Deploy Windows Applications using Peer-to-Peer Distribution

VMware Workspace ONE UEM

vmware®

You can find the most up-to-date technical documentation on the VMware website at:

https://docs.vmware.com/

Contents

Peer-to-Peer Distribution for Windows 10

<div style="text-align: right">1</div>

Workspace ONE UEM powered by AirWatch offers the peer distribution system as another method to deploy your Windows applications to enterprise networks. Peer distribution reduces the time to download large applications to multiple devices in deployments that use a branch office structure. Workspace ONE UEM offers two types of peer-to-peer options. You can either use the Workspace ONE peer distribution or a peer distribution that partners with Adaptiva.

Shortcomings of the default Software Distribution process

In the default software distribution process, the Workspace ONE UEM console deploys Windows applications from a secure file storage system or from a Content Delivery Network (CDN). Windows applications are large and it takes time for them to download to devices. Downloading of Windows applications can also increase the traffic on communication channels. Multiple devices use the channel to retrieve the large application simultaneously from the CDN or file storage. This constant traffic can hamper the network availability needed for other critical applications.

Benefits of using Peer-to-Peer Software Distribution

Peer distribution system benefits environments with specific characteristics, such as:

- Offices in remote locations with the low bandwidth.

- Offices that has a higher latency against the Content Delivery Network (CDN) and Device Services server.

- Enterprises that use branch office hierarchies.

- Enterprises that have multiple branch offices with many devices.

This chapter includes the following topics:

- Peer Distribution with Workspace ONE

- Peer Distribution with Adaptiva

Peer Distribution with Workspace ONE

Workspace ONE Peer Distribution uses the native Windows BranchCache feature that is built into the Windows operating system. This feature provides an alternative peer-to-peer technology for customers to use instead of Adaptiva.

Requirements and Ports used for Peer Distribution with Workspace ONE

Configure peer distribution on your Windows 10 devices with the **Peer Distribution Windows Desktop** Profile. Peer distribution supports **Distributed**, **Hosted** and **Local** BranchCache modes along with their configuration settings; disk space percentage and max cache age. You can also view the BranchCache Statistics of an application from the **Peer Distribution Details** panel under **Apps&Books > Native > List View > Application Details**. For more information, see the topic *Tracking and Monitoring your Application Deployment* of the *Application Lifecycle Management* documentation.

Before you get started with Workspace ONE peer distribution, enable the File Storage Caching so that the applications are cached in the device services server and are accessible by the BranchCache service. Enabling the File Storage Caching allows you to configure an external repository in which the files are stored. A disabled setting means that files are stored as binary large objects in the database.

While configuring Workspace ONE peer distribution, the ports are automatically configured for the Windows Defender Firewall. However, for the Third-Party firewall you might have to configure the ports manually.

Table 1-1. Ports used for Peer Distribution with Workspace ONE

Direction	Protocol	Port	Application	Action
Inbound	TCP	80	SYSTEM	ALLOW
Inbound	UDP	3702	=%systemroot%\\system32\\svchost.exe	ALLOW
Outbound	TCP	Any (Remote 80)	SYSTEM	ALLOW
Outbound	UDP	Any (Remote 3702)	=%systemroot%\\system32\\svchost.exe	ALLOW

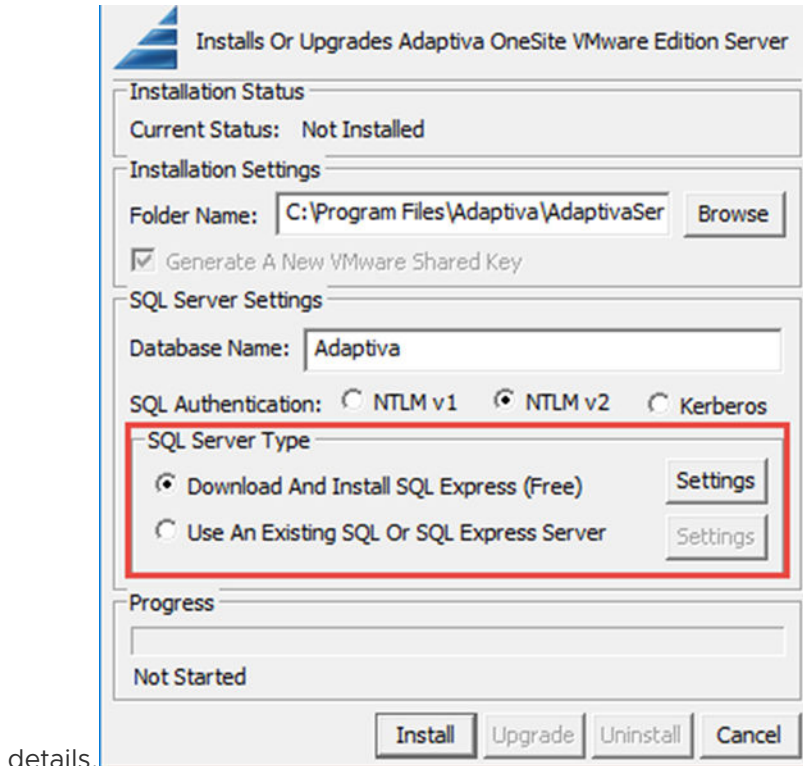## Install Peer-to-Peer Server from the UEM Console

