

Veeam Availability Orchestrator

Version 3.0

Deployment Guide

July, 2020

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Contacting Veeam Software

At Veeam Software we value feedback from our customers. It is important not only to help you quickly with your technical issues, but it is our mission to listen to your input and build products that incorporate your suggestions.

Customer Support

Should you have a technical concern, suggestion or question, visit the Veeam Customer Support Portal at www.veeam.com/support.html to open a case, search our knowledge base, reference documentation, manage your license or obtain the latest product release.

Company Contacts

For the most up-to-date information about company contacts and offices location, visit www.veeam.com/contacts.html.

Online Support

If you have any questions about Veeam products, you can use the following resources:

- Full documentation set: www.veeam.com/documentation-guides-datasheets.html
- Community forum at forums.veeam.com

About This Document

This document describes how to deploy Veeam® Availability Orchestrator. The document includes system requirements, licensing information and step-by-step deployment instructions.

Veeam Availability Orchestrator is built on top of Veeam® Backup & Replication™ and Veeam® ONE™, and this guide assumes that you have a good understanding of these solutions.

Welcome to Veeam Availability Orchestrator

Veeam Availability Orchestrator (VAO) extends the functionality of Veeam® Availability Suite™ to orchestrate disaster recovery (DR) processes in VMware vSphere environments, support one-click recovery for critical applications or even an entire site, and provide rich features for documentation, testing and execution. VAO leverages the backup, replication, failover and restore capabilities of Veeam Backup & Replication to build DR workflows, automate recovery processes and eliminate error-prone manual steps. VAO also provides reporting capabilities that let enterprises document their DR plans to meet compliance requirements. With VAO, you can do the following:

- **Orchestrate disaster recovery** — create workflows to orchestrate recovery operations for Veeam Backup & Replication backups and replicas.
- **Automate DR testing** — build test schedules to automate the verification of failover and restore plans, with isolated and low-impact testing of VM backups, replicas and applications they run.
- **Meet DR compliance requirements** — generate and automatically update documentation for DR procedures to eliminate the problem of outdated DR plans.

In version 3.0, storage plans were introduced to the VAO functionality, in addition to existing replica and restore plans. Storage plans allow recovery orchestration that is based on replicated storage snapshots created on NetApp storage systems. VAO can work with any NetApp SnapMirror snapshots, whether created with NetApp native tools or 3rd-party integration. It is recommended that you drive the creation and transfer of storage snapshots using Veeam Backup & Replication, as described in the Veeam Backup & Replication User Guide, section [Integration with Storage Systems](#).

Architecture Overview

This section provides information on the VAO architecture and its components, and describes the most common [deployment scenarios](#). The main components in the VAO infrastructure are:

- [Veeam Availability Orchestrator Server](#)
- [Veeam Backup & Replication Servers](#)
- [NetApp Storage Systems](#)
- [vCenter Servers](#)

Veeam Availability Orchestrator Server

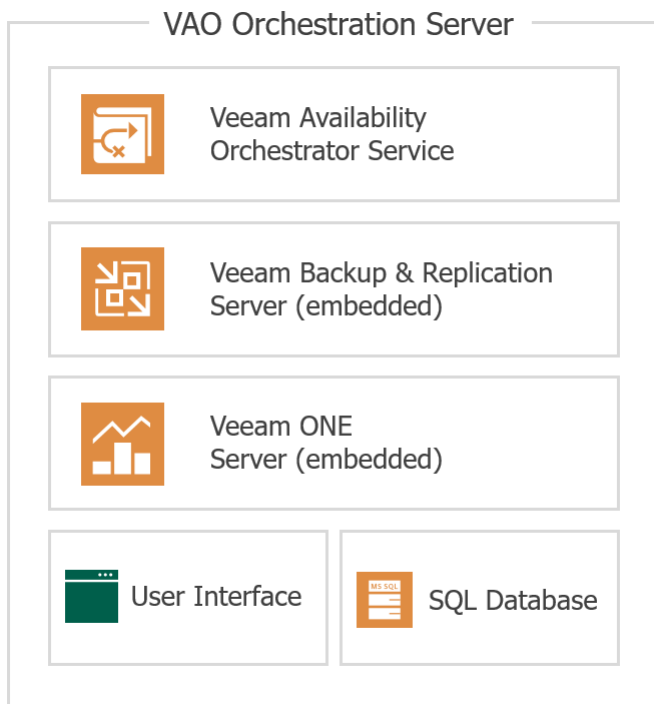
The VAO server is the configuration, administration and management core of the VAO infrastructure. The VAO server performs all orchestration actions. This is where orchestration plans are created, stored, tested and executed. Internally, the VAO server is comprised of the following components:

- **VAO Server Service** — is responsible for managing orchestration plans, and administering user roles and permissions.
- **VAO UI** — is a web-based UI that allows users to interact with the VAO Service, and to perform various configuration and administration actions. In the VAO UI, orchestration plans are designed, checked, tested and executed.
- **Veeam Backup & Replication Server (embedded)** — is included in the VAO server to supply Veeam PowerShell libraries and support certain DR scenarios.
- **Veeam ONE Server (embedded)** — handles the ONE Business View engine to gather VM inventory. This is a custom edition of Veeam ONE that should not be used for other monitoring or reporting functions.
- **SQL Server** — is used to host configuration data, VM inventory and plan definitions. A SQL Server Express instance can be installed locally with other VAO components. However, for best performance and scalability, SQL Server Enterprise edition is recommended, which may be a remote server.

All VAO components can be deployed on a single Windows-based physical or virtual machine using the unified installer.

IMPORTANT

Installation of the VAO server on a machine already running standalone versions of Veeam Backup & Replication and Veeam ONE is not supported.



Veeam Backup & Replication Servers

If you already have Veeam Backup & Replication servers in your environment, deploy a VAO agent to each of these servers to orchestrate the recovery of protected VMs.

NOTE

Best practice recommends that the Veeam Backup & Replication server that runs backup and replication jobs is located in the DR site. This helps you ensure that the server will not be itself lost as part of a production site outage.

To create and transfer storage snapshots, you can use the embedded Veeam Backup & Replication server. For more information, see the Veeam Backup & Replication User Guide, section [Snapshot Orchestration](#).

NetApp Storage Systems

All NetApp storage systems must be connected to the VAO server. That is, you must connect both storage virtual machines that manage volumes hosting VM disks and configuration files, and storage virtual machines that manage volumes storing replicated data.

NOTE

You can connect only storage virtual machines to the VAO server. Connections to NetApp clusters and nodes are not supported.

vCenter Servers

All vCenter Servers that manage protected VMs must be connected to the VAO server.

Deployment Scenarios

VAO supports a number of deployment scenarios. This document describes the 3 most common scenarios.

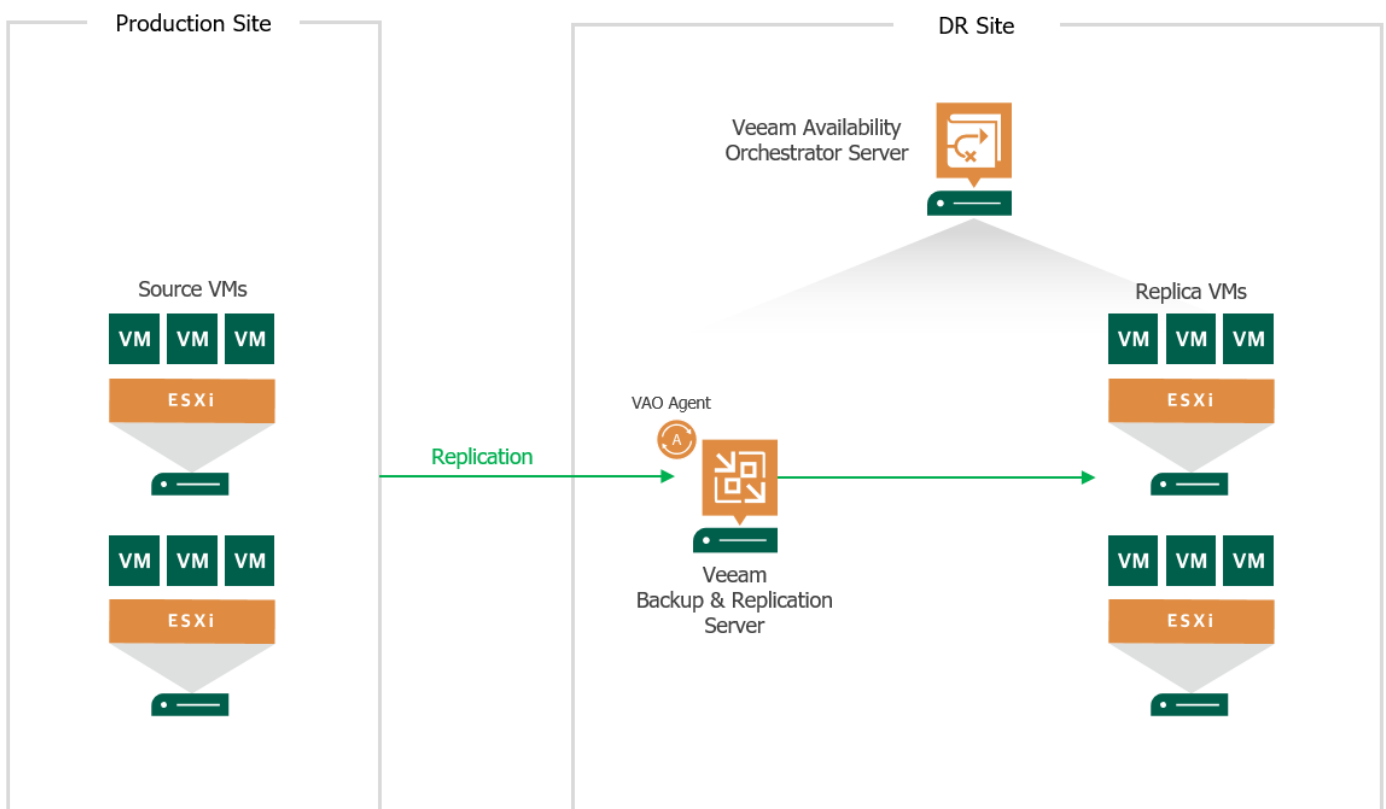
- [Using VAO to orchestrate failover based on Veeam replication jobs](#)
- [Using VAO to orchestrate restore based on Veeam backup jobs](#)
- [Using VAO to orchestrate storage failover based on SnapMirror replication](#)

You can also combine any of the described scenarios to support your own data protection strategy. For example, you can [use VAO to orchestrate both failover and restore](#).

Scenario 1: Orchestrating Failover

This deployment scenario is recommended if you plan to use VAO to orchestrate recovery based on VM replicas created by Veeam Backup & Replication.

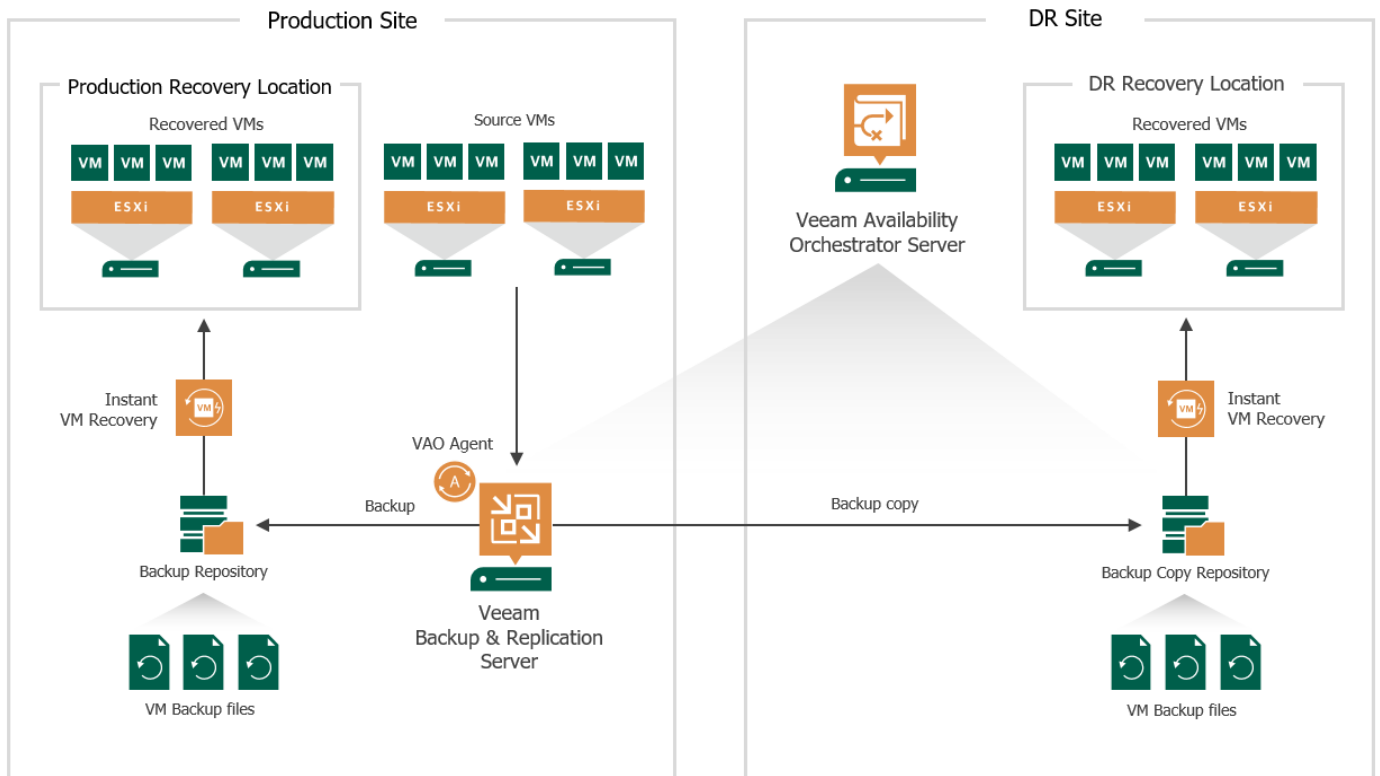
In this scenario, the VAO server that provides plan management, testing and execution is deployed in the DR site, along with the standalone Veeam Backup & Replication server that protects your production workloads.



Scenario 2: Orchestrating Restore

This deployment scenario is recommended if you plan to use VAO to orchestrate recovery based on VM backups created by Veeam Backup & Replication.

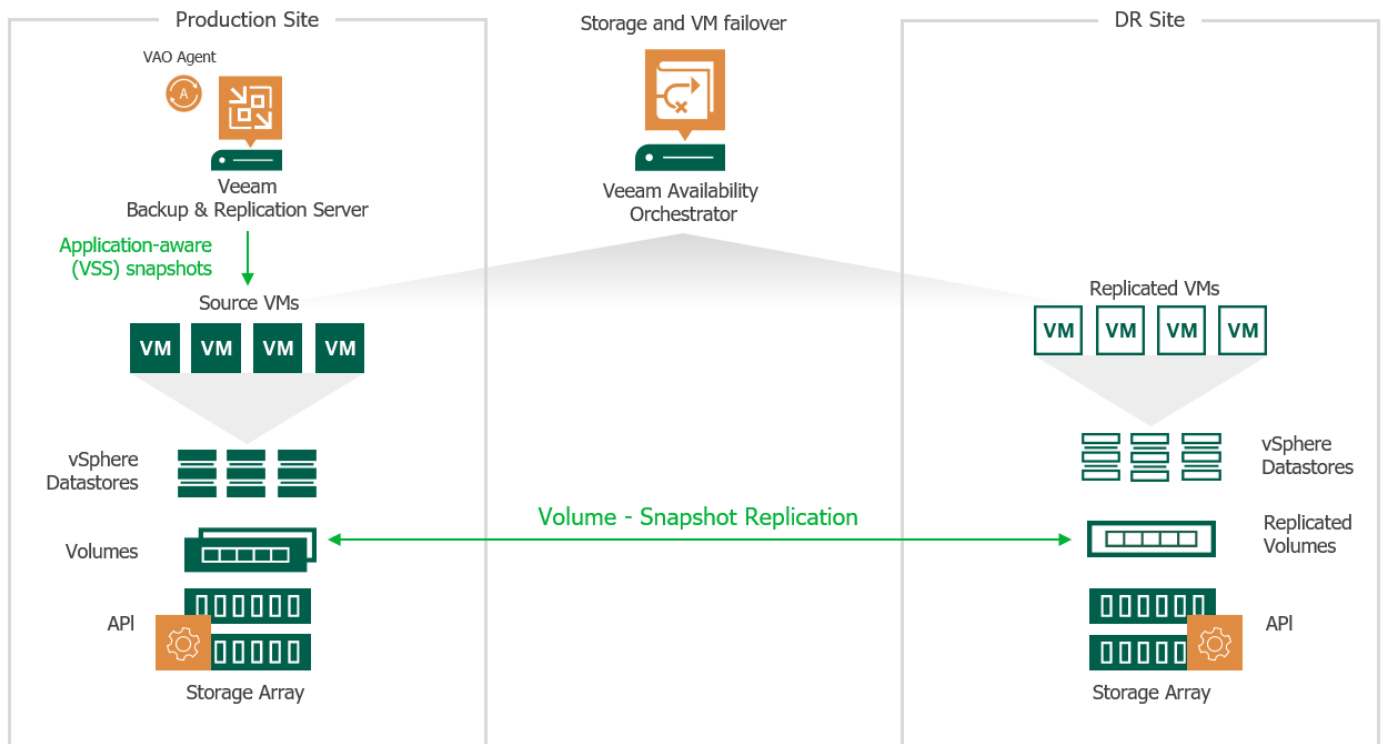
In this scenario, the Veeam Backup & Replication server that protects your production workloads is located in the production site, along with the primary backup repository that stores backup files. The VAO server that provides plan management, testing and execution is deployed in the DR site, along with the secondary backup repository that stores backup copy files.



Scenario 3: Orchestrating Storage Failover

This deployment scenario is recommended if you plan to use VAO to orchestrate recovery based on replicated storage snapshots created on NetApp storage systems.

