solution using your own brand. Learn more	Temperature	Humidity	Modbus 30002	0	Modbus 30003	0			
C Webdyn-Easy-Tunnel	II –	* –	-			-			
💧 Humidity	UT		0		0				
🛃 Modbus 40002	Celsius	Percent (%)	0.00	255.00	0.00	255.00			
🛃 Modbus 40003									
Temperature									

You must now write a script within the Webdyn-Easy-Tunnel to manage the sending and receiving of data from the platform.

5. Configuring the SCRIPT to read the Modbus registers of the PLC and manage Topics

In this example, a script will be used to read the Modbus registers from the PLC and send them to the platform. You will also integrate the required code into this script to accept the command sent from the MyDevices' Cayenne platform, in order to change the value of the Modbus registers 30002 and 30003 of the PLC. Add the following script in the "Other > Titan scripts" section:



The full code of which is detailed here:

```
mtx.println("EXAMPLE MyDevices.com - Running...");
```

```
var USERNAME="b8401ec0-a304-11ed-8d53-aaaaaaaaaaaaaa;;
var CLIENTID="ad2561f0-a3c0-11ed-8d53-aaaaaaaaaaaaaaa;;
var subscribed=false;
var cont=9;
```

```
while (true)
```

{

```
//***** CHECK IF MQTT CONNECTION IS OK
if (mtx.mqttlsConnected())
{
    //***** SUBSCRIBE TO THE MQTT TOPICS (for receiving data from platform)
    if (subscribed==false)
    {
        subscribedTopicO=mtx.mqttSubscribe("v1/" + USERNAME + "/things/" +
CLIENTID + "/cmd/3",0);
        subscribedTopic1=mtx.mqttSubscribe("v1/" + USERNAME + "/things/" +
CLIENTID + "/cmd/4",1);
        if ((subscribedTopic0)&&(subscribedTopic1))
        subscribed=true;
```

else

}

{

//***** EVERY 10 SECONDS READ AND SEND MODBUS DATA ...

```
cont++;
```

{

```
if (cont==10)
```

cont=0:

var res=mtx.modbusRTUGetWords(1,3,30000,2);

```
//***** IF THE MODBUS READING WAS CORRECT ...
                             if (res!==null)
                             {
                                    mtx.println("Temperature:" + res[0]/10);
                                    mtx.println("Humidity:" + res[1]);
                                    //*** BUILDING TOPIC AND JSON DATA
                                    var topic="v1/" + USERNAME+ "/things/" + CLIENTID + "/data/
json";
var data="[{\"channel":1,"value":" + res[0]/10 + ","type":"temp","unit":"c"},";
data=data + "{\"channel\":2,\"value\":" + res[1] + ",\"type\":\"rel_hum\",\"unit\":\"p\"}]";
                                    //*** SENDING DATA TO CAYENNE (MyDevices.com)
                                    var r=mtx.mqttSend(data,topic,0);
                             }
                     }
                     //***** CHECK TOPICS ...
                     for (var topicID=0;topicID<2;topicID++)
                     {
                             //***** IF THERE IS DATA AVAILABLE IN TOPIC
var res=mtx.mqttGetArray(topicID)
                             if(res!=null)
                             {
                                    //***** CONVERT RECEIVED ARRAY BYTE INTO STRING
                                    var stringData=mtx.byteArrayToString(res,0,res.length);
                                    //***** READ seq AND value SENT FROM MYDEVICES
PLATFORM
                                    var seq=stringData.substring(0, stringData.indexOf(","));
                                    var value=stringData.substring(stringData.indexOf(",")+1);
                                    //***** IF RECEIVED DATA COMES FROM TOPIC 0
                                    if (topicID==0)
                                    {
```

```
var array = [0];
                                           array[0]=value;
                                           var res=mtx.modbusRTUSetWords(1,16,30002,array);
                                    }
                                    //***** IF RECEIVED DATA COMES FROM TOPIC 1
                                    else if (topicID==1)
                                    {
                                           var array = [0];
                                           array[0]=value;
                                           var res=mtx.modbusRTUSetWords(1,16,30003,array);
                                    }
//***** RESPONSE OK TO CAYENNE WITH SAME SEQ
mtx.mqttSend("ok," + seq,"v1/" + USERNAME + "/things/" +
CLIENTID + "/response",0);
                            }
                     }
              }
              }
       else
              subscribed=false;
       //***** 1 SECOND PAUSE
       mtx.pause(1000);
```

Essentially, commands sent from the MyDevices' Cayenne platform are sent to the mgtt topics: v1/<USERNAME>/things/<CLIENTID>/cmd/<CHANNEL>

The script therefore subscribes to 2 topics, namely channels 2 and 3, i.e., the channels that will receive the commands to change the Modbus registers 30002 and 30003.

Depending on whether the script receives data in one or the other topic, it will write to register 30002 or 30003.

More detailed information on the JSON format for sending data to the platform can be found here: https://docs.mydevices.com/docs/device/mgtt

}

6. Testing the example

The only thing left for you to do now is to execute your String. Once executed, you should be able to see how the temperature and humidity are being read in the Logs display:

• Http / Https	Other > Titan Scripts v2 > Console	
 Http / Https User Permissions Passwords Web UI CA Certificates Email Config ModBus Slave Titan Scripts Connectivity tools Digital I/O Context of Line 	EXAMPLE MyDevices.com - Running Temperature:32.4 Humidity:65 Temperature:32.4 Humidity:65 Temperature:32.4 Humidity:65 Temperature:32.4 Humidity:65 Temperature:32.4	•
Led Config Syslog	Humidity:65 Temperature:32.4 Temperature:32.4	• //
 Backup / Factory Firmware Upgrade 	Run console Stop console Clear console	

These values should also be reflected in the dashboard of the MyDevices' Cayenne platform:

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Commercialize your IoT solution using your own brand. Learn more	Temperature Humidity Modbus 30002 Modbus 30003	
C Webdyn-Easy-Tunnel 🗸 🗸 🗸	₩32.40 €65.00	
	Celsius Percent (%) 0.00 255.00 0.00 255.00	

Similarly, if you change the values of the sliders from the Cayenne platform (to alter the values of the Modbus registers 30002 and 30003), you can check that everything works correctly.

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Add new 🗸	Overview	Data					N	lebdyn-Ea	sy-Tunne	•
Commercialize your IoT solution using your own brand. Learn more	Temperature	Humidity	Modbus 30002	0	Modbus 30003	0				
C Webdyn-Easy-Tunnel 🗸 🗸	€132.40	€65.00	107.00		218.00	~				
	Celsius	Percent (%)	0.00	255.00	0.00	255.00				
O Search Devices	Last data packet sent: Feb	uary 6, 2023 1:05:40 PM								

.	Mbslave1	- • ×					
ID	ID = 1: F = 03						
	Alias	30000	^				
0		324					
1		65					
2		107					
3		218					
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Any questions?

Please direct your enquiries to iotsupport@mtxm2m.com