You can download the peer-to-peer server from the **Peer Distribution** page in the Workspace ONE UEM console. and install the server. For installation, you can follow the prompts in the installation wizard.

1   Ensure the machine that hosts the peer-to-peer server meets the requirements.

2   Navigate to **Groups & Settings > All Settings > System > Enterprise Integration > Peer Distribution** and download the server.

3   Open the server installer executable.

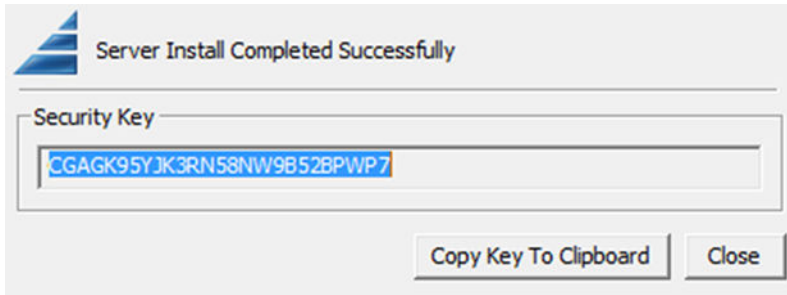4   Select a **SQL Server Type** and configure the **Settings**.

Choose from the following options:

a   To download and use a new instance of SQL Server Express, configure where the wizard installs SQL Server Express.

b   To use an existing SQL Database or SQL Express Server, enter the SQL server and login information. Details include the name of the database server, the SQL instance name, the port of connection and the authentication

details.

5   Select **Install**. If you downloaded a new instance of SQL Server Express, the server downloads and installs with the peer distribution server. The peer distribution server downloads and installs.

6   Copy the **Security Key** to enter in to the UEM console. Also, enter the name and IP address of the new.

Note If you misplace the original security key during the peer distribution, you can generate a new key by rerunning the peer distribution installer. You can select the option **Generate a New VMware Shared Key** in the **Installations Settings** area.

Install SQL Server Express Manually

When installing the peer-to-peer distribution server, some instances need SQL Server Express. If your firewall rules on the peer-to-peer server block the free SQL Server Express download you can install the SQL Server Express manually.

1   Download SQL Server Express from http://redirect.adaptiva.cloud/sqlexpress2014 on a machine without firewall restrictions.

2   On the server machine, copy and extract the downloaded SQL Server Express setup in `c:\sqltemp`.

```
C:\sqltemp\Setup.exe /q /Hideconsole /ACTION=Install /IACCEPTSQLSERVERLICENSETERMS /
Features=SQLEngine /TCPENABLED=1 /BROWSERSVCSTARTUPTYPE=Automatic /
AddCurrentUserAsSQLAdmin /SQLSYSADMINACCOUNTS="NT AUTHORITY\LOCAL SERVICE"
"NT AUTHORITY\SYSTEM" /SQLSVCACCOUNT="NT AUTHORITY\SYSTEM" /SQLSVCSTARTUPTYPE=Automatic /
INSTANCENAME=ADAPTIVASQL
```

3   Run the peer-to-peer server installation wizard with the SQL Server Express.The system generates SQL setup logs in **%temp%**.

Configure a Peer Distribution Profile (Windows Desktop)

Peer distribution with Workspace ONE allows you to deploy your Windows apps to enterprise networks. This profile uses the native Windows BranchCache functionality built into the the Windows operating system.

1   Navigate to **Devices** > Profiles & Resources and select **Add**.

2   Select **Windows** and then select **Windows Desktop**.

3   Select **Device Profile**.

4   Configure the profile **General** settings.

5   Select the **Peer Distribution** profile and select **Configure**.You must have File Storage configured before you can create a Peer Distribution profile.