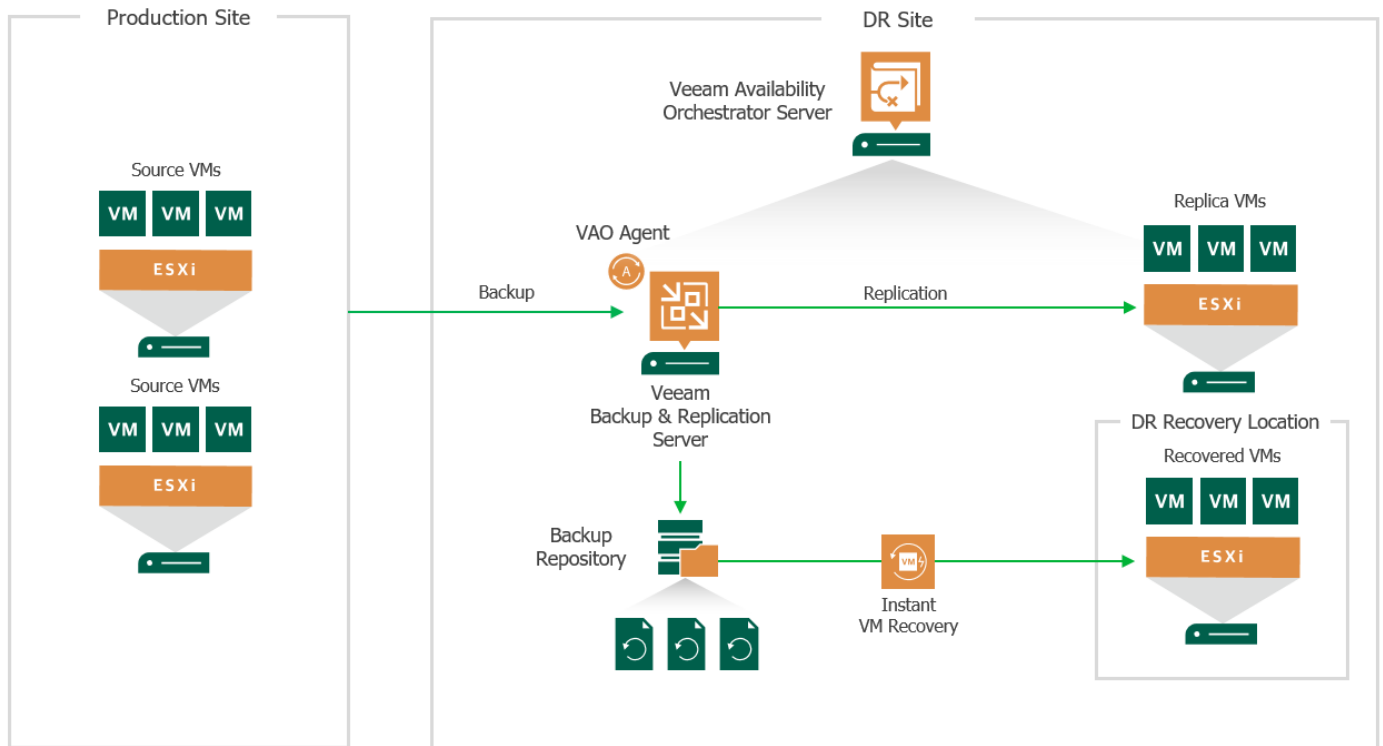
In this scenario, the Veeam Backup & Replication server that triggers the creation of storage snapshots is located in the production site, along with the storage virtual machine that acts as the source of the data protection relationship. The VAO server that provides plan management, testing and execution is deployed in the DR site, along with the storage virtual machine that acts as the destination of the data protection relationship.



Scenario 4: Mixed Protection

This deployment scenario is recommended if you plan to use VAO to orchestrate recovery based on VM backups and replicas created by Veeam Backup & Replication.

In this scenario, the VAO server that provides plan management, testing and execution is deployed in the DR site, along with the Veeam Backup & Replication server that protects your production workloads and the backup repository that stores backup files.



Planning and Preparation

Before you start installing VAO, check supported virtualization platforms, system requirements, permissions and network ports used for data transmission.

System Requirements

The machine where VAO will be deployed must meet the necessary hardware and software requirements. Note that the VAO server can function as a Veeam Backup & Replication server additional to VAO functions and should have sufficient resources.

IMPORTANT

Mind the following limitations:

- Installation of VAO on a machine already running standalone versions of Veeam Backup & Replication and Veeam ONE is not supported.
- Installation of VAO on a machine with the Domain Controller role is not supported.

| Specification | Requirement |
|-----------------|---|
| Hardware | Hardware requirements depend on the size of the managed infrastructure. For more information, see Hardware Recommendations . |
| OS | <p>Only 64-bit versions of the following operating systems are supported:</p> <ul style="list-style-type: none">• Microsoft Windows Server 2019• Microsoft Windows Server 2016• Microsoft Windows Server 2012 R2• Microsoft Windows Server 2012• Microsoft Windows Server 2008 R2 SP1 <p>Note: You cannot install VAO on a machine running Microsoft Windows Server Core.</p> |
| User Management | Windows domain-joined machine |
| Veeam Software | <p>If a standalone Veeam Backup & Replication server is used for backup and replication task management, it must be version 9.5 Update 4 or later. However, it is recommended that you install version 10 cumulative patch 2 as it includes a number of important fixes related to the VAO functionality.</p> <p>Note: If you connect a standalone Veeam Backup & Replication server to the VAO server, it must be joined to either the same domain or a trusted domain.</p> |

| Specification | Requirement |
|-------------------------|---|
| SQL Server | <p>Local or remote installations of the following versions of Microsoft SQL Server are supported:</p> <ul style="list-style-type: none"> • Microsoft SQL Server 2019 • Microsoft SQL Server 2017 • Microsoft SQL Server 2016 (2016 SP2 Express Edition is included in the setup) • Microsoft SQL Server 2014 • Microsoft SQL Server 2012 (2012 SP4 Express Edition is included in the setup) <p>Note: It is not recommended to use the Express Edition in any production VAO deployments – it should only be used for product evaluation.</p> |
| Additional Software | <p>All components will be installed during setup.</p> <p>For inline Report Template editing, Microsoft Word component of SP2 for Microsoft Office 2010 or later is required.</p> |
| Virtualization Platform | <p>VMware vSphere 5.5, 6.0, 6.5, 6.7, 7.0</p> <p>Note: The VAO server must be connected to VMware vCenter Servers. Direct connections to vSphere hosts are not supported.</p> |
| Storage System | <p>NetApp ONTAP 9.3, 9.5, 9.6, 9.7</p> |

Hardware Recommendations

| Number of Virtualization Hosts* | 100 | 100-500 | 500-1000 | >1000 |
|---------------------------------|---|--|--|--|
| CPU | <p>4 vCPUs (minimum) – 8 vCPUs (recommended) for the VAO server</p> <p>4 vCPUs (minimum) – 8 vCPUs (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>8 vCPUs (minimum) – 12 vCPUs (recommended) for the VAO server</p> <p>8 vCPUs (minimum) – 12 vCPUs (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>12 vCPUs (minimum) – 16 vCPUs (recommended) for the VAO server</p> <p>12 vCPUs (minimum) – 16 vCPUs (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>>16 vCPUs for the VAO server</p> <p>>16 vCPUs for the Microsoft SQL Server and Veeam ONE database</p> |
| Memory | <p>4 GB (minimum) – 8 GB (recommended) for the VAO server</p> <p>4 GB (minimum) – 8 GB (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>8 GB (minimum) – 30 GB (recommended) for the VAO server</p> <p>8 GB (minimum) – 30 GB (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>30 GB (minimum) – 70 GB (recommended) for the VAO server</p> <p>30 GB (minimum) – 70 GB (recommended) for the Microsoft SQL Server and Veeam ONE database</p> | <p>>70 GB for the VAO server</p> <p>>70 GB for the Microsoft SQL Server and Veeam ONE database</p> |
| Hard Disk Space | <p>50 GB for product installation and sufficient disk space for the Microsoft SQL Server and Veeam ONE database (if installed locally). Use the Veeam ONE Database Calculator to size application data.</p> | | | |

* Under the condition that 1 host has 20 VMs deployed.

Roles

There are 3 roles that you can assign to Windows Active Directory users and user groups who will work with VAO. Actions a user can perform depend on the role.

- **Administrator** — can perform all configuration actions, can manage user roles, and can also act as a Plan Author and Plan Operator for any orchestration plan.
- **Plan Author** — can create, edit and test orchestration plans, and can also generate VAO reports and view dashboards.
- **Plan Operator** — can schedule, run and test orchestration plans, and can also generate VAO reports and view dashboards.

The following table describes the functionality available to users with different roles in the VAO UI.

| Functionality | Tab | Administrator | Plan Author | Plan Operator |
|-----------------------------|----------------|---------------|-------------|---------------|
| Dashboard | Home | Full | Full | Full |
| Infrastructure | Administration | Full | N/A | N/A |
| Configuration | Administration | Full | N/A | N/A |
| Permissions | Administration | Full | N/A | N/A |
| Licensing | Administration | Full | N/A | N/A |
| Support | Administration | Full | N/A | N/A |
| Planning and Testing | | | | |
| Orchestration Plans | Home | Full | Write | Execute |
| DataLabs | Home | Full | Full | Execute |
| Lab Calendar | Home | Full | Full | Full |
| Documentation | | | | |
| Reports | Home | Full | Full | Full |
| Report Templates | Home | Full | Full | Read |

Required Permissions

The accounts used to install and administer VAO must have the following permissions.

| Account | Required Permission |
|----------------------------------|---|
| Setup Account | The account used for product installation must be a domain user who has the local Administrator permissions on the target machine. |
| VAO Service Accounts | <p>The accounts used to run VAO services, Veeam Backup & Replication services and Veeam ONE services must have the local Administrator permissions on the VAO server.</p> <p>The accounts must also be granted the <i>Log on as a service</i> right. For more information on Windows security policy settings, see Microsoft Docs.</p> |
| VAO Agent Account | The account used to install and run the VAO agent on a Veeam Backup & Replication server must be a Windows domain account, and have both the local Administrator and the Veeam Backup Administrator permissions on the server. |
| VAO User Accounts | The accounts used to log in to the VAO UI must be granted the <i>Allow log on locally</i> right. For more information on Windows security policy settings, see Microsoft Docs . |
| vCenter Server Permissions | <p>The account used to connect the vCenter Server to the VAO infrastructure must have administrative permissions. You can either grant the Administrator role to the account or configure more granular permissions. For more information, see Veeam Backup & Replication Required Permissions and Veeam ONE Required Permissions.</p> <p>The account must also have the <i>Virtual machine.Inventory.Create from existing</i> privilege. For more information on required privileges for common tasks performed on vCenter Server inventory objects, see VMware Docs.</p> |
| Microsoft SQL Server Permissions | <p>Different sets of Microsoft SQL permissions are required in the following cases:</p> <ul style="list-style-type: none">• Installation (remote or local): the current account needs the <i>CREATE ANY DATABASE</i> permission on the SQL server level. After the database is created, this account automatically gets a <i>db_owner</i> role and can perform all operations with the database.• Operation: the account used to run VAO services, Veeam Backup & Replication services and Veeam ONE services requires the <i>db_owner</i> role, as well as permissions to execute stored procedures for the configuration databases on the Microsoft SQL Server. <p>For more information, see Veeam Backup & Replication Required Permissions and Veeam ONE Required Permissions.</p> |

| Account | Required Permission |
|-----------------------------------|---|
| NetApp Storage System Permissions | The account used to connect the storage system to the VAO infrastructure must be granted permissions described in section NetApp Data ONTAP Permissions . |
| VAO Step Accounts | <p>The account used to run the Verify SharePoint URL step, must be assigned the <i>SharePoint_Shell_Access</i> role and must be a member of the <i>WSS_ADMIN_WPG</i> group on the processed VM.</p> <p>The account used to run the Verify Exchange Mailbox step, must be assigned the <i>ApplicationImpersonation</i> role on the processed VM.</p> |

NetApp Data ONTAP Permissions

The account used to connect to a NetApp Data ONTAP storage system must have the following permissions:

| Command/Directory | Access/Query Level |
|-------------------|--------------------|
| DEFAULT | none |
| job | readonly |
| lun | all |
| network interface | readonly |
| snapmirror | all |
| version | readonly |
| volume | all |
| vserver | readonly |

Ports

The following table lists typical connection settings required for VAO components.

NOTE

These requirements assume that the embedded Veeam Backup & Replication and Veeam ONE components are used only in the default configuration (to support VAO activities), and not for full production functionality.

If the embedded VAO components are used for additional functionality, refer to the Veeam Backup & Replication User Guide, section [Used Ports](#) and Veeam ONE Deployment Guide, section [Ports](#) for the full requirements.

| From | To | Protocol | Port | Notes |
|---|-----------------------------------|-----------|-------|---|
| VAO server | Veeam Backup & Replication server | HTTPS | 8888 | Used by the VAO Server Service to connect to VAO agents running on standalone Veeam Backup & Replication servers. |
| | vCenter Server | HTTPS TCP | 443 | Used by the embedded Veeam Backup & Replication and Veeam ONE servers to connect to the vCenter Server. |
| | Microsoft SQL Server | TCP | 1433 | Required to provide access to the Microsoft SQL Server where VAO, embedded Veeam Backup & Replication and ONE databases are stored. Additional ports may need to be open depending on your configuration. For more information, see Microsoft Docs . |
| VAO UI | VAO server | TCP | 12348 | Used by the VAO UI to connect to the remote VAO Server Service. |
| External systems, Workstation Web Browser | VAO REST API | HTTPS | 9899 | Used to connect to the REST API functionality, part of the VAO Server Service. |
| Veeam Backup Catalog service | Veeam Backup & Replication server | TCP | 9393 | Used to collect indexing data for backup and replication jobs, and to store this data in the Veeam Backup Catalog folder on the Veeam Backup & Replication server. |
| Veeam Backup & Replication console | Veeam Backup & Replication server | TCP | 9392 | Used by the Veeam Backup & Replication console to connect to the Veeam Backup & Replication server. |

| From | To | Protocol | Port | Notes |
|-----------------------------------|-----------------------------------|----------|----------------------------------|--|
| Veeam backup source connection | Veeam Backup & Replication server | TCP | 9401 | Used by the mount server to communicate with the Veeam Backup & Replication server. |
| Workstation Web Browser | VAO UI | HTTP | 9898 | Required to access the VAO UI from a user workstation. |
| Workstation Web Browser | Veeam ONE Reporter Web UI | HTTP | 1239 | The Veeam ONE Reporter Web UI is deprecated in VAO, but is included for compatibility reasons. |
| Veeam ONE Monitor Client | VAO server | TCP | 139; 445 | Used by Veeam ONE Monitor Client to communicate with the embedded Veeam ONE server. |
| Veeam Backup & Replication server | VM guest OS | TCP | Ports for VM guest OS connection | <p>Required to run in-guest scripts on a virtual machine being tested, failed over or restored.</p> <p>For the full list of ports that must be opened to ensure proper communication of the Veeam Backup & Replication server with the runtime coordination process deployed inside the VM guest OS, see the Veeam Backup & Replication User Guide, section Used Ports.</p> <p>Make sure that the VM is configured to allow inbound traffic: the default <i>File and Printer Sharing (SMB-In)</i> firewall rule must be enabled.</p> |

Licensing

This section describes how VAO is licensed, what types of licenses you will need to get access to the necessary VAO functionality, how you can install and update licenses, how you can submit license usage reports and so on.

License Types

Veeam offers the following types of licenses for VAO.

Paid Licenses

There are 2 types of paid licenses available for VAO:

- **Rental license** is a full license intended for service providers.
The expiration date of the *Rental* license is set to the contract end date, which is the last day of the month and normally 1 month from the contract start date.
- **Subscription license** is a full license intended for enterprises.
The expiration date of the *Subscription* license is set to the end of the subscription term. The *Subscription* license term is normally 1–5 years from the license issue date.

Free Licenses

There are 2 types of free licenses available for VAO:

- **Evaluation license** is a full license that can be used for product evaluation.
The trial license is valid for 30 days from the moment of the product download.
- **NFR license** is a full license that can be used for product demonstration, training and education.
This license is not for resell or commercial use.

Licensed Objects

To work with VAO, you will require licenses for objects managed by the solution — VMs, VAO agents, Veeam Backup & Replication and Veeam ONE. This section describes how these managed objects are licensed, and what types of licenses you will need to obtain.

Licensing for Managed Virtual Machines

Each VM used in an orchestration plan requires a license. A **license** here is a unit (or token) that is assigned to a VM to make it manageable in VAO. In version 2.0, each VM consumes one license instance regardless of the number of plans and DataLabs that include the VM.

NOTE

All VMs added to the plan consume licenses, even if they have no replica or backup. All VMs used in DataLab groups to support plan testing environments also consume a license instance.

Licenses for VMs are included in the VAO license file. A license file may include an arbitrary number of licenses that form a license pool for VMs. Each VM managed by VAO consumes required licenses from this pool.

NOTE

VAO requires its own specific license file. It does not obtain or consume the 'portable' license instances from connected Veeam Backup & Replication servers.

Licensing for Standalone Veeam Backup & Replication Servers with VAO Agents

Each standalone Veeam Backup & Replication server connected to VAO must have the *Enterprise* or *Enterprise PLUS* edition installed. Otherwise, VAO will not be able to deploy its agent on the server.

Edition check is the only check made by VAO to verify licensing of standalone Veeam Backup & Replication servers. All operations with licenses on standalone Veeam Backup & Replication servers are accomplished according to the Veeam Backup & Replication guidelines. For more information on Veeam Backup & Replication licensing, see the Veeam Backup & Replication User Guide, section [Licensing](#).

Licensing for Embedded Veeam Backup & Replication Server

The VAO license file includes a section to license the embedded Veeam Backup & Replication server installation.

If you plan to use the embedded Veeam Backup & Replication server for production backup and replication activities, you can install an additional paid license to the server using the Veeam Backup & Replication console. To learn how to install Veeam Backup & Replication licenses, see the Veeam Backup & Replication User Guide, section [Installing License](#).

Licensing for Embedded Veeam ONE Server

By default, VAO will use the *Orchestrator Edition* of Veeam ONE that supplies all functionality required to support VAO activities. No additional license is required.

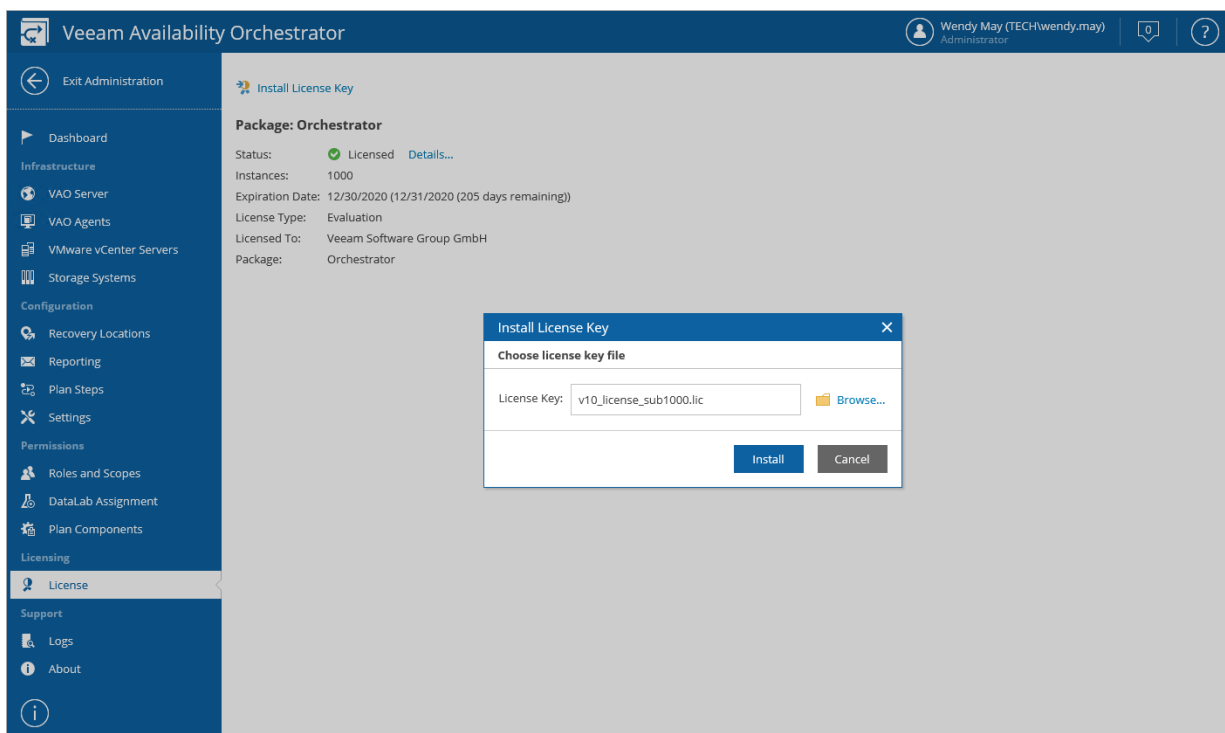
If you have an *NFR* license installed, both VAO and Veeam ONE will use the *NFR* license.

