



## Connectivity Guide

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# Connecting an IoT Gateway MQTT Client Agent to Amazon Web Services IoT Platform (AWS IoT)

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# 1. Connecting an IoT Gateway MQTT Client Agent to Amazon Web Services IoT Platform (AWS IoT)

The purpose of this document is to provide an overview of the way to connect some old Allen-Bradley PLC5 devices using a ControlLogix Gateway.

## 1.1 Hardware Infrastructure

1. **PLC5 Controllers.** This is a very old controller by Allen-Bradley, discontinued a long time ago. They used to communicate with a serial connector with a protocol called DH+ (Data Highway Plus). Each PLC5 has physical switches to provide a DH+ identification number (unique in the network).

Consult: <http://ab.rockwellautomation.com/programmable-controllers/plc-5-controllers>

2. **Data Highway Plus (DH+).** It is an old serial protocol, based on RS-485, developed and owned by Allen-Bradley. With this serial connection, you could exchange messages between devices in the line, and connect PCs to get real time data (for HMI and SCADAS for example) and even to program the PLC.

Consult: <https://www.rtaautomation.com/blog/data-highway-plus-dh/>

3. **ControlLogix Gateway.** This is basically the converter between Ethernet Allen-Bradley CIP protocol to the serial DH+ protocol. This ControlLogix does not need any CPU, but will need the appropriate modules according to what protocols you want to convert from and to. In my case, the ControlLogix Gateway consisted of the following elements:

Consult: <http://literature.rockwellautomation.com/idc/groups/literature/documents/um/1756-um513-en-p.pdf>

- a. **1756-DHRIO.** ControlLogix DHRIO Communication Module. It can be configured to communicate using RIO or DH+ protocols. It has 2 serial interfaces, to create up to 2 DH+ networks (A and B). In my case, the customer was only using Interface A.

Consult: <http://literature.rockwellautomation.com/idc/groups/literature/documents/um/1756-um514-en-p.pdf>



- b. **1756-ENET**. ControlLogix Ethernet Communication Module. This is the module that ThingWorx® Kepware® Server will connect to. You can define the IP via rotary switches or with a software configuration tool. We will use ControlLogix Ethernet driver to connect ThingWorx Kepware Server to this module.

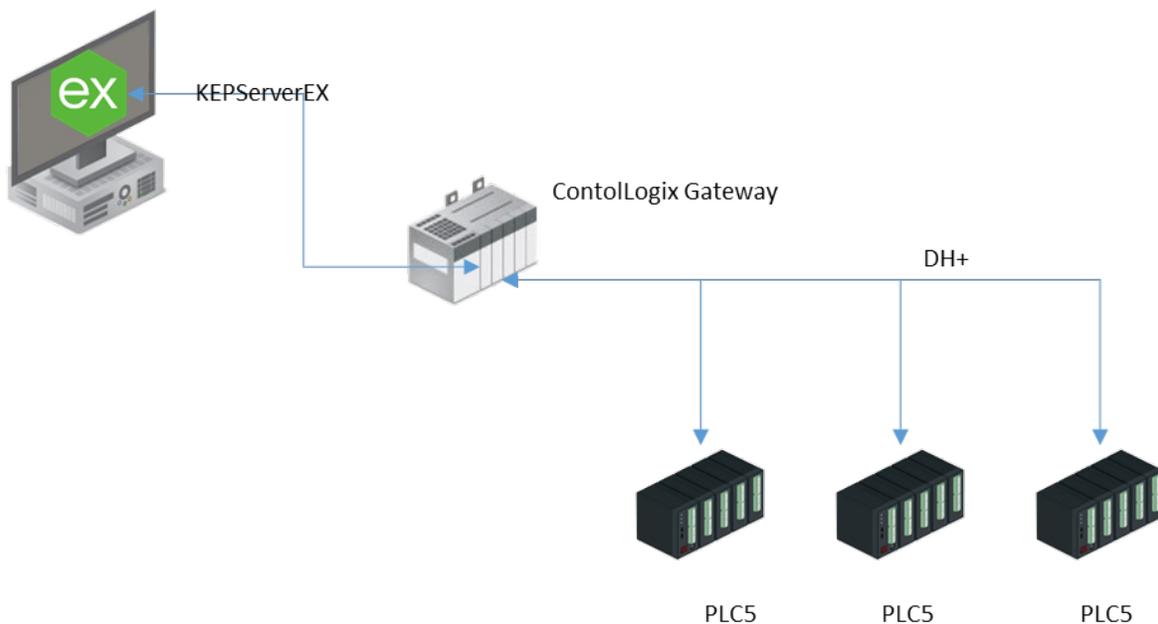


Consult: [http://literature.rockwellautomation.com/idc/groups/literature/documents/um/1756-um051\\_-en-p.pdf](http://literature.rockwellautomation.com/idc/groups/literature/documents/um/1756-um051_-en-p.pdf)