6   Select the **Workspace ONE Peer Distribution Mode** you want to use.

Setting	Description
Distributed	Select this option to have your devices download apps from peers in a local subnet.
Hosted	Select this option to have your devices to download apps from a hosted cache server.
Local	Select this option to have your devices to download apps from local device caching only.
Disabled	Select this option to disable peer distribution.

7   Configure the **Cache** settings:

Setting	Description
Maximum Cache Age (days)	Enter the maximum number of days that peer distribution items should remain in the cache before the device purges the items.
Percentage of Disk Space Used for BranchCache	Enter the amount of local disk space the device should allow peer distribution to use.

8   If you set the distribution mode to Hosted, configure the **Hosted Cache Servers** settings. You must add at least one hosted cache server for devices to download and upload content to and from.

9   Select **Save & Publish**.

Peer Distribution with Adaptiva

Workspace ONE UEM partners with Adaptiva to offer an alternative peer distribution system. In the Adaptiva peer distribution system, installation begins with a specific device in the office or subnet called the rendezvous point (RVP). This initial download takes time. However, installation times improve because devices are not taxing the storage system or the line of communication for the application package. Instead, devices receive the package from other devices in the network. The system also monitors the network for traffic. If the network is busy, installations pause until the network availability increases.

Adaptiva Peer Distribution Component Roles

Peer distribution uses two main components: a peer-to-peer server and peer-to-peer clients.

- **Peer-to-peer server**
  - This component maintains the metadata of the Win32 applications but not the actual application packages. It also maintains information about clients, client IP addresses, the number of active clients, and the content presently at each client.
  - This component resides in your network and it must communicate with these components.
    - VMware Enterprise Systems Connector
    - SQL Database or SQL Server Express

- Peer-to-peer clients on devices

■ Download and install the server from the Workspace ONE UEM console before you configure the peer distribution.

Peer-to-peer clients

■ This component distributes application packages between peers, or devices, and it receives application metadata from the server. These clients use licenses you buy with the peer distribution feature.

■ This component resides on devices and it must communicate with these components:

- Software distribution clients on devices

- Peer-to-peer server

■ The peer distribution system automatically deploys clients to devices when you complete the peer distribution software setup. An installed peer-to-peer client uses one license.

■ **Network Topology**

■ This component represents your network as offices in a hierarchy. It enables the peer distribution system to deploy applications more efficiently. It uses the hierarchy to control what clients get downloads and in what order. It uses devices called rendezvous points, or RVPs, as master clients in an office. The RVP receives downloads and disseminates the applications to peer clients.

■ This component is a spreadsheet that you upload to the Workspace ONE UEM console. If you do not have a network topology, you can download the spreadsheet from the console and edit the topology initially identified by the peer distribution system.

■ Though this component is optional, it greatly improves efficiencies and download speeds.

Considerations for Peer-To-Peer Distribution with Adaptiva

To help set up your peer distribution system and to avoid configuration issues, review the network behaviors, the types of communication, the communication channels between components, and license management.

■ Common Network - The peer-to-peer server, the VMware Enterprise Systems Connector, and the peer-to-peer clients must all communicate on the same network. If these system components are on subnets of your network and the subnets can communicate, then the feature can transfer applications. Clients that are not on the network cannot receive applications with the peer-to-peer distribution.

■ Encryption - Communication between the peer-to-peer server and Workspace ONE UEM is encrypted. The communication is not encrypted between peer-to-peer clients in the network. This communication uses UDP but the package itself is not encrypted between clients. Although the system checks for tampered packages, a best practice is not to send confidential packages with the peer-to-peer distribution.

■ UDP - The peer-to-peer server and client use UDP to communicate with Workspace ONE UEM.

- Central Office - The peer-to-peer server must reside in one of the subnets in the top-tiered Central Office.

- License Overages - The peer-to-peer system does not stop you from assigning more licenses than you have bought. If you assign extra licenses, the system charges you for them.

  To help gauge license usage, the ratio of client installation to the used license is one to one.

- Open Ports - The peer-to-peer client needs specific ports open to transfer metadata. Find out if your network management team has closed the required ports or has blocked broadcasting on these ports. If these ports are closed or do not allow broadcasting, contact your Workspace ONE UEM representative about alternative ports.