Installing License

Before you install VAO, you must specify a path to a license file. Without a license, you will not be able to start installation.

After you install VAO, you can change the license that you provided during installation:

1. Log in to the VAO UI as a VAO Administrator. For more information, see [Accessing VAO UI](#).
2. Switch to the **Administration** tab.
3. Navigate to **License**.
4. Click **Install License Key**.
5. In the **Install License Key** window, click **Browse** to browse to a license file, and then click **Install**.



Updating License

When your VAO license expires, you must update it. To update the license, you can use either of the following methods:

- [Update the license manually](#)
- [Update the license automatically](#)

NOTE

You can update the license automatically only if you have a paid license (*Rental* or *Subscription*) installed.

Updating License Manually

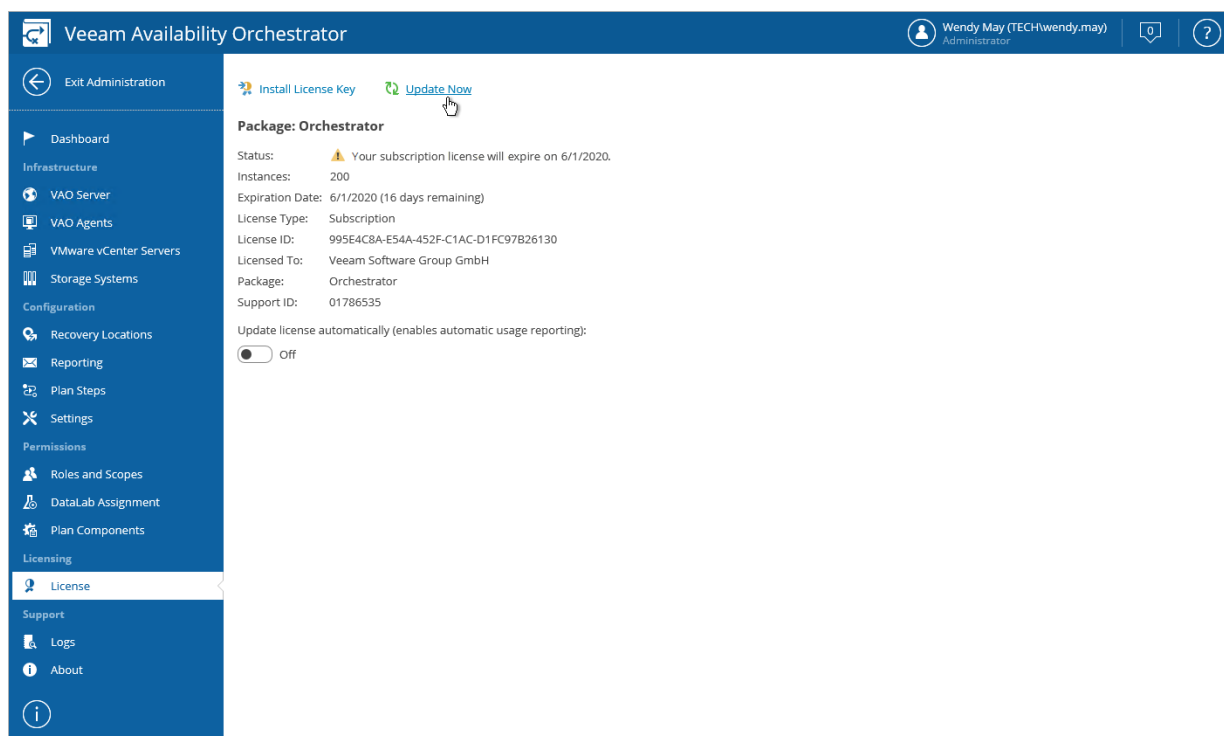
You can update the VAO license from the Veeam License Update Server manually, on demand. When you update the license manually, VAO connects to the Veeam License Update Server on the Internet, downloads a new license (if the license is available) and installs it to replace the old license.

To update the license manually:

1. Log in to the VAO UI as a VAO Administrator. For more information, see [Accessing VAO UI](#).
2. Switch to the **Administration** tab.
3. Navigate to **License**.
4. Click **Update Now**.

VAO will connect to the Veeam License Update Server on the Internet, download a new product license from it (if available), install it, and display a dialog box with the license update status.

5. In the displayed dialog box, click **OK** to acknowledge the license update result.



Manual license update can complete with the following results:

- **Operation is successful.** A new license key has been successfully generated, downloaded and installed.
- **A new license is not required.** The currently installed license key does not need to be updated.
- **The Veeam License Update Server has failed to generate a new license.** You will get this message if an error occurs on the Veeam License Update Server side.
- **Veeam Availability Orchestrator has received an invalid answer.** You will get this message if there are connectivity issues between the Veeam License Update Server and VAO server.
- **Licensing by the contract has been terminated.** The contract has expired. In this case, VAO automatically disables automatic license update.

Updating License Automatically

You can instruct VAO to update the license automatically. Automatic license update removes the need to perform license update manually every time it is about to expire. If automatic license update is enabled, VAO proactively communicates with the Veeam License Update Server to obtain and install a new license before the current license expires.

- [How Automated License Update Works](#)
- [Automatic Update Retries](#)
- [Enabling Automatic License Update](#)

How Automated License Update Works

The process of automatic license update is performed in the following way:

1. After you enable automatic license update, VAO starts sending weekly requests to the Veeam License Update Server on the Internet to check if a new license is available.
2. Seven days before expiration of the current license, VAO starts sending requests once a day.
3. When a new license becomes available, VAO automatically downloads and installs it to replace the old license.

Automatic Update Retries

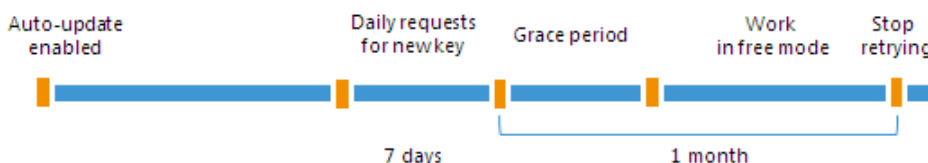
If VAO fails to update the license, it sends a notification to the contact person specified in the contract, and retries to update the license.

VAO retries to update the license key in the following way:

- If VAO fails to establish a connection to the Veeam License Update Server, retry takes place every 60 minutes.
- If VAO establishes a connection but the Veeam License Update Server does not return a new license key upon request, the retry takes place every 24 hours.

The retry period ends one month after the license expiration date. The retry period is equal to the number of days in the month of license expiration: for example, if the license expires in January, the retry period will be 31 day; if the license expires in April, the retry period will be 30 days.

If the retry period is over but the new license has not been installed, VAO automatically disables automatic license update.



Enabling Automatic License Update

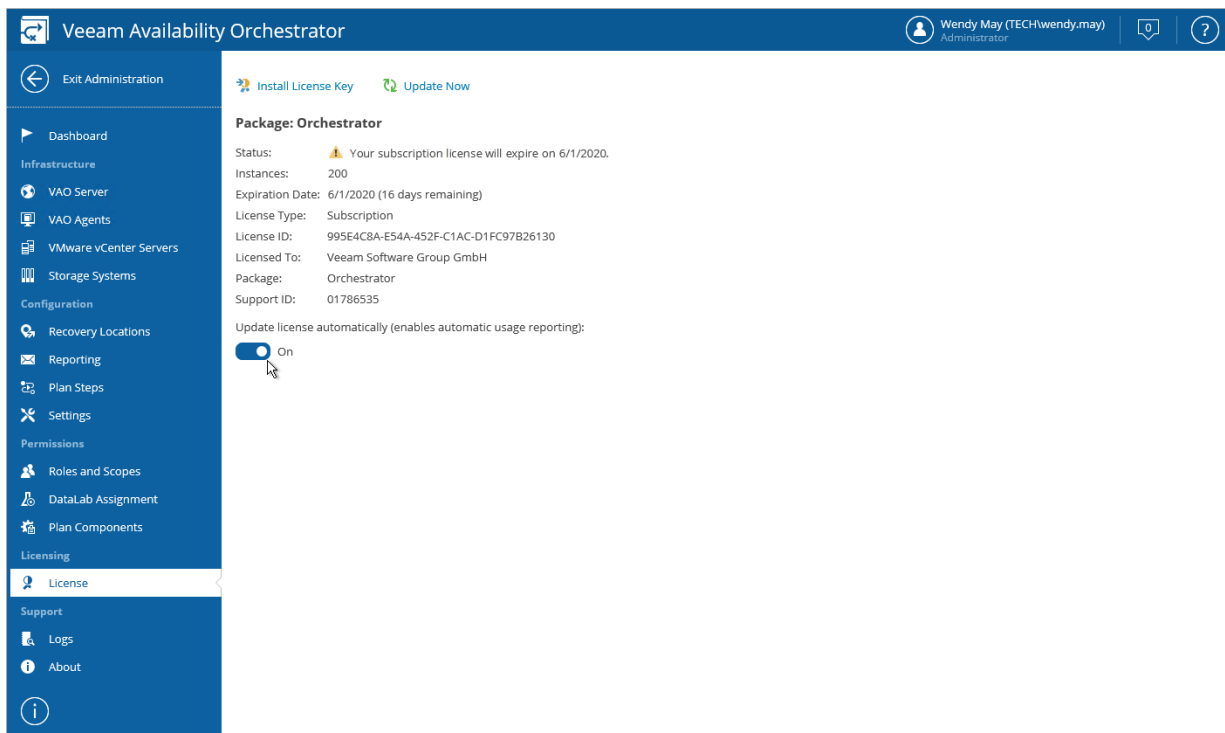
By default, automatic license update is disabled. To facilitate the license update process, you must enable it.

NOTE

Enabling automatic license update activates [Automatic Usage Reporting](#). You cannot use automatic license update without automatic usage reporting.

To enable automatic license update:

1. Log in to the VAO UI as a VAO Administrator. For more information, see [Accessing VAO UI](#).
2. Switch to the **Administration** tab.
3. Navigate to **License**.
4. Set the **Update license automatically (enables automatic usage reporting)** toggle to *On*.



Automatic license update can complete with the following results:

- **Operation is successful.** A new license key has been successfully generated, downloaded and installed.
- **A new license is not required.** The currently installed license key does not need to be updated.
- **The Veeam License Update Server has failed to generate a new license.** You will get this message if an error occurs on the Veeam License Update Server side.
- **Veeam Availability Orchestrator has received an invalid answer.** You will get this message if there are connectivity issues between the Veeam License Update Server and VAO server.
- **Licensing by the contract has been terminated.** The contract has expired. In this case, VAO automatically disables automatic license update.

Automatic Usage Reporting

When [automatic license update is enabled](#) for *Rental* or *Subscription* licenses, VAO additionally performs automatic usage reporting.

As part of reporting, VAO collects statistics on the current license usage and sends it periodically to the Veeam License Update Server. The report provides information on the contract ID, product installation ID, and the maximum number of licensed objects managed by VAO over the past week. The reporting process runs in the background mode, once a week at a random time and day.

The collected data does not include information on VAO usage by any individual person identifiable for Veeam, or any data gathered by VAO. Veeam may also use the collected data for any other internal business purposes it deems appropriate, including (but not limited to) evaluation, improvement and optimization of Veeam licensing models.

By enabling automatic license update, you agree with collection, transmission and use of the reporting data.

License Expiration

VAO license period is set in accordance with the chosen licensing program. When this period is over, you must update the license.

To ensure a smooth license update and provide sufficient time to install a new license file, VAO offers a grace period after the license expiration date. During the grace period, VAO keeps working in a full-version mode. The license status during this period appears as *Your subscription license has expired and needs to be renewed*.

The duration of the grace period is defined by the license type.

| License Type | Expiration Grace Period |
|--------------|-------------------------|
| Rental | 60 days |
| Subscription | 30 days |

You must update the license before the end of the grace period. If you do not update the license, after the grace period VAO will stop processing of plans, VMs and lab groups. Orchestration plan testing will be disabled as well.

To learn how to update VAO license, see [Updating License](#).

VM License Statuses

In VAO, a VM can have one of the following license statuses:

- **Licensed** — the VM has licenses assigned and is fully managed by VAO.
- **New** — the VM was added to a VAO plan within the current calendar month. The VM will be fully managed by VAO until the end of the current month.
- **Unlicensed** — the VM does not have licenses assigned, as there are no more licenses in the license pool. The unlicensed VM will have either the *Licensed by Exceed* or *Unlicensed* status.
 - **Licensed by Exceed** — the VM has no licenses assigned but is within the allowed increase limit. The VM can be used in VAO plans until the end of the grace period.
 - **Unlicensed by Exceed** — the VM has no licenses assigned, and the allowed increase limit was exceeded. The VM will not be managed by VAO.

For more information, see [Exceeding License Limit](#).

Exceeding License Limit

In some situations, the number of actually managed VMs may exceed the license limit. For example, this may happen when some VMs are temporarily used for testing or POC.

To deal with a situation where you need to manage more VMs than covered by your license, VAO provides mechanisms of **Allowed Increase Limit** and **New VMs**.

Allowed Increase Limit (All Licenses)

VAO allows you to increase the number of managed VMs during a certain grace period. The grace period duration is equal to the duration of the license key. The allowed license increase limit is defined by the license type.

| License Type | Allowed Increase Limit |
|--------------|--|
| Rental | 20 licenses or 20% of the license count (whichever is greater) |
| Subscription | 10 licenses or 10% of the license count (whichever is greater) |

When the number of VMs managed by VAO exceeds the license limit, VAO will treat them as follows:

- If the number of VMs is within the allowed increase limit or less, VAO will continue to manage all VMs until your license expires.

To detect what VMs must be managed, a FIFO (first-in first-out) queue is maintained: VMs that were added to VAO plans first will be included in the allowed exceed scope first. The license status of VMs within the increase limit will be set to *Licensed by exceed*.

You must update the existing license by the license expiration date. Otherwise, the license status of VMs within the increase limit will be set to *Unlicensed*, and these VMs will no longer be managed by VAO.

- If the number of VMs is above the allowed exceed limit, the VMs exceeding the licensed number plus the allowed increase limit will be excluded from management.

The license status of VMs above the increase limit will be set to *Unlicensed*.

New VMs (Rental Licenses)

To provide more flexibility and introduce a trial period for VM management, VAO offers the concept of **New VMs**. New VMs are VMs that were discovered by VAO within the current calendar month. This mechanism is provided for *Rental* licenses only.

New VMs are managed by VAO as regular VMs, but do not consume licenses until the beginning of the new month. In license terms, New VMs are counted separately from regular managed VMs. However, such VMs do participate in all VAO activities and are fully-functional.

On the first day of the new month, the number of New VMs introduced in the previous month is added to the number of regular managed VMs. VMs that were treated as New will be managed by VAO in the following cases:

- If there are enough VAO licenses to allocate to these VMs.

- If there are no VAO licenses, but the allowed increase limit has not been breached yet. In this case, the VMs will obtain the *Licensed by exceed* status.

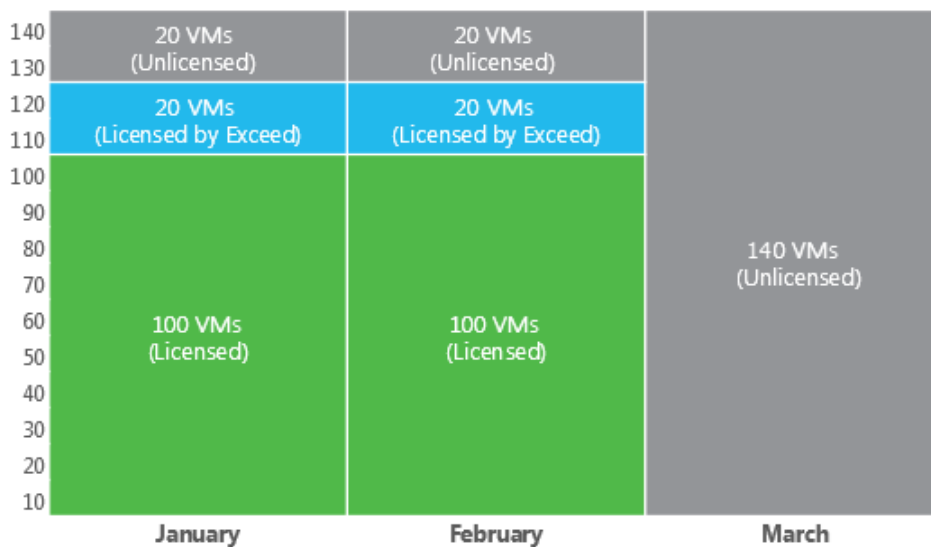
If the allowed increase limit has been already surpassed, these VMs will obtain the *Unlicensed* status.

Example

Consider the following example. Your *Rental* license covers 100 VMs. The license expires in 60 days.

At the beginning of January, the number of VMs is 140. Within the first 2 months (January and February), VAO will manage 100 + 20 VMs that were added to VAO plans first (license limit + 20% allowed increase). 20 VMs that were added last will not be managed.

If the license is not updated upon expiration, in March, VAO will change the status of all 140 VMs to *Unlicensed*.