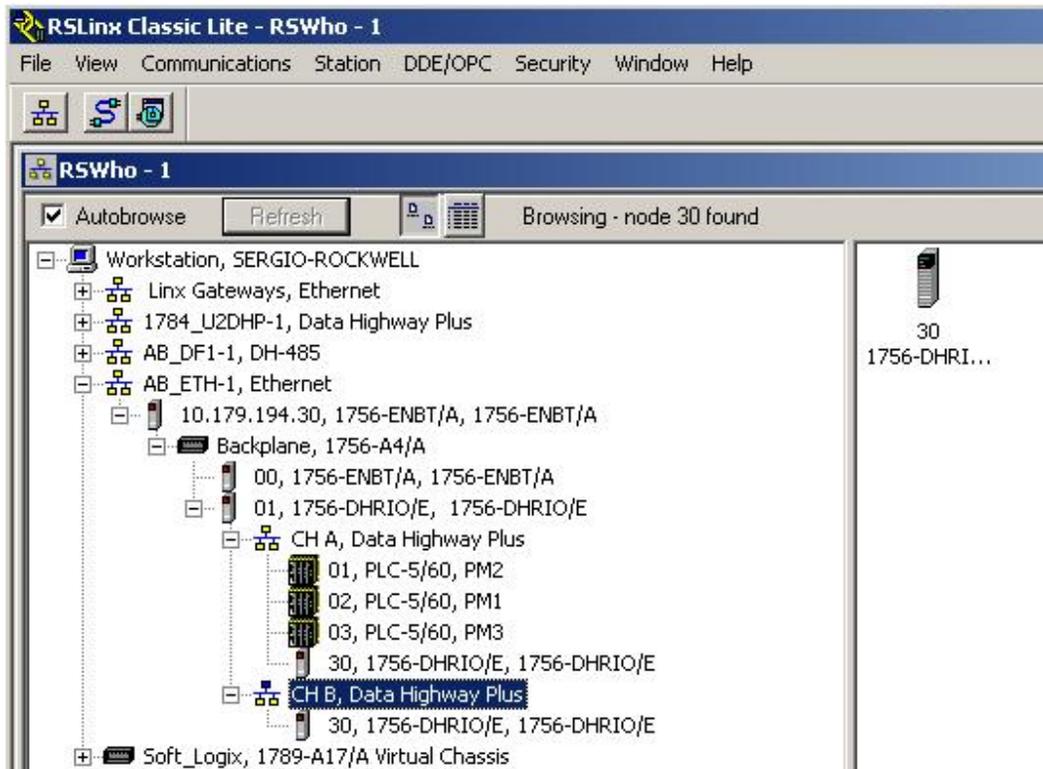
- c. **1756-A4**. ControlLogix chassis. This is the backplane where the modules are plugged in. It is also known as backplane.
- d. **1756-PA72**. Power supply. Also plugged to the chassis.

## 1.2 Architecture



### 1.3 Identify Each Device in the Network

A user already using RSLinx Classic can run the RSWho command from RSLinx (Communications → RSWho) and wait a few seconds for the program to find all the Allen Bradley elements accessible from the PC. Below is an example of what might be received:



**Tip:** RSLinx Lite is a free version of RSLinx that can be used to browse for devices.

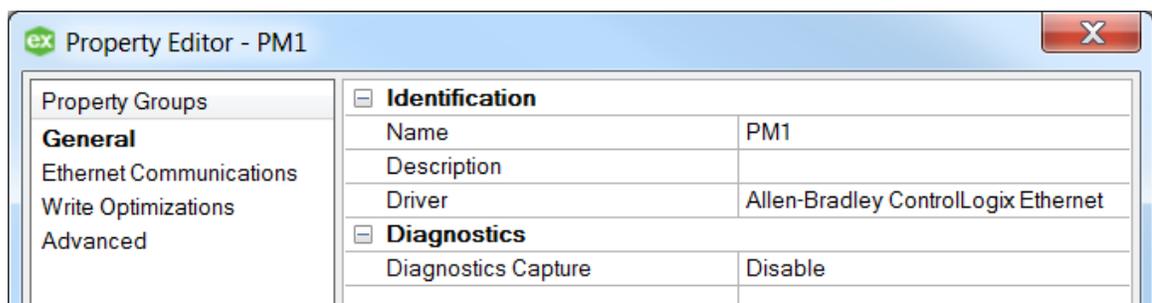
#### Knowns

- The Ethernet module has the following IP address: 10.179.194.30
- The DH+ module is in slot 01 of the backplane, and the Ethernet module is in slot 00.
- In the DH+ network there are 3 devices, PLC5/60, all of them in the first interface of the DH+ module (Interface A) with the identifiers 1, 2 and 3.

