Photon OS and VMware Pulse IoT Center 2.0 on Dell Edge Gateway 5000

Version 1.0

vmware®

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Executive Summary

Business Case

The Internet of Things (IoT) is rapidly transforming traditional business models and operational processes to boost innovation and growth. An IoT-ready infrastructure has unique requirements with onboarding, configuring, managing, and securing connected devices, and as a tidal wave of IoT use cases reaches your organization, your Information Technology (IT) and Operational Technology (OT) departments may struggle to keep up. VMware can help organizations achieve IoT infrastructure excellence and deliver successful business outcomes that meet the needs of both your IT and OT organizations.

VMware Pulse™ IoT Center™ is a secure, enterprise grade, end-to-end IoT infrastructure management solution that allows OT and IT to have complete control over their IoT use cases, from the edge all the way to the cloud. It helps companies to onboard, manage, monitor, and secure all things and infrastructure for IoT.

Photon OS by VMware is a lightweight Linux container host that is optimized for cloud-native applications, cloud platforms, and VMWare infrastructure. Using Photon OS together with Pulse IoT Center and Dell™ Edge Gateway 5000 hardware provides a stable secure foundation for various IoT use cases.

The Dell Edge Gateway 5000 Series is designed to aggregate, secure and relay data from diverse sensors and equipment at the edge. The Intel® Atom® processor provides capacity to perform local analytics so only meaningful information is sent to the next tier, which could be another gateway, the datacenter or the cloud. Engineered with an industrial grade form factor and fan less solid-state design, the Dell gateway can reliably run 24x7 with long life at extended temperatures, in addition to withstanding the higher levels of humidity and dust typical of industrial environments.

This solution paper describes how VMware Pulse IoT Center can be used to onboard, manage, monitor and secure one or a fleet of Dell 5000 IoT Gateways running Photon OS.

Solution Overview

This solution paper describes a reference architecture for using VMware Pulse IoT Center to effectively and efficiently onboard, manage, monitor and secure Dell 5000 Gateways running the Photon OS.

- We download and install Photon OS on Dell 5000 gateway hardware.
- We successfully onboard the IoT Gateway as a managed edge system.
- We monitor the health of Photon and the gateway by collecting system metrics.

Introduction

Purpose

This reference architecture outlines the supportability of Photon OS on Dell Edge Gateway 5000 hardware as a managed edge system on VMware Pulse IoT Center.

Audience

This reference architecture is intended for IT and OT administrators and IoT architects involved in planning and managing Internet of Things infrastructure, applications and services.

Solution Configuration

Solution Architecture

For this solution, we have a Dell Edge Gateway 5000 running Photon OS 3.0 connected via WIFI or Ethernet to your internal network. From there it connects to VMware Pulse IoT Center which is either installed on-premises or hosted in the cloud. In this case, we will be onboarding a Dell 5000 as a managed edge system/gateway.

Dell IoT Gateway

VMware Pulse IoT Center
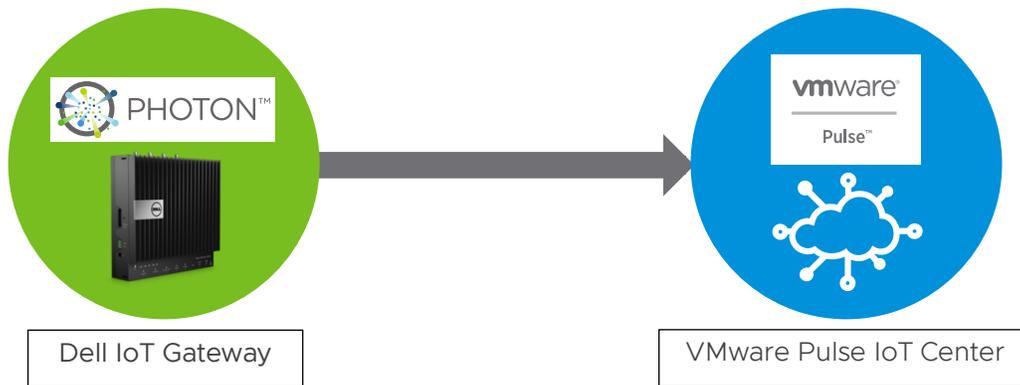
Assumptions
- You have a Dell Edge Gateway 5000.
- You have access to a VMware Pulse IoT Center version 2.0 environment hosted on a cloud or set-up in your on-prem environment.
- The Dell 5000 Gateway has a WIFI or LAN connection and the ability to reach out to internet.
- You have a basic understanding of navigating through Linux Command Line Interface.
- You have access to the Dell 5000 Gateway via SSH or SCP.
- You have a User created on VMware Pulse.
- You have a USB drive that can be emptied, in order to create a bootable USB drive
- You have a Windows 7 computer that you can use to create the bootable USB drive