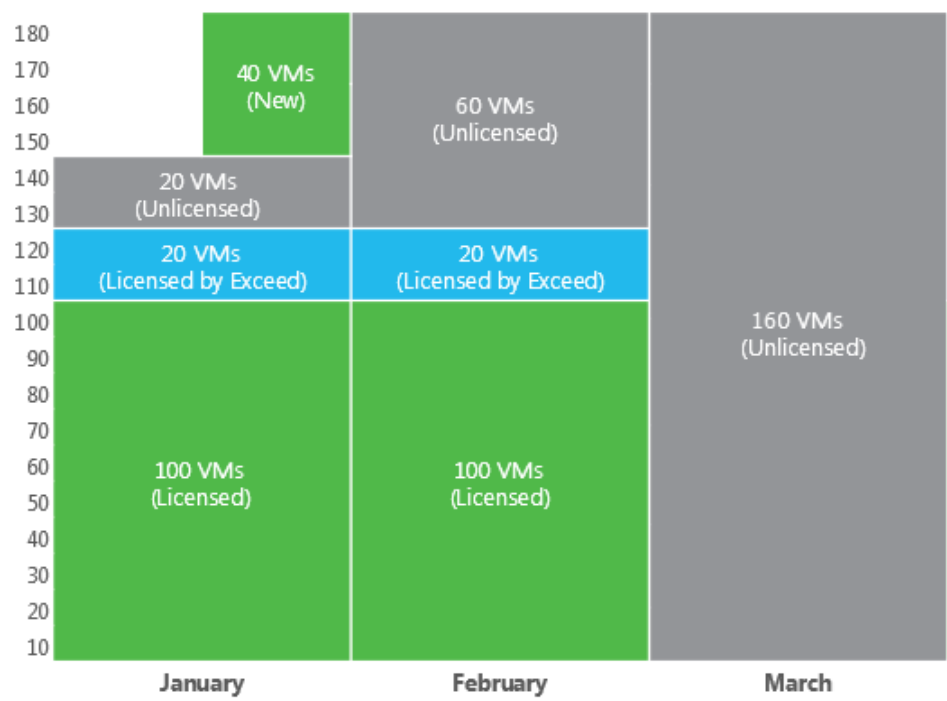


Consider the same example but with [New VMs](#).

In the middle of January, 40 New VMs are added to VAO plans. VAO will manage these VMs until the end of the month. If the license is not updated, and the license pool is not increased, in February, VAO will change the license statuses as follows:

- The first 20 VMs that obtained the *Licensed by Exceed* status in January will keep the same *Licensed by Exceed* status.
- The second 20 VMs that obtained the *Unlicensed* status in January will keep the same *Unlicensed* status.
- The last 40 VMs added in the middle of January will obtain the *Unlicensed* status according to the FIFO queue.

If the license is not updated upon expiration, and the license pool is not increased, in March, VAO will change the status of all 160 VMs to *Unlicensed*.

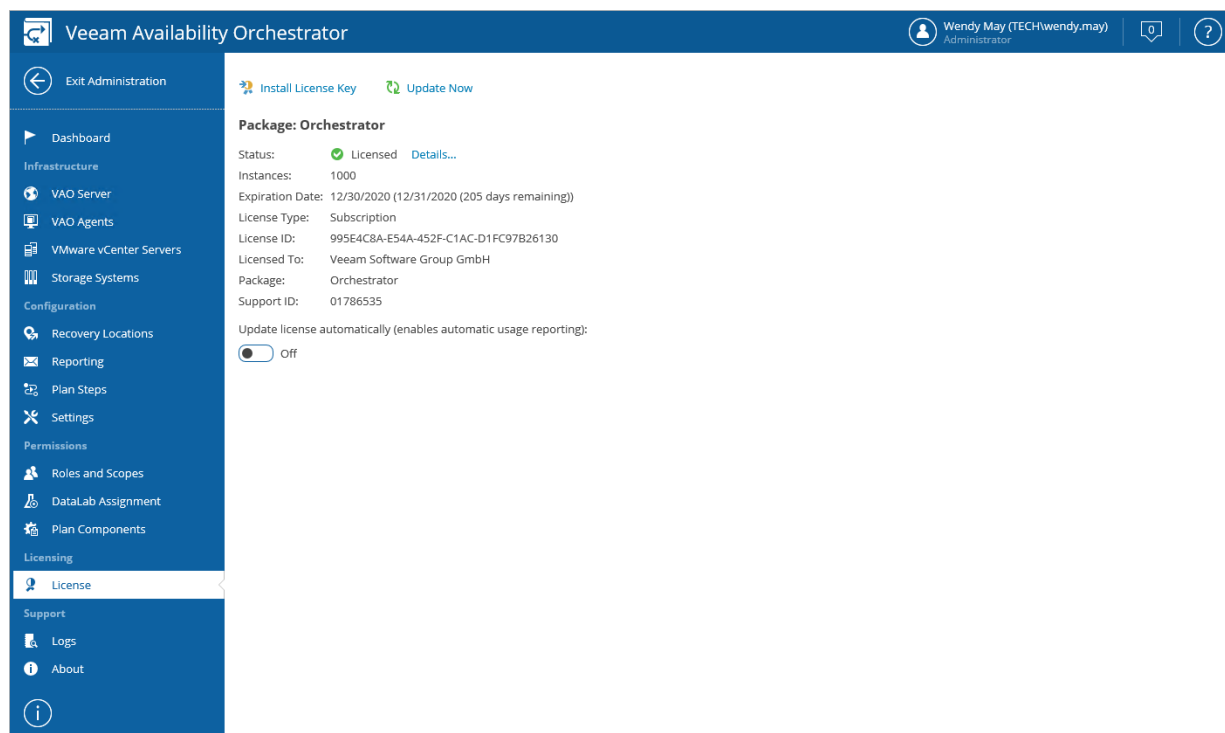


Viewing License Details

To view VAO license details:

1. Log in to the VAO UI as a VAO Administrator. For more information, see [Accessing VAO UI](#).
2. Switch to the **Administration** tab.
3. Navigate to **License**.

The licensing section will display details on the currently installed VAO license.



The following details are available for the current license:

- **Status** — the license status. The status will depend on the license type, the number of days remaining until license expiration, the number of days remaining in the grace period (if any), and the number of VMs that exceeded the allowed increase limit (if any).

Click the **Details** link to get more information on the number of licenses consumed by managed VMs, and the number of licenses reserved for New VMs that exceed the license limit and that were discovered less than a month ago.

For more information on New VMs, see [Exceeding License Limit](#).

- **Instances** — the total number of licenses for VMs included in the license file.
- **Expiration Date** — the date when the license will expire.
- **License Type** — the license type (*Rental, Subscription, Evaluation, NFR*).
- **License ID** — the ID of the provided license file (required for contacting Veeam Customer Support).
- **Licensed To** — the name of an organization to which the license was issued.
- **Package** — the software product for which the license was issued.
- **Support ID** — the ID of the contract (required for contacting Veeam Customer Support).

Deployment

To start working with VAO, you must configure the VAO server:

1. [Install Veeam Availability Orchestrator](#) including all components on a machine that meets the system requirements.
2. [Complete the Initial Configuration Wizard on the VAO server](#) (during the configuration process, you will connect to a vCenter Server).

NOTE

The VAO solution can be installed in the unattended mode. Installation is launched from the command line and performed without any user interaction. For more information, see [Installing Veeam Availability Orchestrator in Unattended Mode](#).

After you perform these steps, you will be able to:

- Configure VAO settings
- Create and manage orchestration plans
- Review dashboards
- Generate documentation

For more information, see the [Veeam Availability Orchestrator Operations Guide](#).

Installing Veeam Availability Orchestrator

During VAO installation, VAO server components will be installed all together on a single machine. For more information on the components, see [Architecture Overview](#).

IMPORTANT

When installing VAO, mind the following limitations:

- Installation of VAO on a machine already running standalone versions of Veeam Backup & Replication and Veeam ONE is not supported.
- Installation of VAO on a machine with the Domain Controller role is not supported.

Before You Begin

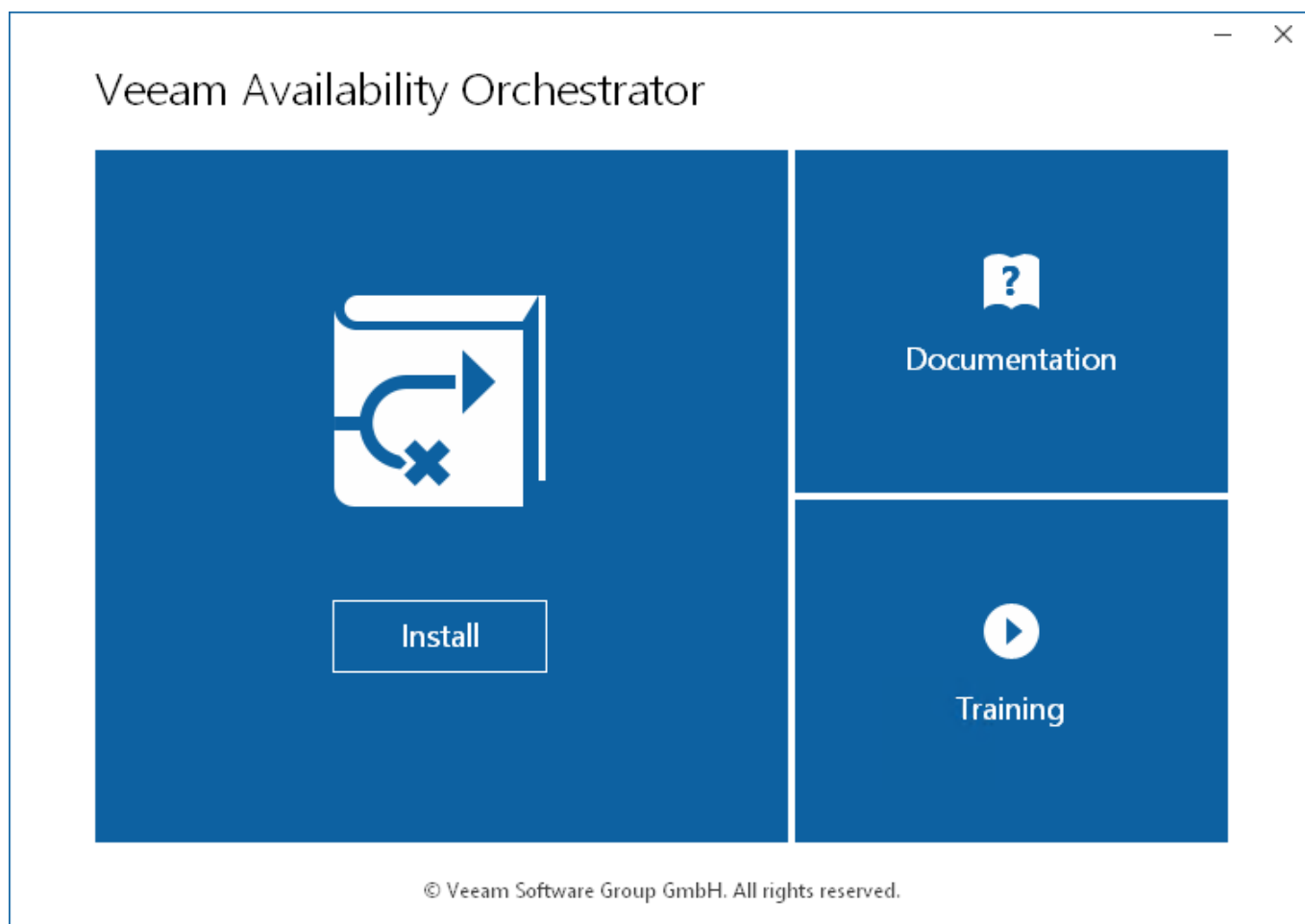
Before you begin installation, check the following prerequisites:

1. Make sure the machine where VAO will be installed meets the prerequisite conditions described in section [System Requirements](#).
2. Download the VAO product installation `VAO_3.0.iso` file from the [Veeam downloads page](#). You can burn the downloaded image file to a CD/DVD or mount the installation image to the target machine using disk image emulation software.

Step 1. Launch Splash Window and Start Setup Wizard

To start the setup wizard, perform the following steps:

1. Log in to the machine where you want to install VAO using an account with the local Administrator rights.
2. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open a splash screen with VAO installation options.
3. Click **Install** to launch the **Veeam Availability Orchestrator Setup** wizard.



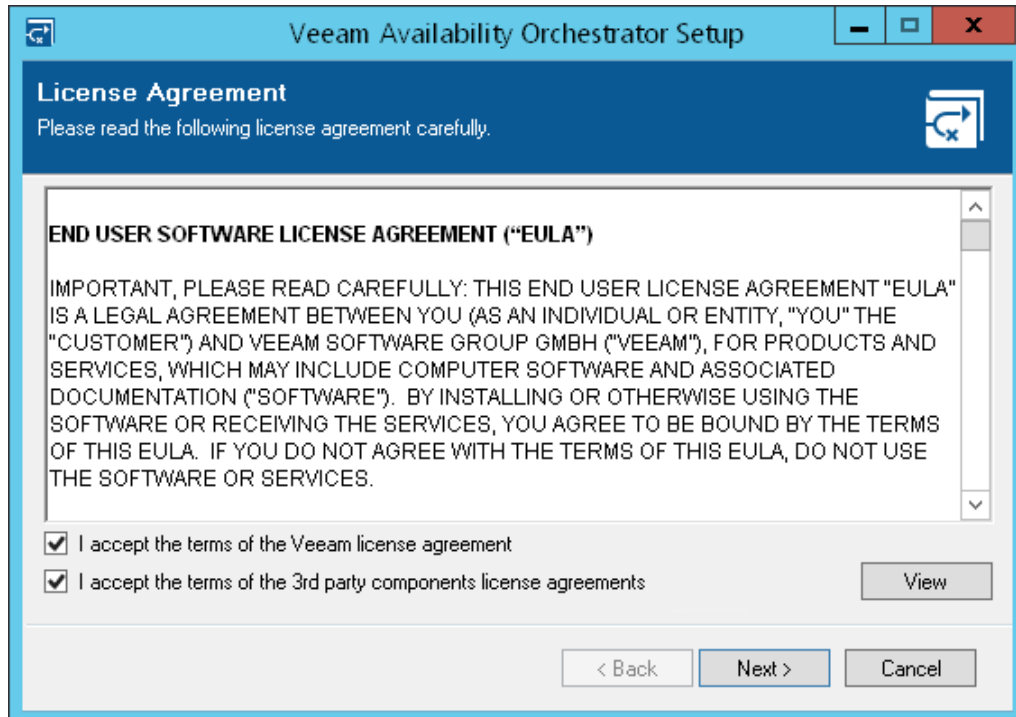
NOTE

Before proceeding with installation, the installer will check whether you have Microsoft .NET Framework 4.7.2 installed on the machine. In case the required version is missing, the installer will offer to install it automatically. To do that, click **OK**.

Installation will require performing a reboot. Click **Reboot** in the warning message to acknowledge the reboot.

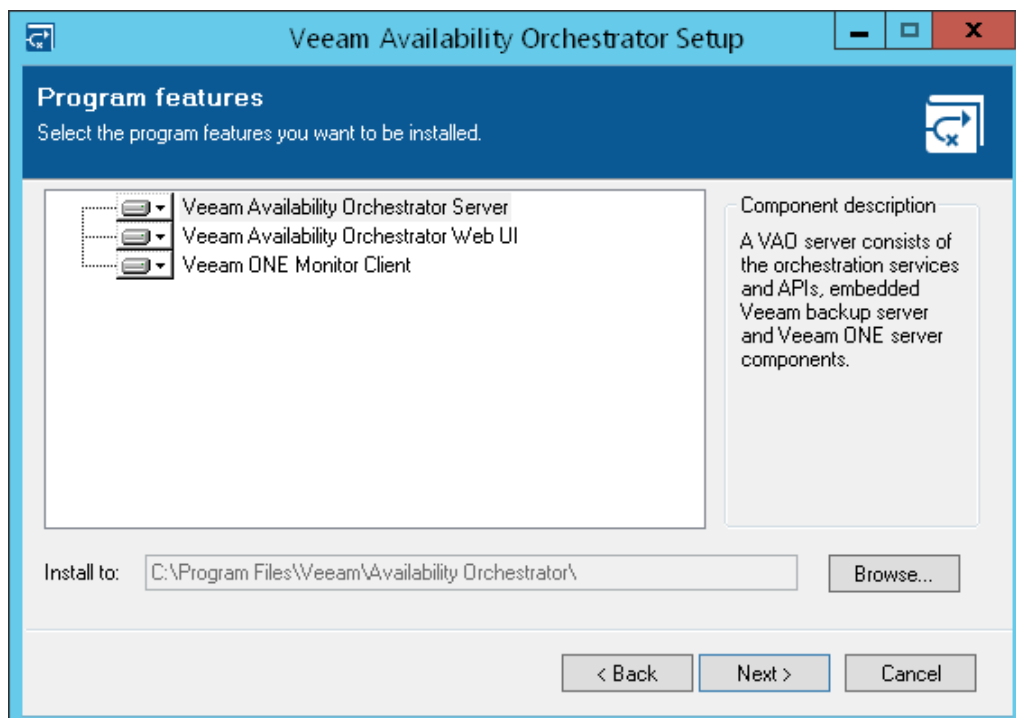
Step 2. Accept License Agreement

At the **License Agreement** step of the wizard, read and accept both the Veeam license agreement and the 3rd party components license agreement. If you reject the agreements, you will not be able to continue installation.



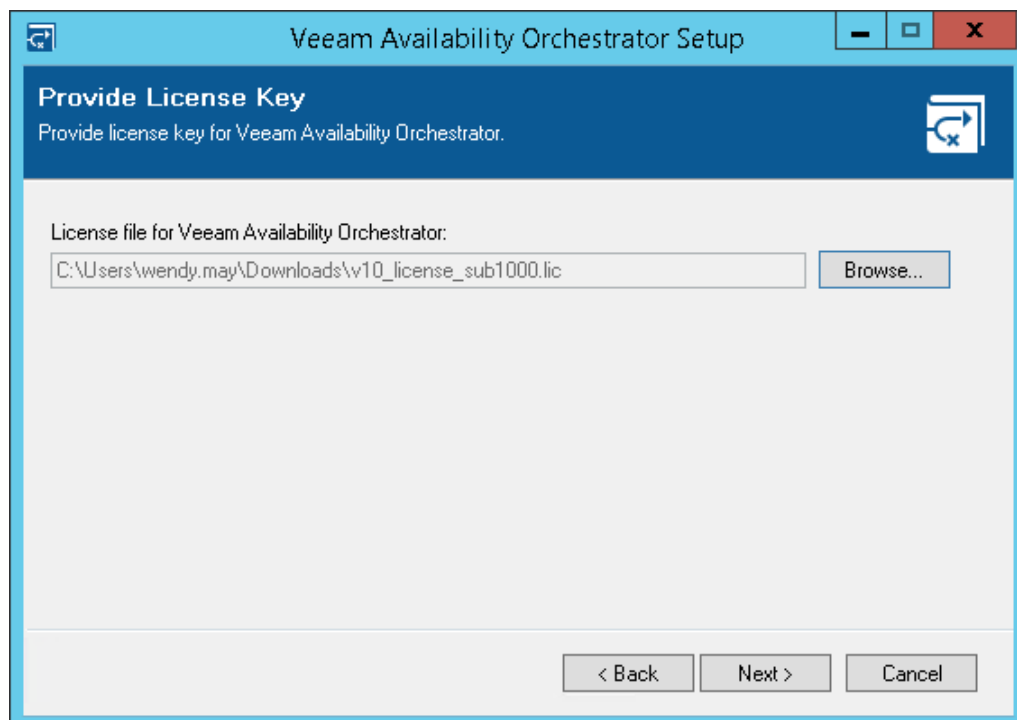
Step 3. Choose Components to Install

At the **Program Features** step of the wizard, choose VAO components to be installed. If necessary, you can change the installation directory.