- Console, Client, and Server Versions - You must deploy and use the supported version of the peer-to-peer client and the peer-to-peer server. Update the peer-to-peer server when the Workspace ONE UEM console includes an update to the peer-to-peer client. If the versions are not supported, the feature does not work.

- SQL Server Express - Download and install SQL Server Express on the same server that has the VMware Enterprise Systems Connector. Install this component before configuring peer-to-peer setup because it might take some time to complete its installation.

- Application Metadata - The peer-to-peer system stores and transmits the blob ID (or content ID), the application size, and the application hash. It does not store or transfer any other data.

- Initial Downloads - The first download in a peer distribution process takes the longest time. After the initial downloads and as more devices in the subnet receive the application, download times get faster.

- Activation Processes - After you save your configurations, the system activates the peer-to-peer server and clients with a license key. You can input your topology or use the one the network generates at activation. Also at the time of activation, the system publishes all the existing Win32 application content to the peer-to-peer server. From this point on, devices that belong to the peer distribution network begin to receive the application download.

Requirements for Adaptiva Peer-To-Peer Distribution

Peer distribution requires components for communication, data management, application deployment, and optional storage.

Supported Platforms and Application Types

- Windows Desktop (Windows 10)

- Win32 applications

Required Components

- **SQL** - Get SQL Server Express or see if your organization uses SQL Database. The peer-to-peer server uses SQL Database to store application metadata and information about the network topology. To download SQL Server Express, outbound port 443 must be open.

Ensure that the peer-to-peer server can communicate with SQL Server Express or the organization's SQL Database.

- **VMware Enterprise Systems Connector** - Ensure that VMware Enterprise Systems Connector is enabled. This component ensures secure communication between your network and Workspace ONE UEM. Ensure that the **All Other Components** option is enabled in the VMware Enterprise Systems Connector configurations located in the console at **Groups & Settings** > **All Settings** > **Enterprise Integration** > **VMware Enterprise Systems Connector** > **Advanced** > **AirWatch UEM Services** > **All Other Components**.

- **Software Package Deployment** - Configure Workspace ONE UEM to recognize the deployment of application packages through the software distribution method. The software distribution client resides on devices to communicate with the peer-to-peer system and the Workspace ONE UEM console. Go to **Groups & Settings** > **All Settings** > **Device & Users** > **Windows** > **Windows Desktop** > **App Deployments** and enable **Software Package Deployment**.

- **File Storage (on-premises)** - Workspace ONE UEM stores Win32 applications on a secure file storage system. Peer-to-peer clients receive application packages from the storage system when clients cannot find other clients with the application package.

Ports Used for Peer-To-Peer Distribution with Adaptiva

Open specific ports in your network so that the peer-to-peer clients can transfer metadata to the peer-to-peer server. If you have no group policies that block the creation of firewall policies, the peer distribution component installers create the necessary firewall rules.

Table 1-2. Messaging from Client to Server

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer server	UDP	34322	After clients receive small messages, they acknowledge or reply to the server.
Peer-to-peer clients	Peer-to-peer server	UDP	34323	Clients send small messages to the server.
Peer-to-peer clients	Peer-to-peer server	UDP	34331	Large replies from clients to the server using Foreground Protocol.
Peer-to-peer clients	Peer-to-peer server	UDP	34333	Clients send large messages to the server using Foreground Protocol.

Table 1-2. Messaging from Client to Server (continued)

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer server	UDP	34339	Large replies from clients to the server using Background Protocol.
Peer-to-peer clients	Peer-to-peer server	UDP	34341	Clients send large messages to the server using Background Protocol.

Table 1-3. Messaging from Server to Client

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer server	Peer-to-peer clients	UDP	34324	After the server receives small messages, it acknowledges or replies to clients.
Peer-to-peer server	Peer-to-peer clients	UDP	34325	Server sends small messages to clients.
Peer-to-peer server	Peer-to-peer clients	UDP	34335	Large replies from the server to clients using Foreground Protocol.
Peer-to-peer server	Peer-to-peer clients	UDP	34337	Server sends large messages to clients using Foreground Protocol.
Peer-to-peer server	Peer-to-peer clients	UDP	34343	Large replies from the server to clients using Background Protocol.
Peer-to-peer server	Peer-to-peer clients	UDP	34345	Server sends large messages to clients using Background Protocol.