**Note:** The DH+ interface must have a DH+ address. The PLC programmer gave the address 30 octal (24 decimal).

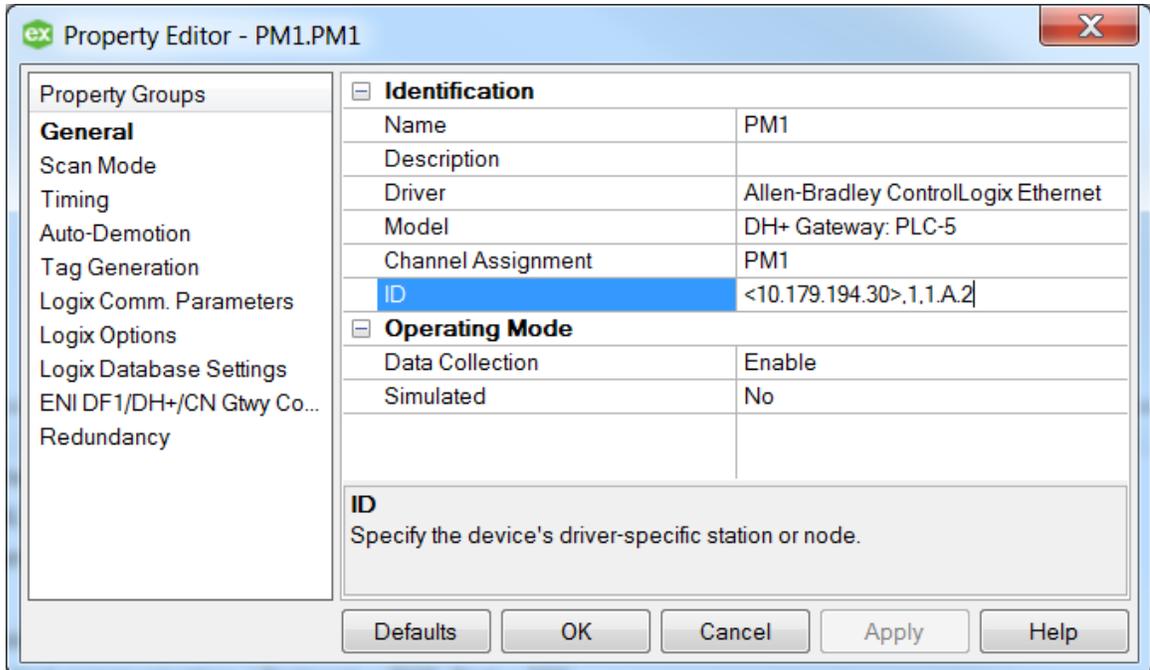
### 1.4 Configure ThingWorx Kepware Server

1. Create a new channel for Allen-Bradley ControlLogix Ethernet.

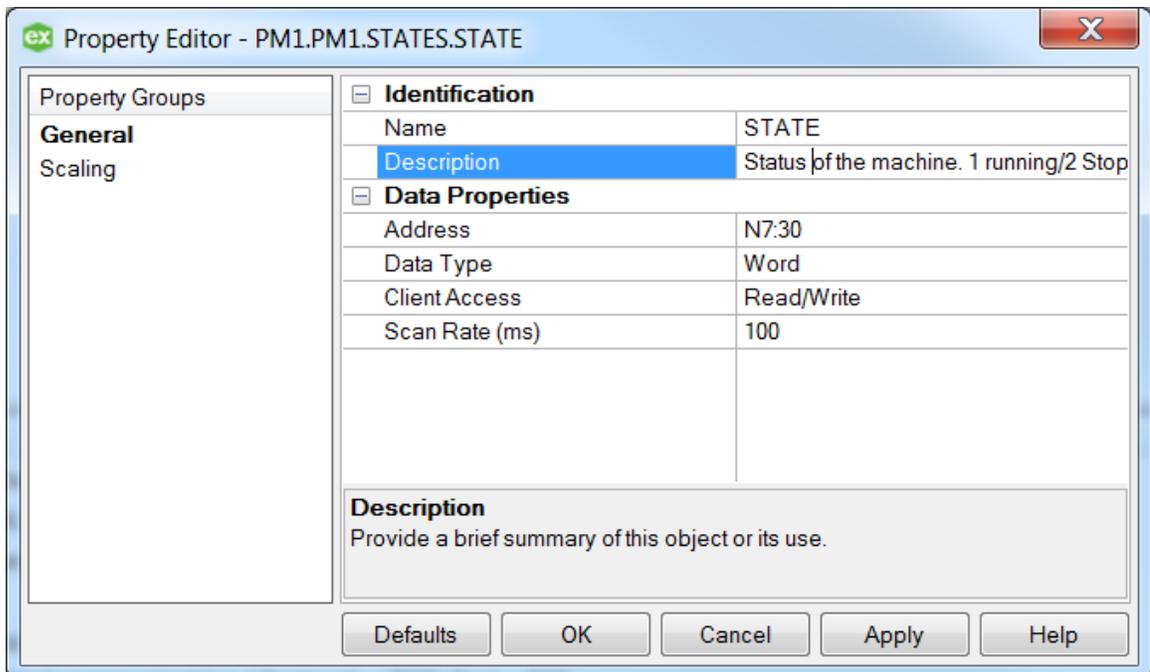


2. Create a new device and configure it with DH+ Gateway: PLC5 as the model.

3. In the ID field, enter the following: <10.179.194.30>,1,1.A.2.



4. This allows access to the device ID 2 in DH+ interface A in slot 1 of the backplane (always #1) in the gateway whose IP address is 10.179.194.30.
5. DH+ devices do not accept ATG, so create the tags manually according to the PLC5 syntax, as shown in the screenshot below.



6. Verify communication is successful and providing data.