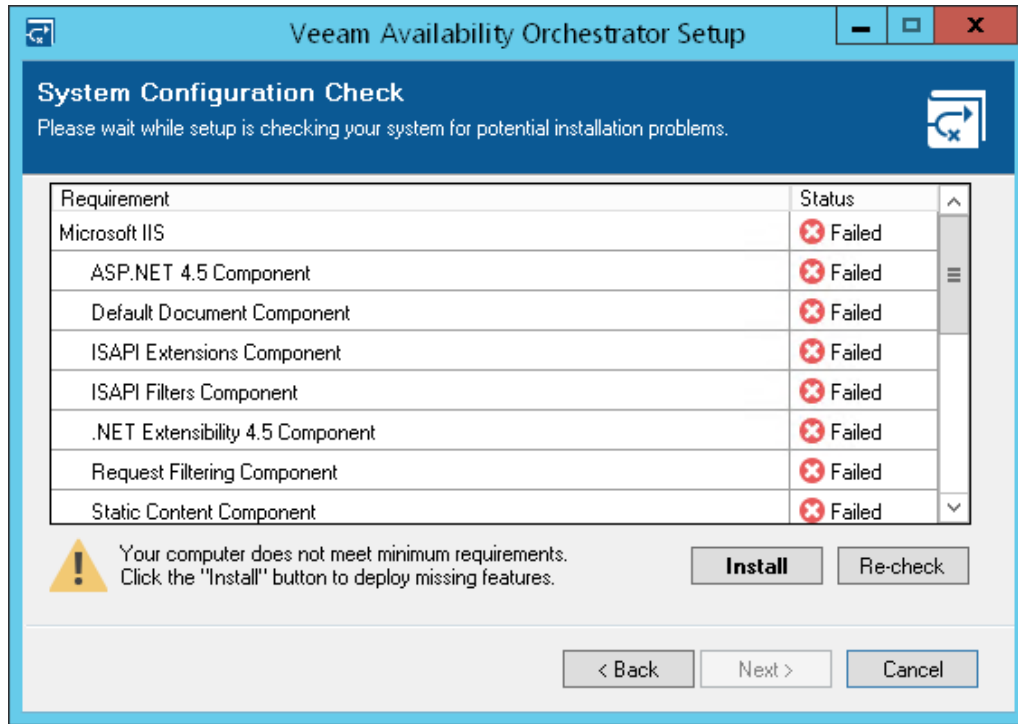
Step 4. Provide License File

At the **Provide License Key** step of the wizard, click **Browse** to locate the license file supplied to you by Veeam. You will not be able to continue installation without providing a license.

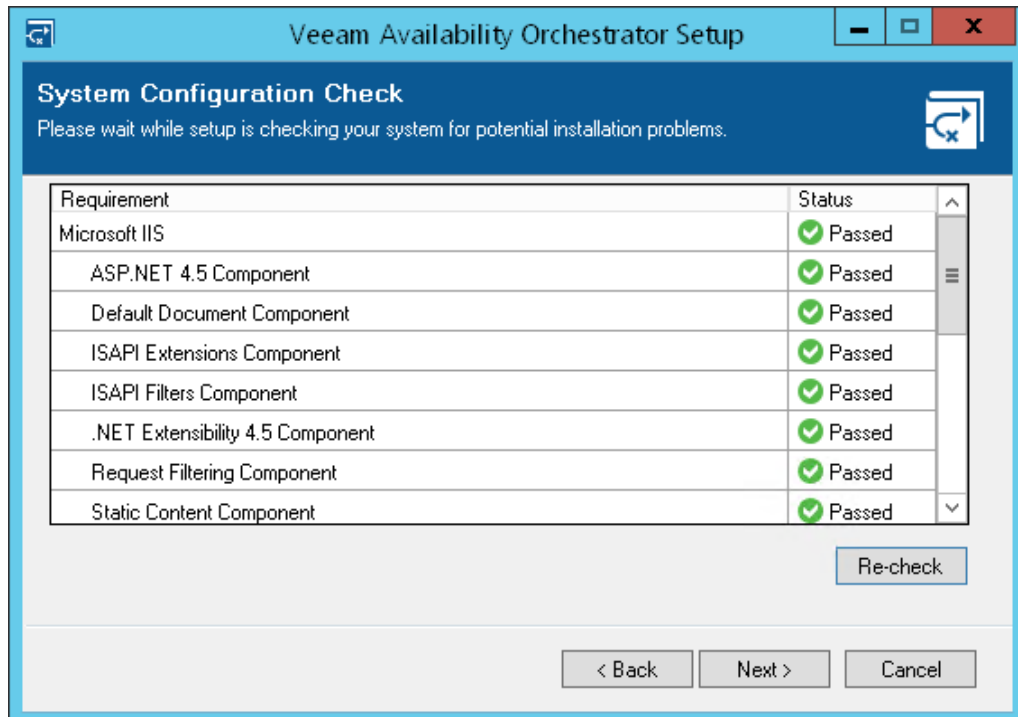


Step 5. Perform System Configuration Check

At the **System Configuration Check** step of the wizard, check whether all prerequisite software is available on the target system. If some of the required software components are missing, the wizard will offer to install missing software automatically. To do that, click **Install**.

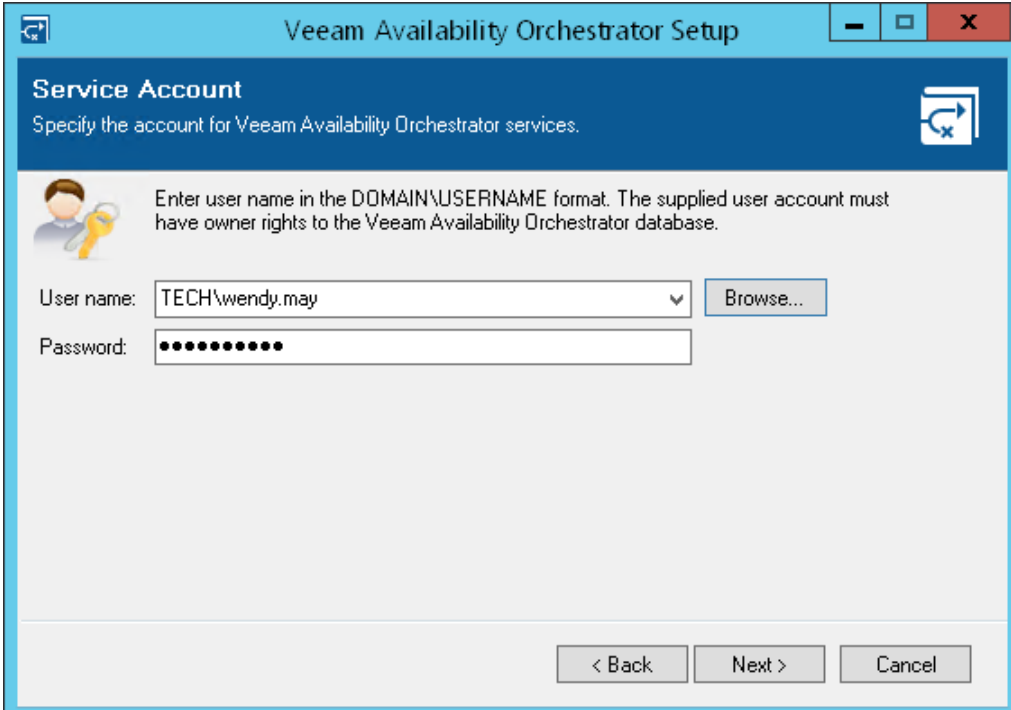


When all the required software is installed, click **Re-check** to repeat verification.



Step 6. Specify Service Account Credentials

At the **Service Account** step of the wizard, enter credentials of the account under which the VAO Service will run. The account must be a member of the local *Administrators* group. The user name must be specified in the *DOMAIN\USERNAME* format.



The screenshot shows the 'Veeam Availability Orchestrator Setup' window, specifically the 'Service Account' step. The window has a blue title bar and a dark blue header area with the title 'Service Account' and a subtitle 'Specify the account for Veeam Availability Orchestrator services.' Below the header, there is a light gray area with a key icon and a text box containing the instruction: 'Enter user name in the DOMAIN\USERNAME format. The supplied user account must have owner rights to the Veeam Availability Orchestrator database.' Below this, there are two input fields: 'User name:' with a dropdown menu showing 'TECH\wendy.may' and a 'Browse...' button, and 'Password:' with a masked password field. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Veeam Availability Orchestrator Setup

Service Account
Specify the account for Veeam Availability Orchestrator services.

Enter user name in the DOMAIN\USERNAME format. The supplied user account must have owner rights to the Veeam Availability Orchestrator database.

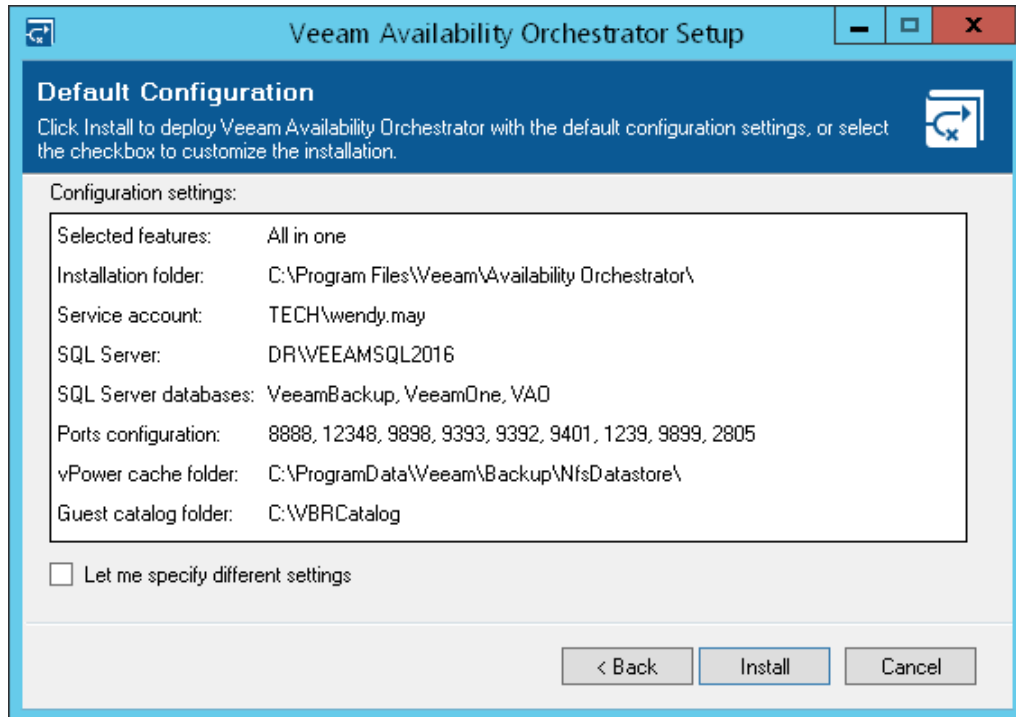
User name: TECH\wendy.may

Password:

< Back Next > Cancel

Step 7. Review Default Installation Summary

At the **Default Configuration** step of the wizard, review installation configuration. Click **Install** to begin installation.



NOTE

During VAO installation, by default, the setup will install Microsoft SQL Server 2016 Express to host VAO databases. If you want to use an existing local or remote Microsoft SQL Server instance, select the **Let me specify different settings** check box and click **Next**.

In this case, you will also be able to configure used ports, choose an SSL certificate to secure traffic between the VAO UI and a web browser, and to select local folders where VAO, Veeam ONE and Veeam Backup & Replication components will store data cache.

Step 8. Choose SQL Server

[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **SQL Server Instance** step of the wizard, choose a Microsoft SQL Server instance that will host the VAO database:

- If on the target machine you do not have a Microsoft SQL Server instance that you can use for VAO, select the **Install new instance of SQL Server** option. In this case, the setup will install Microsoft SQL Server Express locally, on the machine where you are installing VAO.

NOTE

If a Microsoft SQL Server instance that meets VAO system requirements is detected on the machine, you can only use the existing local Microsoft SQL Server instance or choose one that runs remotely. In this case, the option to install a new Microsoft SQL instance will be unavailable.

- If you want to use an existing local or remote Microsoft SQL Server instance, select the **Use existing instance of SQL Server** option and choose a local Microsoft SQL Server instance, or browse to a Microsoft SQL Server instance running remotely. You can either enter the address of the instance manually or use the **Browse** button to search among available remote instances.

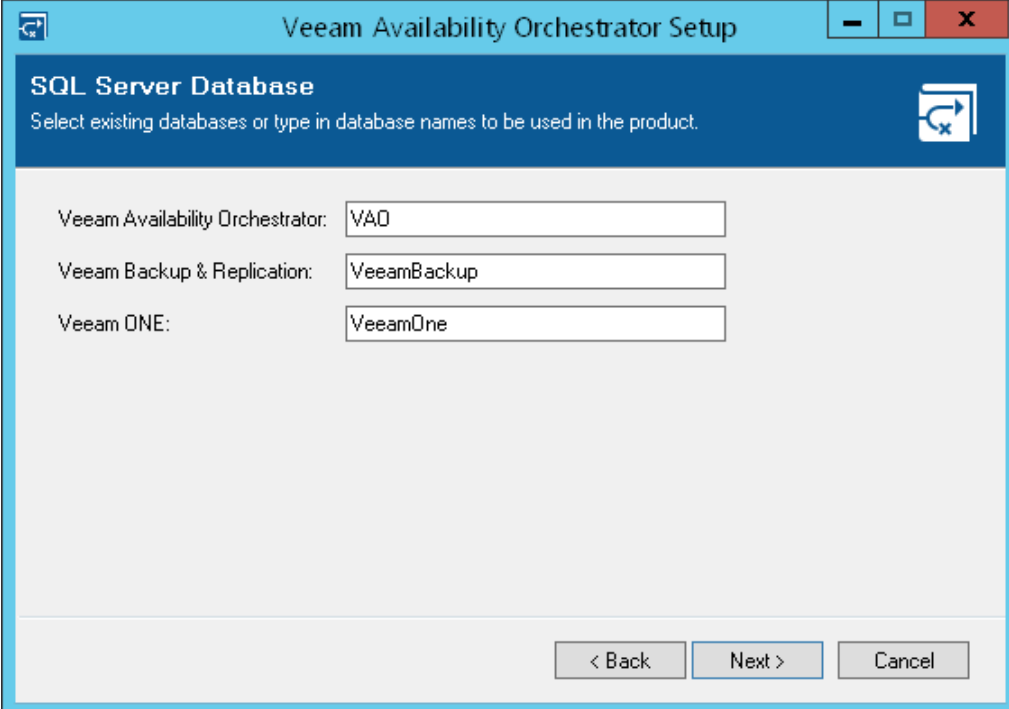
To connect to the Microsoft SQL Server instance, you must provide valid credentials for an account that will be used by VAO components to access the Microsoft SQL Server database. You can either specify credentials explicitly or use Windows authentication credentials. Note that the account must have the *System Administrator* rights on the selected Microsoft SQL Server instance.

The screenshot shows the 'Veeam Availability Orchestrator Setup' window, specifically the 'SQL Server Instance' step. The window has a blue title bar and a dark blue header area with the text 'SQL Server Instance' and 'Choose SQL Server Instance to create Veeam Availability Orchestrator databases on.' Below the header, there are two radio button options: 'Install new instance of SQL Server (DR\VEEAMSQL2016)' which is selected, and 'Use existing instance of SQL Server (HOSTNAME\INSTANCE)'. Under the second option, there is a text box for 'SQL Server:' containing 'DR\VEEAMSQL2016' and a 'Browse...' button. Below these options, there is a section 'Connect to SQL Server using' with two radio button options: 'Windows authentication credentials of service account' which is selected, and 'SQL Server authentication using the Login ID and password below:'. Under the second option, there are text boxes for 'Login ID:' containing 'sa' and 'Password:'. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Step 9. Create SQL Server Databases

[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **SQL Server Database** step of the wizard, enter names for databases that will be used to store data collected from VAO, Veeam Backup & Replication and Veeam ONE.



The screenshot shows the 'Veeam Availability Orchestrator Setup' window, specifically the 'SQL Server Database' step. The window has a blue title bar and a dark blue header area. The header area contains the title 'SQL Server Database' and a subtitle 'Select existing databases or type in database names to be used in the product.' Below the header, there are three text input fields with labels to their left: 'Veeam Availability Orchestrator:', 'Veeam Backup & Replication:', and 'Veeam ONE:'. The input fields contain the text 'VAO', 'VeeamBackup', and 'VeeamOne' respectively. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'.

| Component | Database Name |
|---------------------------------|---------------|
| Veeam Availability Orchestrator | VAO |
| Veeam Backup & Replication | VeeamBackup |
| Veeam ONE | VeeamOne |

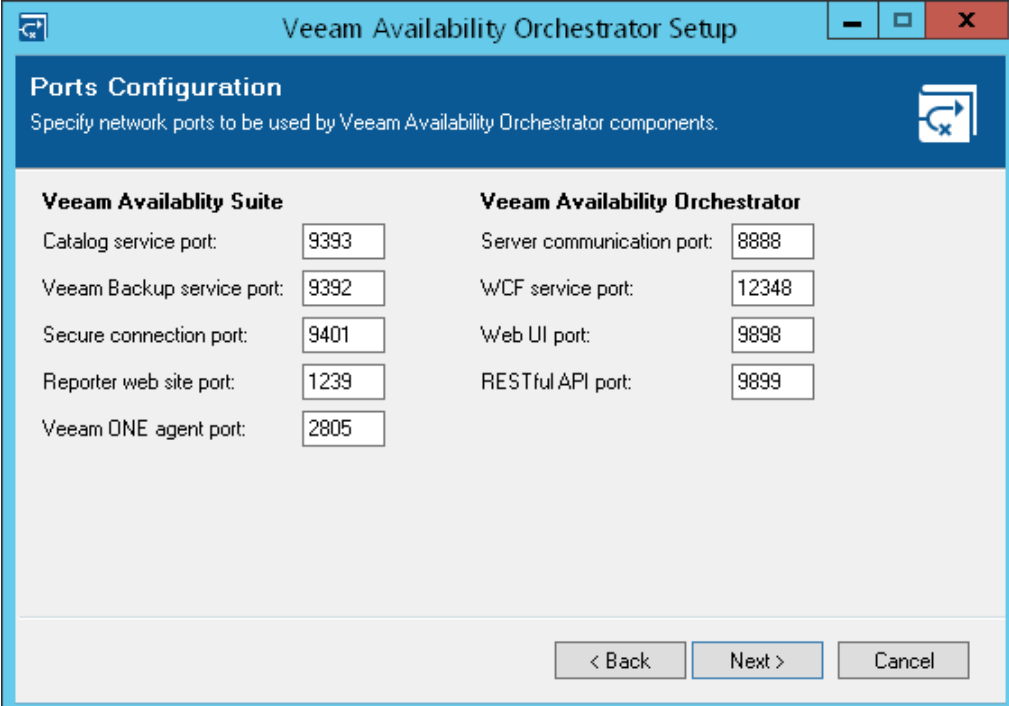
Step 10. Specify Service Ports

[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **Ports Configuration** step of the wizard, customize the following ports:

- **Veeam Availability Orchestrator** communication ports used for collecting data from connected servers, for accessing the VAO UI through a web browser, and for connecting to the REST API functionality.
- **Veeam Availability Suite** ports used for communication between Veeam ONE components and Veeam Backup & Replication infrastructure components.

