

Photon Controller Getting Started Guide

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1 Photon Platform

Photon Platform is a highly scalable multi-tenant control plane designed for cloud-native applications. The platform includes Photon Controller and ESXi. It provides an IaaS-style API to create, manage, and destroy

virtual machines and container cluster frameworks like Kubernetes. Photon Platform is also available as a bundle with Pivotal Cloud Foundry. The design favors scale, high churn, and self-healing of the infrastructure.

Photon Controller is built for cloud-native applications. While capable of running other workloads, it is designed for modern workloads, including container-based applications.

2 Download and Install Photon Platform

A complete installation of Photon Platform requires two components: Photon Controller and VMware ESXi. Both the fully licensed vSphere version of ESXi and the free ESXi hypervisor are supported.

If you do not already have access to licensed ESXi hosts, you can download and install the free version at the following URL:

<http://www.vmware.com/products/vsphere-hypervisor.html>

Photon Controller is available at the following URL:

<https://github.com/vmware/photon-controller/releases>

Download the Photon Controller installer, which is named `installer-vm.ova`.

You will also need the Photon Controller command-line utility:

- Mac CLI: `photon-darwin64`
- Windows CLI: `photon-windows.exe`
- Linux CLI: `photon-linux64`

3 Installation Requirements

If you've ever gone through the process of installing other distributed IaaS-like systems, installing Photon Controller should be similar.

3.1 Installation on ESXi

The following is a list of requirements for installation of Photon Controller in an ESXi environment:

3.1.1 Requirements

- ESXi v6.0
- 1+ ESXi host
 - 4 CPU Cores
 - 8GB of RAM
- SSH must be enabled on ESXi hosts
- Two VLANs
 - **Management VLAN** with 8 available **static** IP addresses for Photon Controller management VMs. Note: DHCP must be disabled on the management network.
 - * Mesos and Kubernetes clusters will require additional static IPs
 - **Tenant VLAN** with DHCP pool large enough for all resources you spin up
- NTP synchronizations on all ESXi hosts

3.1.2 Recommended

While you can install Photon Controller on one node, it is recommended that you install it on 8 or more ESXi hosts, each of which should have 8 CPU cores and 64 GB of RAM.

Please ensure you meet the requirements listed in the installation requirements document before proceeding with the installation.

4 Overview

Photon Controller was built as a distributed control plane for the management of ESXi hosts. There are two ways to install Photon Controller on ESXi:

- The Photon Controller command-line interface (CLI), which you install on a workstation to connect to the installer virtual appliance and run commands that set up Photon Controller on ESXi. You also use the CLI to work with Photon Controller after the installation is complete.
- A graphical user interface that appears as pages in a web browser connected to the deployer VM.

5 Preparing for Install

You need to do two things to prepare for the installation of Photon Controller:

- **Deploy the OVA Installation Appliance.** The install virtual appliance bootstraps the Photon Controller cluster and installs a full-fledged control plane on your management nodes.
- **Install Photon CLI Tools.** Even if you use the installation UI to deploy the platform, you'll need the CLI tools to interact with the platform later.

5.1 Deploy Installation Appliance

The installation appliance will bootstrap a full-blown Photon Controller cluster. There are two ways to deploy the OVA:

- **ESXi Embedded Host Client** - The web interface has a mechanism by which you can deploy the virtual appliance
- **ovftool** - You can deploy the virtual appliance using ovftool, freely available at <https://www.vmware.com/support/developer>

All methods listed above are equal in as long as you deploy the OVA to an ESXi host, you're good to go.

5.2 CLI Installation

The CLI tools are written in Go and hosted on the Photon Controller GitHub repository at the following URL:

<https://github.com/vmware/photon-controller/releases>

There are three versions of the CLI:

- photon-windows.exe for Windows
- photon-darwin64 for Mac
- photon-linux64 for Linux

6 A networking refresher

Take heed of the networking requirements listed in the section on installation requirements. It's worth repeating, though, as this will likely stave off issues you may encounter otherwise.

- **You must have a management network.** This network is where the control plane — your Photon Controller VMs — will live.
- You must not have DHCP enabled on the management network.
- **You must have tenant networks.** Your VMs, containers, etc. will live on this network.
- **Your installation appliance can live on any network**, but it must have access to both the management hypervisors and CLOUD ESXi hosts.

