

VMware Pulse IoT Center Sizing Guide

VMware Pulse IoT Center 2.0.0



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Introduction

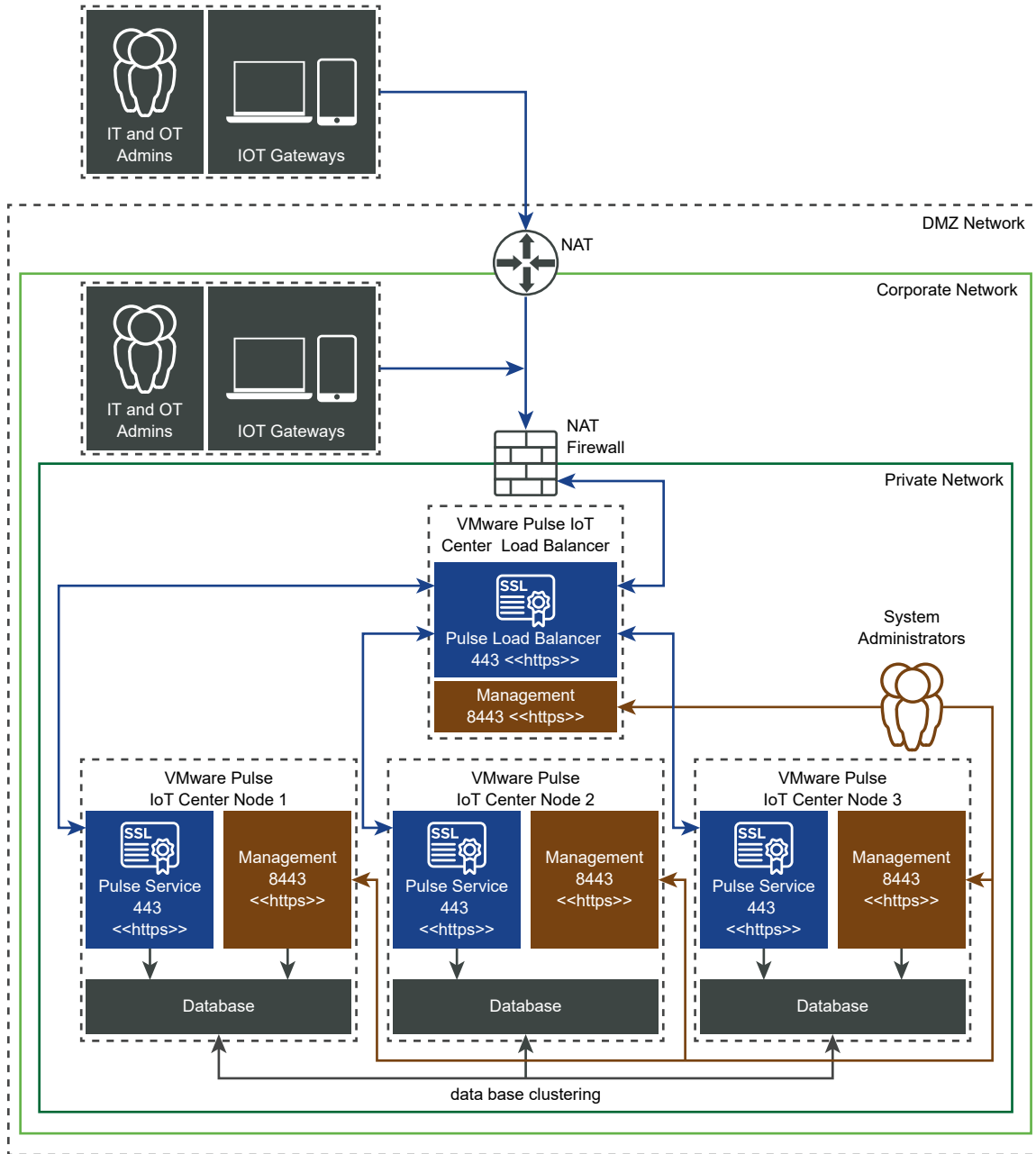
The *VMware Pulse IoT Center Sizing Guide* captures the sizing guidelines for VMware Pulse IoT Center 2.0.0 for the number of devices managed and the use of components such as device management, metrics ingestion, alert generation, notifications, device updates, and command execution.

This guide also provides some best practices and server-side tuning parameters to fine-tune the environment for a specific data set and feature usage on a large scale.

VMware has tested VMware Pulse IoT Center 2.0.0 with 15000 devices (2500 Gateways + 12500 Things). The details are listed in the following table.

The VMware Pulse IoT Center 2.0.0 offers an excellent control plane solution to manage, monitor, update, and troubleshoot an enterprise IoT infrastructure and drive its operational efficiency. It supports a varied range of gateways and sensors.

Figure 1-1. VMware Pulse IoT Center 2.0.0 Schematic Diagram



Key Terminology

The following key terminologies are used throughout this guide.