For the full description of ports used by VAO and their default values, see [Ports](#).



The screenshot shows the 'Veeam Availability Orchestrator Setup' window, specifically the 'Ports Configuration' step. The window has a blue header bar with the title 'Veeam Availability Orchestrator Setup' and standard window controls (minimize, maximize, close). Below the header, there's a sub-header 'Ports Configuration' with a description: 'Specify network ports to be used by Veeam Availability Orchestrator components.' and a refresh icon. The main area is divided into two columns: 'Veeam Availability Suite' and 'Veeam Availability Orchestrator'. Each column contains five rows of labels and text input fields with default values. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

| Veeam Availability Suite | | Veeam Availability Orchestrator | |
|----------------------------|------|---------------------------------|-------|
| Catalog service port: | 9393 | Server communication port: | 8888 |
| Veeam Backup service port: | 9392 | WCF service port: | 12348 |
| Secure connection port: | 9401 | Web UI port: | 9898 |
| Reporter web site port: | 1239 | RESTful API port: | 9899 |
| Veeam ONE agent port: | 2805 | | |

Step 11. Select Certificate for VAO UI

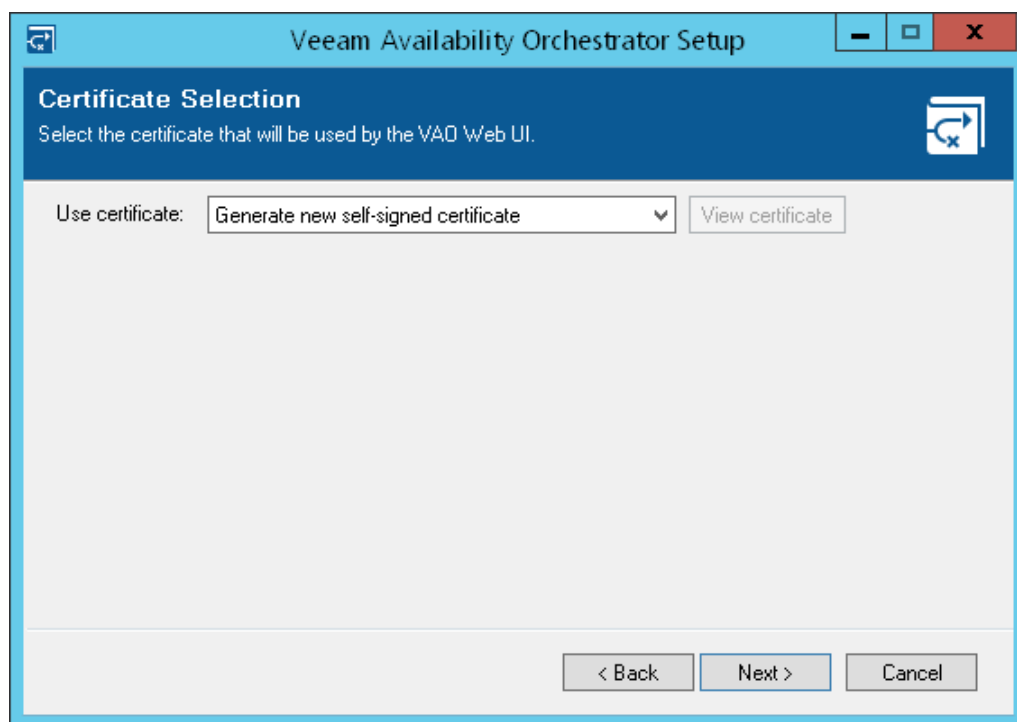
[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **Certificate Selection** step of the wizard, choose an SSL certificate that will be used to secure traffic between the VAO UI and a web browser.

You can choose an existing certificate installed on the machine (self-signed or provided by CA) or generate a new self-signed certificate. If you generate or choose a self-signed certificate, you must configure a trusted connection between the VAO UI and a web browser later. For more information, see [Configuring Trusted Connection](#).

IMPORTANT

For an existing certificate to be displayed in the **Use certificate** list, it must be added to the **Certificates > Personal** folder in the Microsoft Management Console snap-in. To learn how to move SSL certificates, see [this Microsoft KB article](#).

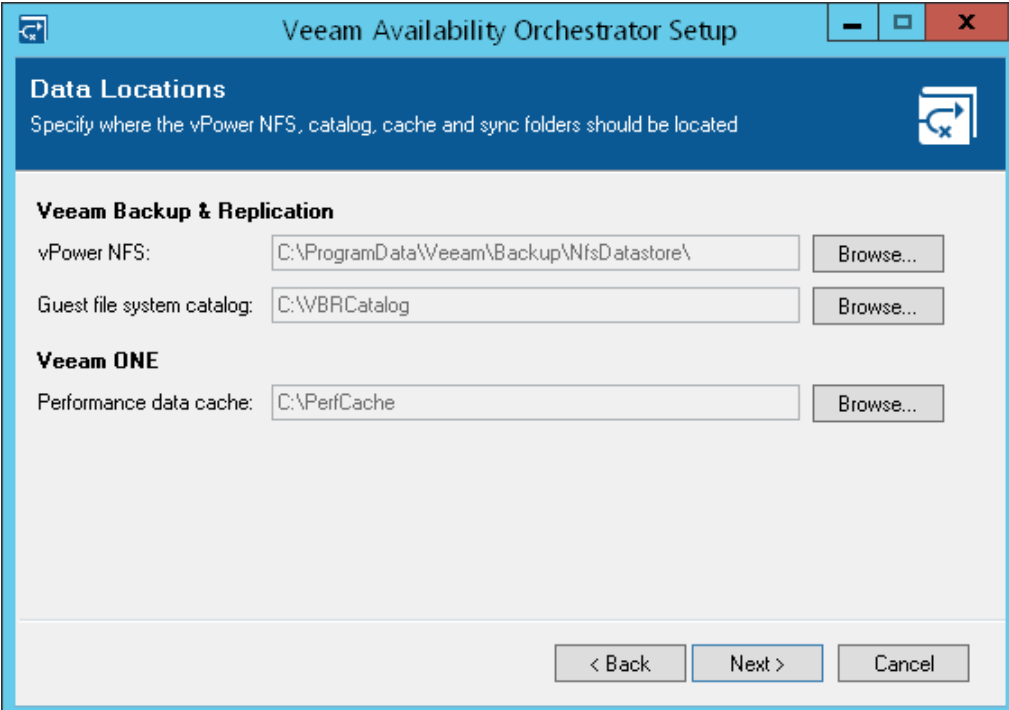


Step 12. Specify Data Locations

[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **Data Locations** step of the wizard, select local folders where Veeam ONE and Veeam Backup & Replication components will store data cache:

- In the **vPower NFS** field, specify a path to the folder where Instant VM Recovery write cache must be stored. Make sure that you have at least **10 GB** of free disk space to store the write cache.
- In the **Guest file system catalog** field, specify a path to the folder where Veeam Backup & Replication index files must be stored. By default, the setup wizard creates the `VBRCatalog` folder on the volume with the maximum amount of free space.
- In the **Performance data cache** field, specify a path to the folder where Veeam ONE write cache must be stored.



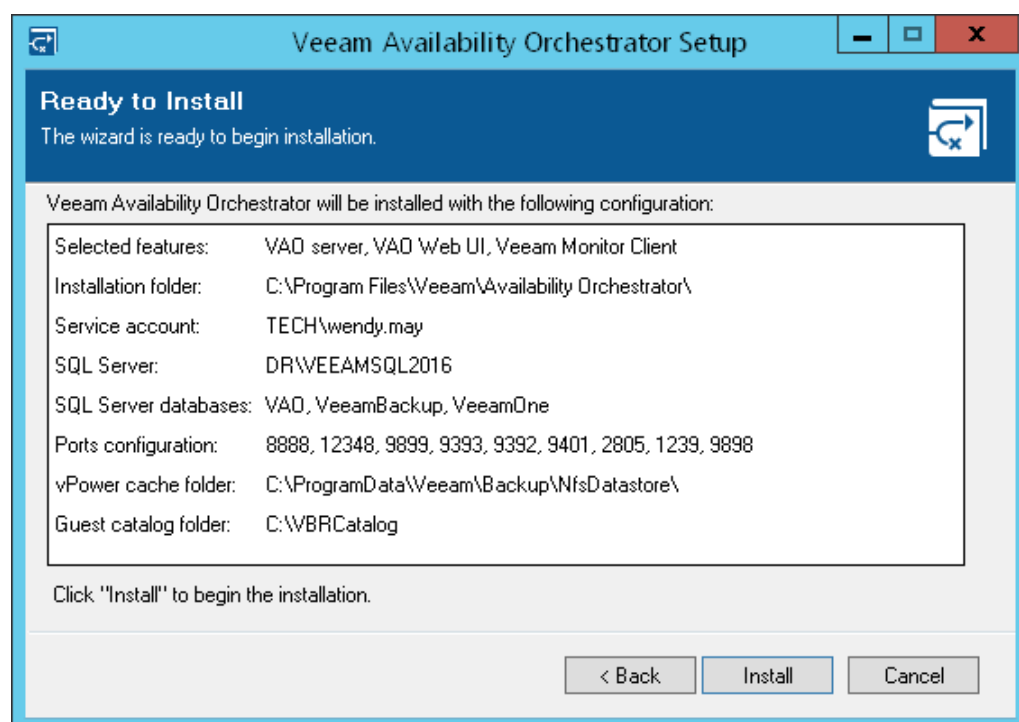
The screenshot shows the 'Veeam Availability Orchestrator Setup' window, specifically the 'Data Locations' step. The window title bar includes standard Windows window controls (minimize, maximize, close). The 'Data Locations' header is in a dark blue bar with a sub-header 'Specify where the vPower NFS, catalog, cache and sync folders should be located'. Below this, the 'Veeam Backup & Replication' section contains two fields: 'vPower NFS:' with the path 'C:\ProgramData\Veeam\Backup\NfsDatastore\' and a 'Browse...' button, and 'Guest file system catalog:' with the path 'C:\VBRCatalog' and a 'Browse...' button. The 'Veeam ONE' section contains one field: 'Performance data cache:' with the path 'C:\PerfCache' and a 'Browse...' button. At the bottom of the window are three buttons: '< Back', 'Next >', and 'Cancel'.

Step 13. Review Advanced Installation Summary

[This step applies only if you have selected the **Let me specify different settings** check box at the **Default Configuration** step of the setup wizard]

At the **Ready to Install** step of the wizard, review installation configuration and start the installation process:

1. Click **Install** to begin installation.
2. Wait for the installation process to complete and click **Finish** to exit the setup wizard.



Step 14. Upgrade to Veeam Backup & Replication 10

It is essential that you upgrade to version 10 cumulative patch 2 every standalone Veeam Backup & Replication server that you plan to connect to VAO. This version contains numerous enhancements and fixes required for the VAO integration. To perform upgrade of Veeam Backup & Replication to version 10, follow the instructions provided in the Veeam Backup & Replication User Guide, section [Upgrading to Veeam Backup & Replication 10](#), and in [this Veeam KB article](#).

After the upgrade process completes, open the Veeam Backup & Replication console on the VAO server to update Veeam Backup & Replication components installed on all managed servers. To perform the update, follow the steps of the **Components Update** wizard. For more information on updating server components, see the Veeam Backup & Replication User Guide, section [Server Components Upgrade](#).

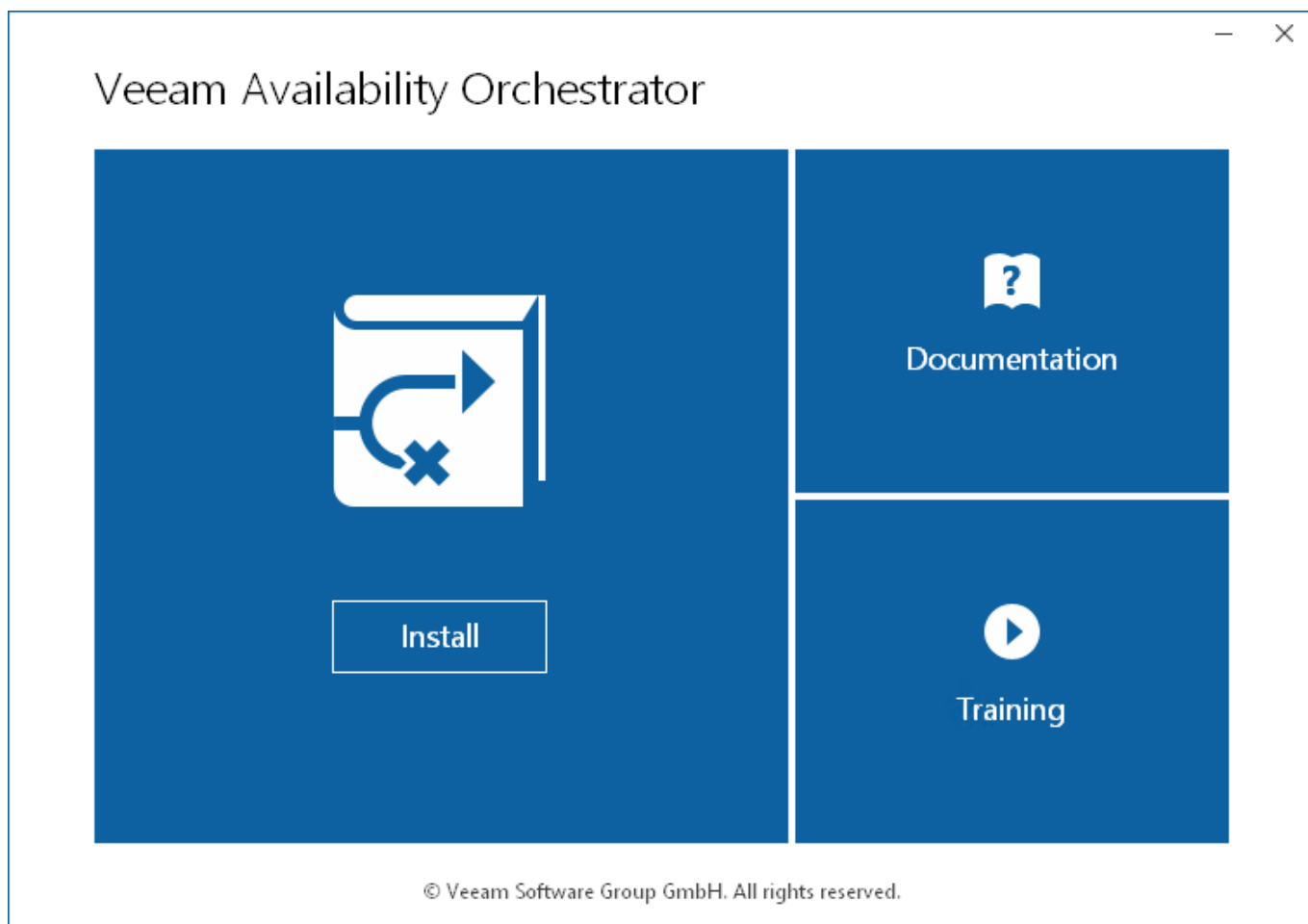
TIP

If you want to use the embedded Veeam Backup & Replication server to run backup and replication jobs along with orchestration, connect to the vSphere infrastructure and create jobs on that server. VAO will discover backups and replicas produced by these jobs and will use them for orchestration plans. For more information on adding VMware vSphere Servers and creating jobs, see the Veeam Backup & Replication User Guide, sections [Adding VMware vSphere Servers](#), [Creating Backup Jobs](#) and [Creating Replication Jobs](#).

Step 15. Install Additional Veeam ONE Monitor Clients

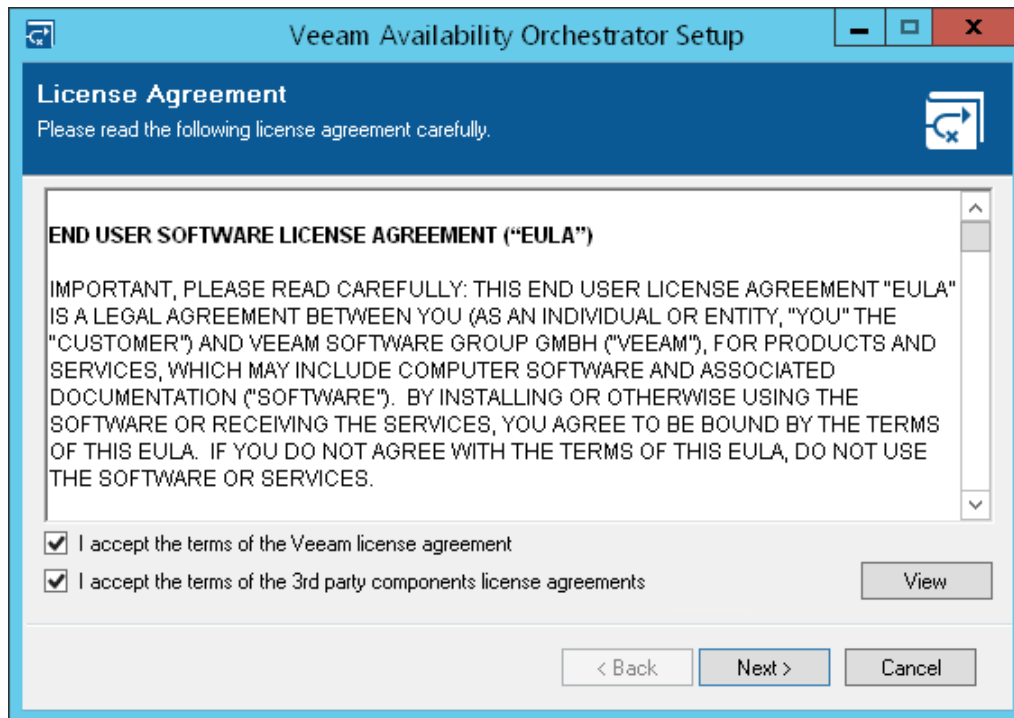
This step applies only if you want to install an additional instance of Veeam ONE Monitor Client (separately from the VAO server) to access the Veeam ONE functionality remotely.

1. Download the VAO product installation `VAO_3.0.iso` file from the [Veeam downloads page](#). You can burn the downloaded image file to a CD/DVD or mount the installation image to the target machine using disk image emulation software.
2. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open a splash screen with VAO installation options.
3. Click **Install**.