Table 1-4. Messaging from Client to Client

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34324	After clients receive small messages from another client, acknowledgments and replies are sent to this port.
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34325	Clients send small messages to other clients.
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34335	Large replies from clients to clients using Foreground Protocol.
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34337	Clients send large messages to other clients using Foreground Protocol.
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34343	Large replies from clients to clients using Background Protocol.
Peer-to-peer clients	Peer-to-peer clients ■ Same office ■ Parent offices ■ Child offices	UDP	34345	Clients send large messages to other clients using Background Protocol.

Table 1-5. Messaging client to Client Broadcast

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer clients in the same subnet	UDP	34329	Clients broadcast requests to other clients

Table 1-6. Data Transfer from Server to Client

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer server	Peer-to-peer clients in the Central Office	UDP	34760	Server sends content to clients using Foreground Protocol.

Table 1-7. Data Transfer from Client to Client

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer clients in the same office	UDP	34760	Clients send content to other clients in the same logical office using Foreground Protocol.
Peer-to-peer clients	Peer-to-peer clients in child offices	UDP	34750	Clients send content to clients in child offices using Background Protocol.

Table 1-8. Data Transfer Control Ports

Sending Component	Receiving Component	Protocol	Port	Description
Peer-to-peer clients	Peer-to-peer server	UDP	34545	Clients send a control signal to the server for any large transfer using Adaptive Protocol.
Peer-to-peer clients	Peer-to-peer clients in the same office, in parent offices, and in child offices	UDP	34546	Clients send a control signal to other clients for any large transfer using Adaptive Protocol.

Table 1-9. Data Transfer between VESC, Server, and Database

Sending Component	Receiving Component	Protocol	Port	Description
VMware Enterprise Systems Connector (VESC)	Peer-to-peer server	UDP	34323	VESC sends messages for activation, health checks, application metadata to the peerto- peer server.
Peer-to-peer server	VESC	UDP	34320	Peer-to-peer server responds to requests from the VESC.

Data Transport Behaviors for Peer-To-Peer Networks

To control the sources of application packages, also called distribution optimization, in your peer-to-peer deployment, consider how data transfers within networks and subnetworks.

Define an office with one or more subnets or subnet ranges connected over a local area network (LAN). Offices retrieve the content from their parent offices, and distribute them to their child offices.

■ Office Types - Peer distribution has three types of offices, and these office types share data in specific ways.

■ **Default** - Defines a standard wired LAN. Clients attempt to the share content and they send broadcast discovery requests.

■ **VPN** - Defines an office and subnet range allocated for clients connecting through VPN. Clients within a VPN office do not attempt to the share content, but they do send broadcast discovery requests.

■ **WiFi** - Defines an office and subnet range allocated to clients connected over WiFi. Clients within a WiFi office share content, but they do not send broadcast discovery requests.

Note If you have a physical office with a wired (default) subnet and a WiFi subnet, create an office for each network. Make the WiFi office a child of the wired office so that the WiFi network receives packages from the wired parent office.

■ Central Office and the Peer-to-Peer Server - The peer-to-peer server must reside in one of the subnets in the top-tiered Central Office. This placement makes it available to all clients in the hierarchy.

Data Transport in Offices

The system distributes content from a parent to child office once. This behavior limits data sent across wide area network (WAN) links.

■ Adaptive Protocol - The adaptive protocol is a proprietary protocol that monitors the length of edge router queues and sends data when queues are nearly empty. This protocol, implemented by an advanced kernel driver, removes the need to throttle the bandwidth when deploying applications with the peer distribution.

■ Within Offices - Data transport within offices uses the LAN, or Foreground protocol. The peer distribution system does not manage this protocol.

■ Between Offices - Data transport between offices uses the WAN, or Background protocol. This protocol is also called the Adaptive Protocol that protects the bandwidth availability on WAN links.

■ Between Subnets - Define subnets connected over a WAN link as separate offices. If offices are misconfigured, the LAN protocol might be used over a WAN link, causing saturation of the WAN.

Clients Receive Applications According to Ordered Criteria

The peer-to-peer system sends and receives applications according to many factors, including the available device space, device form factor, and operating system type. The download order follows these elections from top to bottom.

1   Devices with the largest actual free space

2   Devices that are identified as preferred, also called RVPs (rendezvous points)

3   Device chassis type (desktops are selected over laptops)

4   Device operating system type (servers are selected over work stations)

5   Devices with the longer system up-times

6   Devices with the largest usable free space

Back up Systems

Peer-to-peer clients receive application packages from a CDN or a file storage system when they cannot find packages within the hierarchy. A CDN, which is optional for on-premises deployments, offers increased download speed over the file storage system.