Solution Validation

Download Photon 3.0 Image and Rufus tool:

Download Photon (Full ISO - x86_64) from:

https://github.com/vmware/photon/wiki/Downloading-Photon-OS

Use Rufus to create a bootable flash drive:

http://rufus.akeo.ie/

Use Rufus to create a bootable USB drive

1. Connect a USB drive to your computer (this USB drive will be wiped during this process)

2. Open Rufus

3. Under "Device," select the drive you want to use.

4. On the right-side of "Boot selection," click the Select button to load the Photon ISO file.

5. Use the "Partition scheme" drop-down menu, and select the GPT option.

6. Use the "Target system" drop-down menu, and select the UEFI (non CSM) option.

7. On "Partition scheme and target system type," select GPT partition scheme for UEFI.

8. Start the process, and wait (About 5 minutes)

Apply the Photon Image to the Dell 5000 Gateway

1. Plug the USB drive that was just created into the Dell 5000

2. Reboot gateway, pressing F12 repeatedly to get to UEFI boot

3. Select "Boot from USB drive"

4. Follow process to configure and install Photon

5. Once the image load begins, it takes less then 3 minutes to complete

6. Note - Photon has strict password requirements

After Reboot - Configure pre-requisites:

Note that reboot takes a long time (>2 minutes).

The following tools are not included in the default Photon image, so use tdnf (app installer) to download and install them:

Tar:

tdnf install -y tar

Sudo:

tdnf install -y sudo

By default you can't ssh to root, so either update the ssh settings, or just create a non root user: with sudo privileges

useradd -m -G sudo <username>

And set the password:

passwd <username>

Reboot and login as this new user (run "reboot" or)

Setup Path and Library path so that Pulse Agent works:

export PATH=$PATH:/opt/vmware/iotc-agent/bin
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/opt/vmware/iotc-agent/lib

OR add these lines to /home/<user>/.bash_profile (to retain after reboot

PATH="$PATH:/opt/vmware/iotc-agent/bin"; export PATH
LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/opt/vmware/iotc-agent/lib"; export
LD_LIBRARY_PATH

Additional notes for Photon:

List IP address and network status:

- networkctl status

Reboot

- /sbin/shutdown -r now

Install Pulse Agent:

- Cd to an appropriate directory -eg /home/<username>/pulse
- Download and transfer the Pulse agent for x86, from your Pulse environment (top right corner, settings icon), or you can direct download on the Dell 5000 using (for example, replace your environment and version):
  curl -o iotcagent.tar.gz https://iotc001-pulse.vmware.com/api/iotc-agent/iotc-agent-x86_64-2.0.0.403.tar.gz
- Extract the Pulse agent on the Dell 5000:
  tar -xvf iotcagent.tar.gz
- Install (from the iotc-agent folder created during extract):
  Sudo ./install.sh

Enroll

Use DefaultClient in the Pulse home directory to enroll

DefaultClient enroll --template=<templatename> --name=<devicename> --username=<Pulse admin name>

Should get a response like:

Status of enroll response: 0

Once the enrollment succeeds you are done! You will see the Dell Gateway enrolled, with properties and metrics flowing to the Pulse console.

Disclaimer:

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Questions:

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