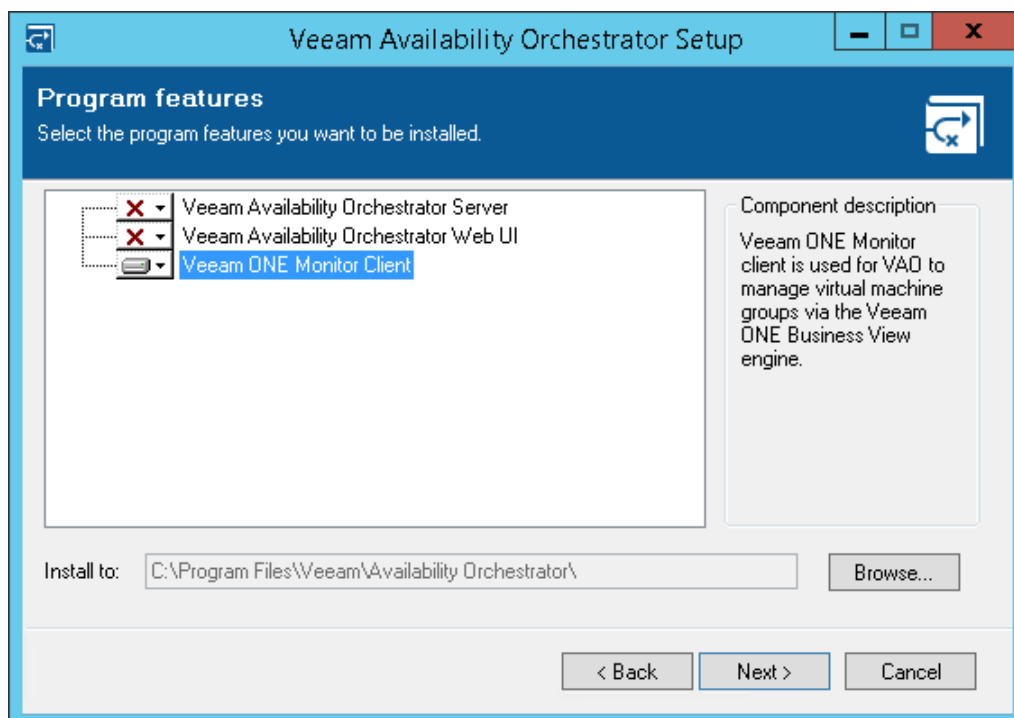


4. Complete the **Veeam Availability Orchestrator Setup** wizard:

- a. At the **License Agreement** step of the wizard, read and accept both the Veeam license agreement and the 3rd party components license agreement. If you reject the agreements, you will not be able to continue installation.

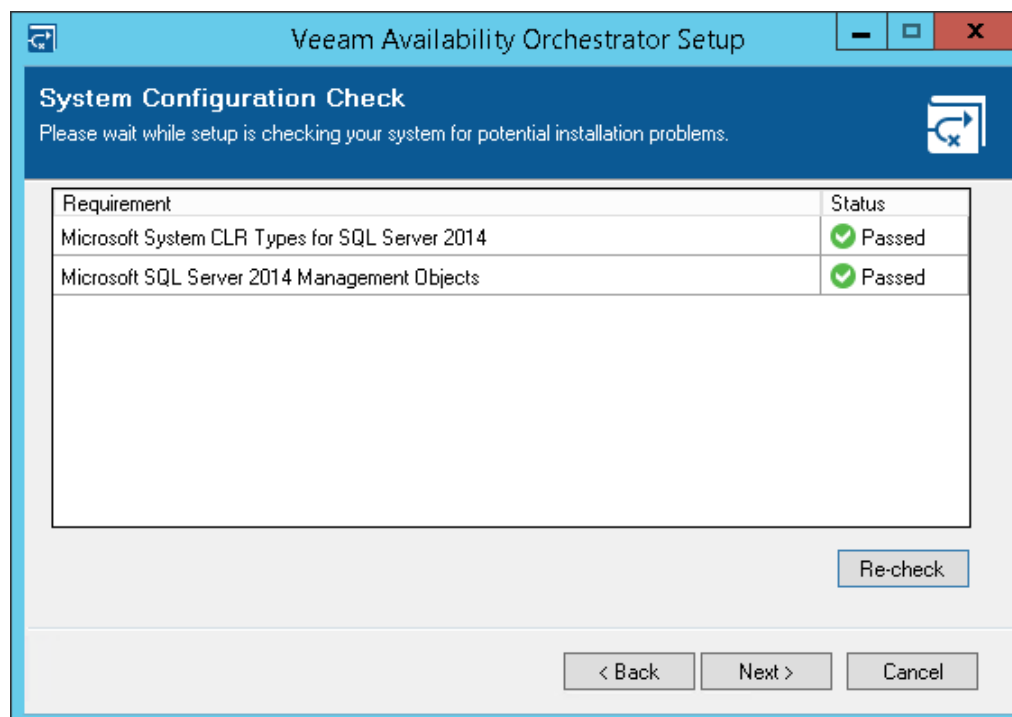


- b. At the **Program Features** step of the wizard, choose Veeam ONE Monitor Client to be installed. If necessary, you can change the installation directory.

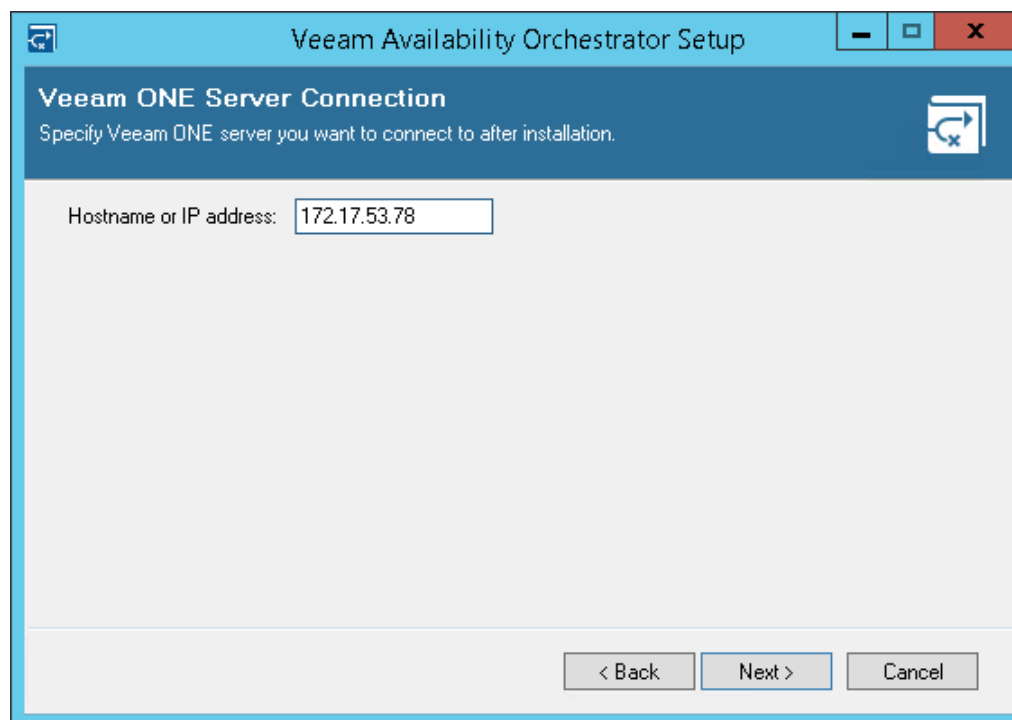


- c. At the **System Configuration Check** step of the wizard, check whether all prerequisite software is available on the target system.

If some of the required software components are missing, the wizard will offer to install missing software automatically. To do that, click **Install**. When all the required software is installed, click **Re-check** to repeat verification.



- d. At the **Veeam ONE Server Connection** step of the wizard, specify the hostname or IP address of the VAO server.



- e. At the **Ready to Install** step of the wizard, review installation configuration. Click **Install** to begin installation.

Installing Veeam Availability Orchestrator in Unattended Mode

You can install VAO in the unattended mode using the command line interface. The unattended installation mode does not require user interaction — the installation runs automatically in the background, and you do not have to respond to the installation wizard prompts. You can use the unattended installation mode to automate the VAO installation process in large-scale environments.

In unattended mode, VAO components must be installed in the following order:

1. [Veeam Availability Orchestrator Server Service](#).
2. [Veeam Availability Orchestrator Web UI](#).

Before You Begin

Before you start unattended installation, perform the following steps:

1. [For Veeam Availability Orchestrator Server Service] Pre-install the following components on the target machine:
 - a. .NET Framework 4.6 (or later)
 - b. Microsoft System CLR Types for SQL Server 2014
 - c. Microsoft SQL Server 2014 Management Objects
 - d. Microsoft SQL Native Client 2012
 - e. Local or remote Microsoft SQL Server 2012 (or later)
 - f. Veeam Backup & Replication 9.5 Update 4 (or later)
 - g. Veeam ONE 9.5 Update 4 (or later)
2. [For Veeam Availability Orchestrator Web UI] Pre-install the following components on the target machine:
 - a. .NET Framework 4.6 (or later)
 - b. Internet Information Services, with the following features enabled:
 - ASP.NET 4.5 Component
 - Default Document Component
 - ISAPI Extensions Component
 - ISAPI Filters Component
 - .NET Extensibility 4.5 Component
 - Request Filtering Component
 - Static Content Component
 - HTTP Errors Component
 - HTTP Redirection Component
 - Windows Authentication Component

3. Download the product installation `VAO_3.0.iso` file from the [Veeam downloads page](#). You can burn the downloaded image file to a CD/DVD or mount the installation image to the target machine using disk image emulation software.
4. Browse the .ISO contents — the files that you will need for installation will be located in the following folders:
 - o `<installation media>\Server\VAO.Server.x64.msi` — the installation package for installing the Veeam Availability Orchestrator Server Service
 - o `<installation media>\WebUI\VAO.WebUI.x64.msi` — the installation package for installing Veeam Availability Orchestrator Web UI
5. Log on to the target machine under the account that has the local Administrator permissions on the machine. For more information, see [Required Permissions](#).
6. Obtain a license file. The license file is required for VAO installation. You will not be able to perform installation without providing a license.

Veeam Availability Orchestrator Server Service

Open the command prompt and run the setup file `VAO.Server.x64.msi` using the following parameters:

```
msiexec.exe [/L*v "<path_to_log>"] /qn /I "<path_to_msi>" VAO_LICENSE_FILE="<path_to_license_file>" VAA_SERVICEACCOUNT="<VAO_Service_account>" VAA_SERVICEPASSWORD="<VAO_Service_password>" VAA_VO_SQL_DATABASE="<Veeam ONE_DB_name>" [INSTALLDIR="<path_to_installdir>"] [VAA_PORT="<VAO_Service_port>"] [VAO_SERVER_MANAGEMENT_PORT="VAO_WCF_port"] [VAA_SQL_SERVER="<SQL_Server>"] [VAA_SQL_DATABASE="<DB_name>"] [VAA_SQL_AUTHENTICATION="0/1"] [VAA_SQL_USER="<SQL_account>"] [VAA_SQL_PASSWORD="<SQL_password>"]
```

The following command-line options are used to run the setup file:

| Option | Parameter | Required | Description |
|-------------------|------------|----------|---|
| /L | *v logfile | No | <p>Creates an installation log file with the verbose output.</p> <p>Specify a full path to the log file as the parameter value. Any setup log file created during the previous installation will be deleted.</p> <p>Example: <code>/L*v "C:\ProgramData\Veeam\Setup\Temp\Logs\VAO_Server.txt"</code></p> |
| /q | n | Yes | <p>Sets the user interface level to <i>None</i>, which means no user interaction is needed during installation.</p> |
| /I | setup file | Yes | <p>Installs the Veeam Availability Orchestrator Server Service component.</p> <p>Specify a full path to the setup file as the parameter value.</p> <p>Example: <code>/I "C:\Veeam\VAO.Server.x64.msi"</code></p> |
| INSTALLDIR | path | No | <p>Installs the component to the specified location. By default, VAO uses a subfolder in the <code>C:\Program Files\Veeam\Availability Orchestrator\</code> folder.</p> <p>Example: <code>INSTALLDIR="C:\Veeam\"</code></p> |

| Option | Parameter | Required | Description |
|----------------------------|---------------------|----------|---|
| VAO_LICENSE_FILE | path | Yes | <p>Specifies a full path to the license file. You will not be able to perform installation without providing a license.</p> <p>Example: VAO_LICENSE_FILE="C:\Users\Administrator\Downloads\vao_nfr.lic"</p> |
| VAA_SERVICEACCOUNT | user | Yes | <p>Specifies an account under which the Veeam Availability Orchestrator Server Service will run. For more information on the required account permissions, see Planning and Preparation.</p> <p>Along with this parameter, you must define the VAA_SERVICEPASSWORD parameter.</p> <p>Example: VAA_SERVICEACCOUNT="srv\Administrator"</p> |
| VAA_SERVICEPASSWORD | password | Yes | <p>[Applies only if you have defined the VAA_SERVICEACCOUNT parameter]</p> <p>Specifies a password for the account under which the Veeam Availability Orchestrator Server Service will run.</p> <p>Example: VAA_SERVICEPASSWORD="1234"</p> |
| VAA_PORT | port | No | <p>Specifies a TCP port that will be used by the Veeam Availability Orchestrator Server Service. By default, 8888.</p> <p>Example: VAA_PORT="8884"</p> |
| VAA_SQL_SERVER | SQL Server\instance | No | <p>Specifies a Microsoft SQL Server instance where the VAO configuration database will be deployed. By default, (local)\VEEAMSQL2012.</p> <p>Example: VAA_SQL_SERVER="VAOSERVER\VEEAMSQL2012_MY"</p> |
| VAA_SQL_DATABASE | database | No | <p>Specifies a name of the VAO configuration database to be deployed. By default, VAO.</p> <p>Example: VAA_SQL_DATABASE="OrchestratorDB"</p> |

| Option | Parameter | Required | Description |
|-------------------------------|-----------|----------|--|
| VAA_VO_SQL_DATABASE | database | Yes | <p>Unattended mode installation prerequisites demand that Veeam ONE Server must be already deployed on the machine where you install VAO.</p> <p>The VAA_VO_SQL_DATABASE parameter specifies a name of the Veeam ONE configuration database.</p> <p>Example: VAA_VO_SQL_DATABASE="VeeamOne"</p> |
| VAA_SQL_AUTHENTICATION | 0/1 | No | <p>Specifies if you want to use the SQL Server authentication mode to connect to the Microsoft SQL Server where the VAO configuration database is deployed.</p> <p>To use the SQL Server authentication mode, set the parameter value to 1. If you do not define this parameter, VAO will connect to the Microsoft SQL Server in the Microsoft Windows authentication mode (default value, 0).</p> <p>Along with this parameter, you must define the following parameters: VAA_SQL_USER and VAA_SQL_PASSWORD.</p> <p>Example: VAA_SQL_AUTHENTICATION="1"</p> |
| VAA_SQL_USER | user | No | <p>[Applies only if you have defined the VAA_SQL_AUTHENTICATION parameter]</p> <p>Specifies a LoginID to connect to the Microsoft SQL Server in the SQL Server authentication mode.</p> <p>Example: VAA_SQL_USER="sa"</p> |
| VAA_SQL_PASSWORD | password | No | <p>[Applies only if you have defined the VAA_SQL_AUTHENTICATION parameter].</p> <p>Specifies a password to connect to the Microsoft SQL Server in the SQL Server authentication mode.</p> <p>Example: VAA_SQL_PASSWORD="1234"</p> |

| Option | Parameter | Required | Description |
|-----------------------------------|-----------|----------|--|
| VAO_SERVER_MANAGEMENT_PORT | port | No | <p>Specifies a WCF port that will be used by the Veeam Availability Orchestrator Server Service. By default, 12348.</p> <p>Example: VAO_SERVER_MANAGEMENT_PORT="12247"</p> |

Veeam Availability Orchestrator Web UI

Open the command prompt and run the setup file `VAO.WebUI.x64.msi` using the command of the following format:

```
msiexec.exe [/L*v "<path_to_log>"] /qn /I "<path_to_msi>" VAO_SERVER_NAME="<VAO_server_address>" [INSTALLDIR="<path_to_installdir>"] [VAO_SERVER_PORT="<VAO_port>"] [VAA_IIS_SITE_PORT="<website_port>"] [VAO_THUMBPRINT="<SSL_certificate_thumbprint>"]
```

The following command-line options are used to run the setup file:

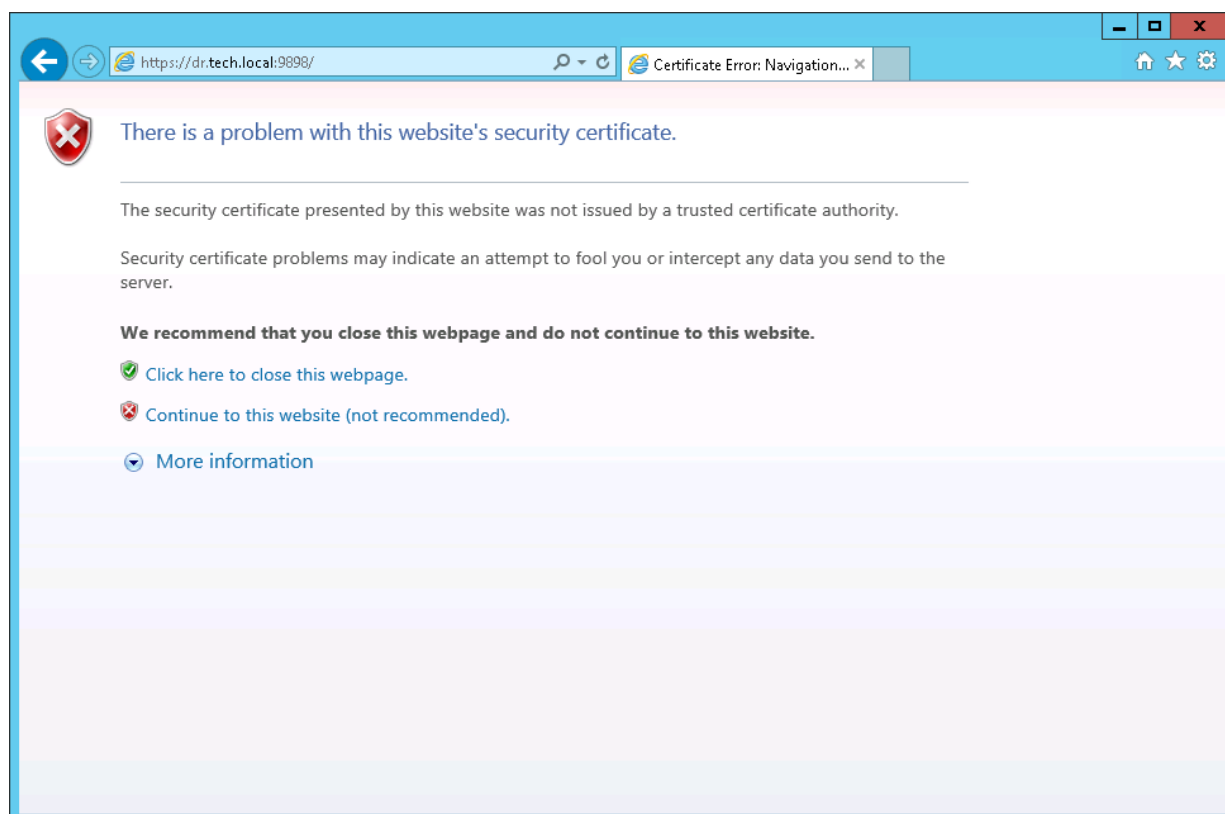
| Option | Parameter | Required | Description |
|-----------|------------|----------|--|
| /L | *v logfile | No | <p>Creates an installation log file with the verbose output.</p> <p>Specify a full path to the log file as the parameter value. Any setup log file created during the previous installation will be deleted.</p> <p>Example: /L*v "C:\ProgramData\Veeam\Setup\Temp\Logs\VAO_WebUI.txt"</p> |
| /q | n | Yes | <p>Sets user interface level to <i>None</i>, which means no user interaction is needed during installation.</p> |
| /I | setup file | Yes | <p>Installs the Veeam Availability Orchestrator Web UI component.</p> <p>Specify a full path to the setup file as the parameter value.</p> <p>Example: /I "C:\Veeam\VAO.WebUI.x64.msi"</p> |

| Option | Parameter | Required | Description |
|--------------------------|------------------------|----------|---|
| INSTALLDIR | path | No | <p>Installs the component to the specified location. By default, VAO uses a subfolder in the C:\Program Files\Veeam\Availability Orchestrator\ folder.</p> <p>Example: <code>INSTALLDIR="C:\Veeam\"</code></p> |
| VAO_SERVER_NAME | server name or address | Yes | <p>Specifies an IP address or FQDN of the server where the Veeam Availability Orchestrator Server Service is installed.</p> <p>Example: <code>VAO_SERVER_NAME="servername.domain.local"</code></p> |
| VAO_SERVER_PORT | port | No | <p>Specifies a WCF port that was defined to connect to the Veeam Availability Orchestrator Server Service. By default, 12348.</p> <p>Example: <code>VAO_SERVER_PORT="12247"</code></p> |
| VAA_IIS_SITE_PORT | port | No | <p>Specifies an IIS port that will be used to connect to the VAO UI website from a web browser. By default, 9898.</p> <p>Example: <code>VAA_IIS_SITE_PORT="9998"</code></p> |
| VAO_THUMBPRINT | hash | No | <p>Provides a thumbprint of an SSL certificate that will be used to secure traffic between the VAO UI and a web browser.</p> <p>Example: <code>VAO_THUMBPRINT="a909502dd82ae41433e6f83886b00d4277a32a7b"</code></p> |

Configuring Trusted Connection

The VAO UI uses SSL to ensure secure data communication between VAO and a web browser.