Gateway versus Thing

Apart from the gateways that send the data to the VMware Pulse IoT Center server, there are sensors that read the data from the physical world and send them to the gateways from time to time. These sensors are called Things. The VMware Pulse IoT Agent software residing at the gateway device aggregates the data and sends it to the VMware Pulse IoT Center server.

What Are Metrics

Metrics are the data sent by the gateway devices to the VMware Pulse IoT Center server. They are the parameters that are under observation at a given time. The values are ingested in the database and are displayed in a graphical representation in the VMware Pulse IoT Center console.

What Is a Metrics Ingest Interval

Metrics Ingest Interval is the interval at which the gateway devices send metrics to the server. The default interval value is 5 minutes. However, the recommendation for Metrics Ingest Interval can vary depending on the scale of devices added to the system and the number of metrics sent to the server.

What Is a Sampling Frequency

There are several sensors connected to a gateway. These sensors send data to the gateway every minute or every 2 minutes. This interval is known as Sampling Frequency. However, the aggregation of this data is done by the gateway and sent at every Metrics Ingestion Interval set at the VMware Pulse IoT Center server.

Basis of Sizing

The sizing guideline for VMware Pulse IoT Center 2.0.0 has been arrived at after performing the following tests.

- 1 Ran multiple small experiments for specific feature sets that were provided by customers as feedback. These tests are called workload models and are referred throughout this document.
- 2 Set up a large-scale test environment with 15000 enrolled virtual devices including gateways and things. Performed regular user operations and monitored the performance over an extended time.

The following workload model table lists the number of devices enrolled, the number of metrics or devices ingested, the number of alert definitions, the number of campaigns, and the number of commands run.

Gateways	Things	Metric Point	Sampling Frequency	Ingestion Interval	Alert Definitions	Alerts per Day	Notifications	Campaigns	Commands
2500	12500	10	3	1 Hour	20	750	1500	1	100 file uploads per day.
		30 data points per device per interval				32 alerts per hour.		10 MB package.	2 MB file size.

The following features were covered in the tests that were simulated at scale:

- VMware Pulse IoT Agents ingesting metrics to the VMware Pulse IoT Center Server.
- Monitoring alerts generated in the system.
- Monitoring notifications generated in the system.
- Running campaigns using real agents.
- Running commands to fetch logs from devices.

Device Template Recommendations

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Device templates are created to group different types of sensors and gateways that are used to report metrics to the VMware Pulse IoT Center server.

There are certain limits set to these templates to help you design and group the devices in an effective way.

Each organization can have up to 100 templates. There is no limit for the number of devices per template. There can be a maximum of 1000 devices in an organization and a maximum of 100 templates in an organization.

Sizing Work Models

The sizing work model is determined by a baseline of feature usage and the number of devices used in the system. If the baseline of the feature usage varies, then it increases the resource usage of the underlying prescribed infrastructure.

Each of the resources listed in the following table is divided equally among the three-node cluster to create a high availability setup.

Devices (gateways and things)	CPU Cores	RAM	Hard Disk
< 1000	6	24	612
1001–4000	12	48	612
4001–10000	18	72	1000
10001–15000	24	96	1500
> 15000	Contact VMware Support	Contact VMware Support	Contact VMware Support

To resize the environment for the number of devices in the sizing work model, contact VMware Support.

Server-Side Tuning and Configuration Parameter Recommendations

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The following are the recommendations for server-side tuning and configuration parameters.

System Configuration for HA Proxy

- HA Proxy Version - 1.9.4
- Operating System - Photon OS 2.0
- Number of vCPUs - 4
- RAM Size - 8 GB
- Storage Size - 16 GB

For details about configuring the HA Proxy settings, see the *VMware Pulse IoT Center Administration Guide*.

Peak Load Recommendations

For a peak load, the workloads are managed by vertically scaled setups of VMware Pulse IoT Center. The following table lists the guidelines to use VMware Pulse IoT Center with the indicated scale factor for matching the features with their workloads.

Illustrative Usage of VMware Pulse IoT Center with Vertical Scale

Vertical Scale Factor	Devices (gateways and things)	Metrics Ingest Interval (in seconds)	Metric Points Per Device	Data Points Per Hour	OTA Devices Per Campaign	Alert Definitions
1	1000	5	10	120000	50	10
1	2000	5	5	120000	50	10
1	3000	10	7	126000	50	10
1	3000	15	10	120000	50	10
2	4000	10	5	120000	100	25
2	3000	10	7	252000	100	25
3	4000	15	10	450000	100	30
4	8000	25	10	320000	100	40
4	10000	30	10	400000	100	40
4	15000	60	10	450000	100	40

Note Uploading files using the command execution option on many gateways increase the disk size and must be monitored. Contact VMware Support for adding additional disk resources if 70% disk usage is reached.

All the OTA campaigns indicated in the table work with a package size of 10 MB in a large-scale environment. Ensure that you run a campaign on a maximum number of 100 devices at a time. After the campaign runs successfully, proceed to the next 100 devices.