7 UI Installation

Installation via the web interface is quick and easy.

Because the appliance has VMware Tools installed, you can glean the IP address of the installer via the ESXi Embedded Host Client. Armed with this information, browse to `http://<installer_ip>`.

Once you begin the installation wizard, the process goes like this:

- Accept the EULA to proceed
- Configure your **management** hosts
- Configure your **cloud** hosts
- Wrap up by tweaking the **global** settings

There are details about the various steps below.

7.1 Management Configuration

The management configuration tab allows you to configure a variety of different parameters, most of which are required to proceed with the deployment:

Parameter	Description
Username	The hypervisor username
Password	Password to authenticate to hypervisor
Network Name	Port group name in which management VMs should live
Subnet Mask	Network mask for the management Virtual Machines
DNS	A DNS server for use by your management VMs
VM IP Address	The IP address for the management VM

7.2 Cloud Configuration

The cloud configuration tab is more concise. The only information required is a single (or multiple) hypervisors along with the credentials.

7.3 Global Configuration

The management configuration tab allows you to configure a variety of different parameters, only some of which are required to proceed with the deployment:

Parameter	Description
Image Datastore Names	Names of shared datastore for Photon Controller
Authentication	Enable Lightwave authentication
Other Services	IP addresses for system services (NTP and syslog)
Load Balancer	Deploy a load balancer (nginx) in management cluster

7.4 Export Configuration

Once you've completed all of the steps you may export the YAML configuration file.

The configuration file can be subsequently used in a CLI deployment later.

7.5 Deploy the system

You can now deploy the platform by clicking the *deploy* button.

8 CLI Installation

Deployment via the CLI is a relatively straight-forward process, summarized below:

- Install the CLI tool
- Create a YAML (.yaml) configuration file (either manually or using the UI and then exporting it)
- Use the CLI tool to deploy the system

8.1 YAML Configuration File

The YAML file we feed into the installer includes information about the management hosts, cloud hosts, credentials, network configuration, datastores, etc.

8.1.1 Manually create config

A template configuration file can be found here. Tweak the configuration file with the proper information before proceeding to the next step.

8.1.2 Grab config from UI

Perhaps the easiest method to build your configuration is to use the UI to do so.

Go through the wizard by browsing to `http://<installer_ip>`, and then export your configuration. The resulting YAML config can be used for a CLI-based installation, as well.

8.2 Deploy the system

You can now use the configuration file you created to kick off an installation of the system.

- Set the target for your CLI client: `photon target set http://<installer_appliance_ip>`
- Execute system deploy: `photon system deploy config.yaml`

9 Confirm Deployment and Resume System Services

Once the deployment has been completed, change the target to the production system. If you chose to deploy our internal load balancer, the production system IP is the IP of that Load Balancer. To find the Load Balancer IP:

```
photon deployment list
```

```
photon deployment show <Deployment_ID>
```

The URI changes based on whether or not you enabled Authentication in the install.

Authentication enabled, set target as follows:

```
photon target set https://<production_system_ip>:443.
```

Carefully note the **https://** and explicitly-defined **:443** in the URI.

Authentication Not Enabled, set target as follows:

```
photon target set http://<production_system_ip>:28080.
```

To Resume System Services (0.9 release and above):

```
photon deployment resume <Deployment_ID>
```

A simple `photon system status` can be used to ensure everything is up and running after the deployment:

```
~ % photon system status
Using target 'https://10.15.33.125'
Overall status: READY
```

Component	Status
HOUSEKEEPER	READY
DEPLOYER	READY
CLOUD_STORE	READY

Alternatively you can manually check the control plane containers are running via a `docker ps` on each management VM.

9.1 Web Browser Interface

Once the system is fully operational, you can browse to `http://<mgmt_ip>/api` to see all of the API endpoints.

10 Authentication

If you enabled authentication during the deployment, you may want to read our authentication wiki page for more information.

11 Cluster Orchestration

Spinning up clusters on Photon Controller is a piece of cake. First, run through these preparation steps, which boils down to pushing a base image to Photon Controller. Once that's done you can spin up a cluster in short order:

- Kubernetes

- Mesos
- Docker Swarm