When you install VAO, you can generate or choose a self-signed certificate. In this case, when you try to access the VAO UI in a web browser, the browser will display a warning notifying that the connection is untrusted (although it is secured with SSL).



To eliminate the warning, import the self-signed certificate to client machines (the machines from which you plan to access the VAO UI website). To learn how to import SSL certificates, see [this Microsoft KB article](#).

If you want to use the certificate generated during [VAO installation](#), perform the following steps:

1. Log in to the machine where VAO is installed.
2. Open the Microsoft Management Console snap-in.
 - a. Navigate to **Certificates > Trusted Root Certification Authorities > Certificates**.
 - b. Export the *Veeam Self-Signed Certificate* following the instructions provided in [this Microsoft KB article](#).
3. Import the *Veeam Self-Signed Certificate* to client machines.

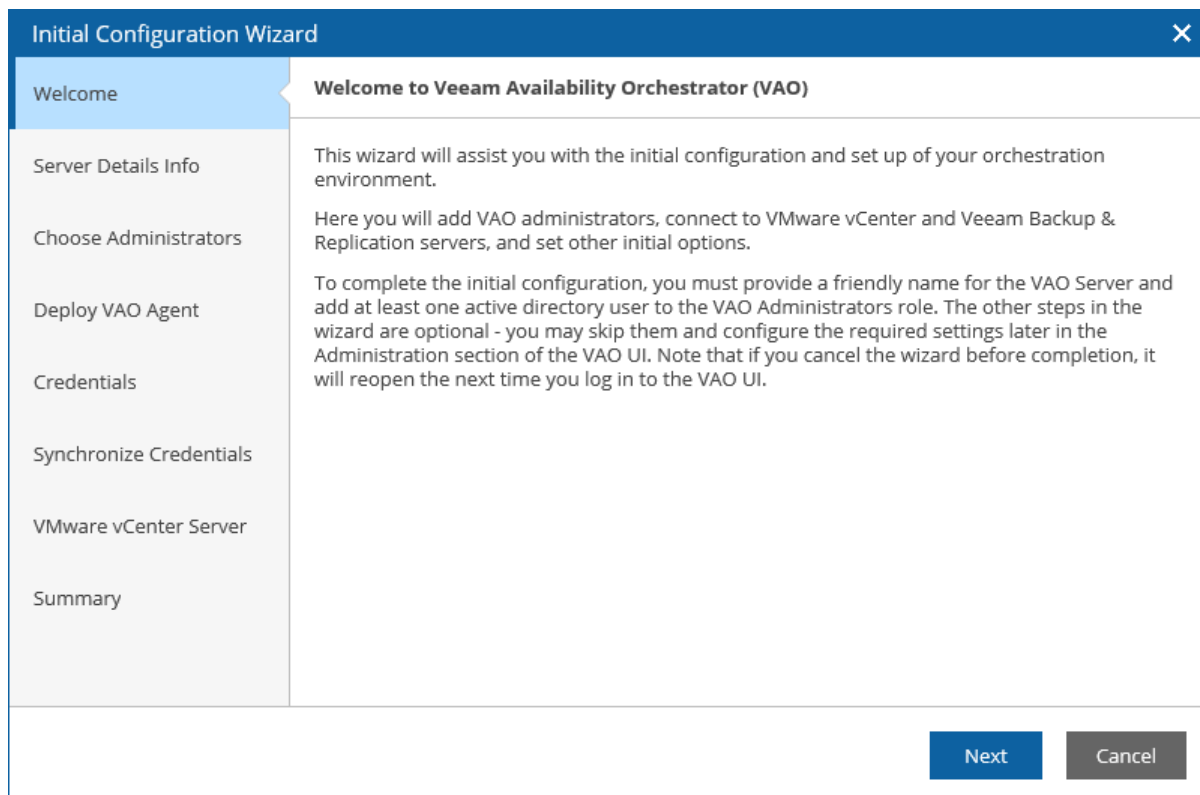
After You Install

To start working with the VAO UI, you must perform the initial configuration of the VAO server.

Step 1. Launch Initial Configuration Wizard

Log in to the VAO UI as the local Administrator who performed VAO installation. For more information, see [Accessing VAO UI](#).

At the **Welcome** step of the **Initial Configuration Wizard**, click **Next**.



Step 2. Enter Server Details

At the **Server Details Info** step of the wizard, type an arbitrary name for the VAO server and a short description. You can also provide a contact name, email and telephone number of a person responsible for monitoring VAO performance.

Initial Configuration Wizard

Welcome

Server Details Info

Choose Administrators

Deploy VAO Agent

Credentials

Synchronize Credentials

VMware vCenter Server

Summary

Provide details for the VAO Server

This information will be shown in all VAO reports.

Name:

Columbus

Description:

Server to orchestrate recovery

Contact Name:

John Smith

Contact Email:

john.smith@veeam.com

Contact Tel:

18002223344

Previous

Next

Cancel

Step 3. Specify Administrator Account Credentials

At the **Choose Administrators** step of the wizard, add users that will be assigned the *VAO Administrator* role for the server.

If you want to assign the *VAO Administrator* role to the local Administrator who performed VAO installation, click **Add Current User**.

To add another user, click **Add**. In the **Choose Account** window:

1. From the **Account Type** list, select *User*.
2. In the **Domain** and **Account** fields, enter the user name and a domain to which the user belongs, and click **Find**.

For more information on the required account permissions, see [Required Permissions](#).

3. Select the user and click **Add**.

Repeat the procedure for each user that must become a VAO Administrator and click **Next**.

The screenshot shows the 'Choose Account' dialog box. The title bar is blue with a close button. The main area has a white background. At the top, it says 'Choose users and user groups that will be Administrators of the VAO Server.' Below this is a search bar. There are three input fields: 'Account Type' (set to 'User'), 'Domain' (set to 'tech'), and 'Account' (set to 'john.smith'). To the right of the 'Account' field is a 'Find' button with a magnifying glass icon. Below the input fields is a table with two columns: 'Account' and 'Description'. The table has one row with the text 'John Smith (TECH\john.smith)'. At the bottom of the dialog box are two buttons: 'Add' (blue) and 'Cancel' (gray). On the left side of the image, a portion of the wizard's navigation pane is visible, showing steps like 'Welcome', 'Server Details', 'Choose Administrator', 'Deploy VAO Agent', 'Credentials', 'Synchronize Configuration', 'VMware vCenter', and 'Summary'. The 'Choose Administrator' step is currently selected.

| Account | Description |
|------------------------------|-------------|
| John Smith (TECH\john.smith) | |

Step 4. Connect Veeam Backup & Replication Server

Since the embedded Veeam Backup & Replication server is automatically registered in the VAO UI during installation, you will not need to connect it manually.

If you want to connect a standalone Veeam Backup & Replication server, proceed with the **Deploy VAO Agent** step, or skip it and follow the instructions provided in the Veeam Availability Orchestrator Operations Guide, section [Connecting Veeam Backup & Replication Servers](#).

At the **Deploy VAO Agent** step of the wizard, in the **Server** field, enter a DNS name or an IP address of the server that you want to register. Use the **Type** option to specify whether the server is a Veeam Backup & Replication server or Veeam Backup Enterprise Manager server.

Initial Configuration Wizard

Welcome

Server Details Info

Choose Administrators

Deploy VAO Agent

Credentials

Synchronize Credentials

VMware vCenter Server

Summary

Choose a Veeam Backup & Replication server

The VAO Agent is used for communication with Veeam Backup & Replication servers. You may connect to multiple Veeam backup servers by specifying a Veeam Enterprise Manager server.

Server: 172.17.53.111

Type:

Veeam Backup & Replication server

Veeam Enterprise Manager server

Previous

Skip

Next

Cancel

Step 5. Specify Access Credentials

[This step applies only if you have not skipped the **Deploy VAO Agent** step]

At the **Remote Access Credentials** step of the wizard, in the **User name** and **Password** fields, specify credentials of a user account for connecting to the Veeam Backup & Replication server. The provided credentials will be also used to run the VAO agent on the server.

The user name must be specified in the *DOMAIN\USERNAME* format. For more information on the required account permissions, see [Required Permissions](#).

Initial Configuration Wizard

Welcome

Server Details Info

Choose Administrators

Deploy VAO Agent

Credentials

Synchronize Credentials

VMware vCenter Server

Summary

Remote Access and Service Credentials

Enter credentials of an account that will be used to remotely access the Veeam Backup & Replication or Enterprise Manager server, to install and run the VAO Agent service on the server, and to perform the ongoing communications with the server.

User name:

tech\wendy.may

Password:

••••••••

This account requires administrative access to the Veeam server.

Previous

Next

Cancel

Step 6. Enable Credential Synchronization

[This step applies only if you have not skipped the **Deploy VAO Agent** step]

At the **Synchronize Credentials** step of the wizard, choose whether you want to retrieve credentials from the connected Veeam Backup & Replication server.

You will be able to use these credentials later when configuring orchestration plan steps. For more information, see the Veeam Availability Orchestrator Operations Guide, section [Configuring Plan Steps](#).

Initial Configuration Wizard

Welcome

Server Details Info

Choose Administrators

Deploy VAO Agent

Credentials

Synchronize Credentials

VMware vCenter Server

Summary

Choose whether you want to retrieve all managed credentials from the Veeam Backup & Replication server

☒ Retrieve managed credentials

i

This option will retrieve all managed credentials from the Veeam Backup & Replication server and allow these credentials to be used in Orchestration Plans (for example, to run application verification steps). VAO will regularly update the list of retrieved credentials to keep them in the up-to-date state.

Previous

Next

Cancel

Step 7. Connect VMware vSphere Server

At the **VMware vCenter Server** step of the wizard:

1. Enter a DNS name or an IP address of the vCenter Server that you want to connect to.
2. Specify credentials of a user account for connecting to the server.

You will be able to register other VMware servers later. For more information, see the Veeam Availability Orchestrator Operations Guide, section [Connecting VMware vSphere Servers](#).

The screenshot shows the 'Initial Configuration Wizard' window. The left sidebar contains a list of steps: Welcome, Server Details Info, Choose Administrators, Deploy VAO Agent, Credentials, Synchronize Credentials, VMware vCenter Server (highlighted), and Summary. The main area is titled 'Connect to VMware vCenter Server'. It contains two sections: 'Enter DNS name or IP address of the VMware vCenter Server:' with fields for 'Server' (172.17.52.34) and 'Port' (443), and 'Type credentials to access the VMware vCenter Server:' with fields for 'User name' (tech\wendy.may) and 'Password' (masked with dots). At the bottom right, there are four buttons: 'Previous', 'Skip', 'Next' (highlighted in blue), and 'Cancel'.

Step 8. Review Configuration Summary

At the **Summary** step of the wizard, review configuration information and click **Finish**.

Accessing VAO UI

To access the VAO UI, perform the following steps:

1. In a web browser, navigate to the VAO UI web address.

The address consists of a FQDN of the VAO server and the website port specified during installation (by default, **9898**). Note that the VAO UI is available over HTTPS.

`https://<hostname>:<port>`

2. If you log in for the first time, in the **Username** and **Password** fields, specify credentials of the local Administrator who performed VAO installation.

To authenticate using the credentials provided when logging into the system, select the **Log in as current user** check box.

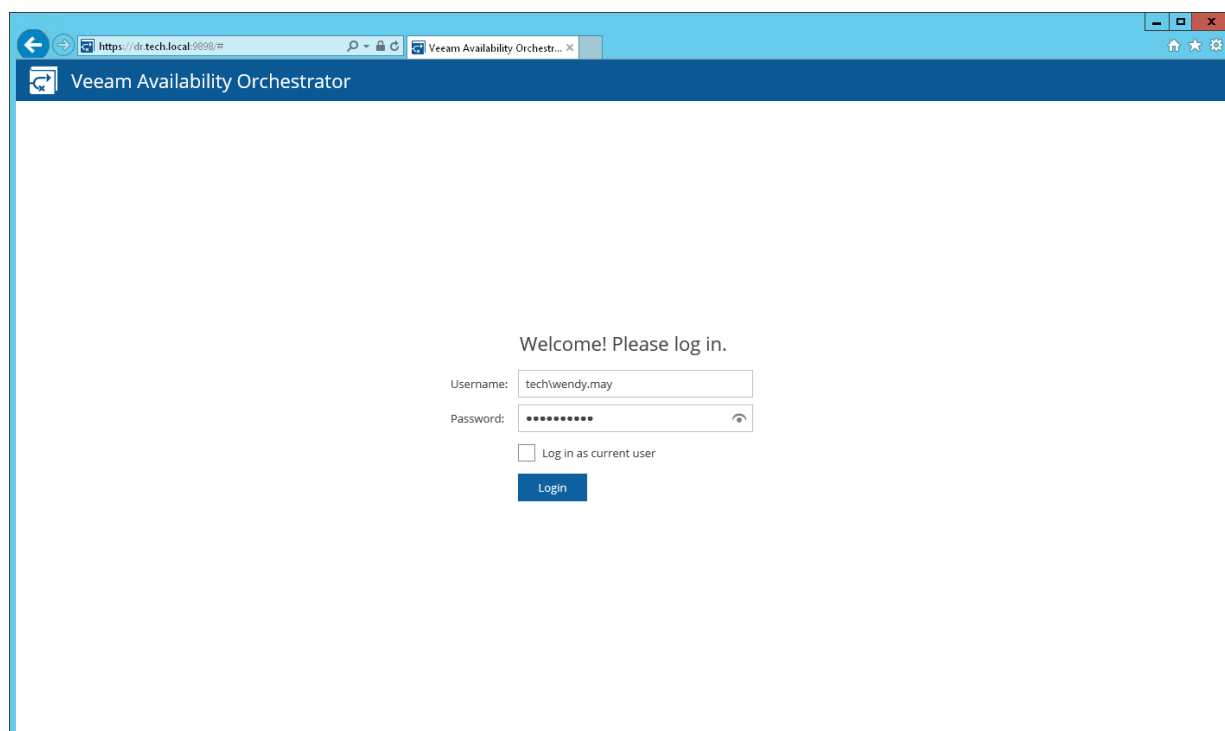
TIP

To be able to log in as the current user, you must first do the following:

1. Complete the Initial Configuration Wizard as described in section [After You Install](#).
2. Enable this option in your browser. In Internet Explorer, go to **Tools > Internet options > Security**. Click **Custom level**, scroll down to the **User Authentication** options and select the **Automatic logon with current user name and password** option.

In future, you can configure users and roles to grant access to the VAO UI. For more information, see [Managing User Roles and Permissions](#).

3. Click **Login**.



Adding VAO UI to Trusted Sites

If you have issues accessing the VAO UI, check your browser settings to ensure that the VAO UI site is included in the **Trusted Sites** list.

In Internet Explorer, go to **Tools > Internet options > Security > Trusted sites**. Click **Sites** and add the VAO UI web address to the list.

Logging Out

To log out of the VAO UI, at the top right corner of the Veeam Availability Orchestrator window, click the user name and then click **Logout**.

Upgrading Veeam Availability Orchestrator

Upgrade to VAO version 3.0 is supported from VAO version 2.0 only. Upgrade from VAO version 1.0 is not supported. To learn how to manually migrate VAO 1.0 deployment to version 2.0, see [this Veeam KB article](#).

Upgrade Checklist

Check the following prerequisites before upgrading VAO:

1. Perform backup of all existing databases that are used to store data collected from VAO, Veeam Backup & Replication and Veeam ONE, so that you can easily go back to the previous version in case of upgrade issues.
2. Make sure there is enough space for upgrade of the Microsoft SQL Server configuration database. To calculate the required space, add at least 25% of free space to the size of the Microsoft SQL Server configuration database.

By default, the setup wizard installs VAO with Microsoft SQL Server Express. Mind that the maximum configuration database size for Microsoft SQL Server Express is 10 GB.

3. Make sure there are no orchestration plans being tested or executed (that is, no plans are in the *IN USE* mode, *HALTED* state or any of the active states).

For the list of modes and states that a replica plan can acquire, see [Running and Scheduling Replica Plans](#). For the list of modes and states that a restore plan can acquire, see [Running and Scheduling Restore Plans](#). For the list of modes and states that a storage plan can acquire, see [Running and Scheduling Storage Plans](#).

4. Make sure there are no orchestration plans scheduled to run during upgrade. Otherwise, disable the configured schedule as described in section [Scheduling Failover](#), [Scheduling Restore](#) or [Scheduling Storage Failover](#).

Performing Upgrade

To upgrade from VAO 2.0 to VAO 3.0, perform the following steps:

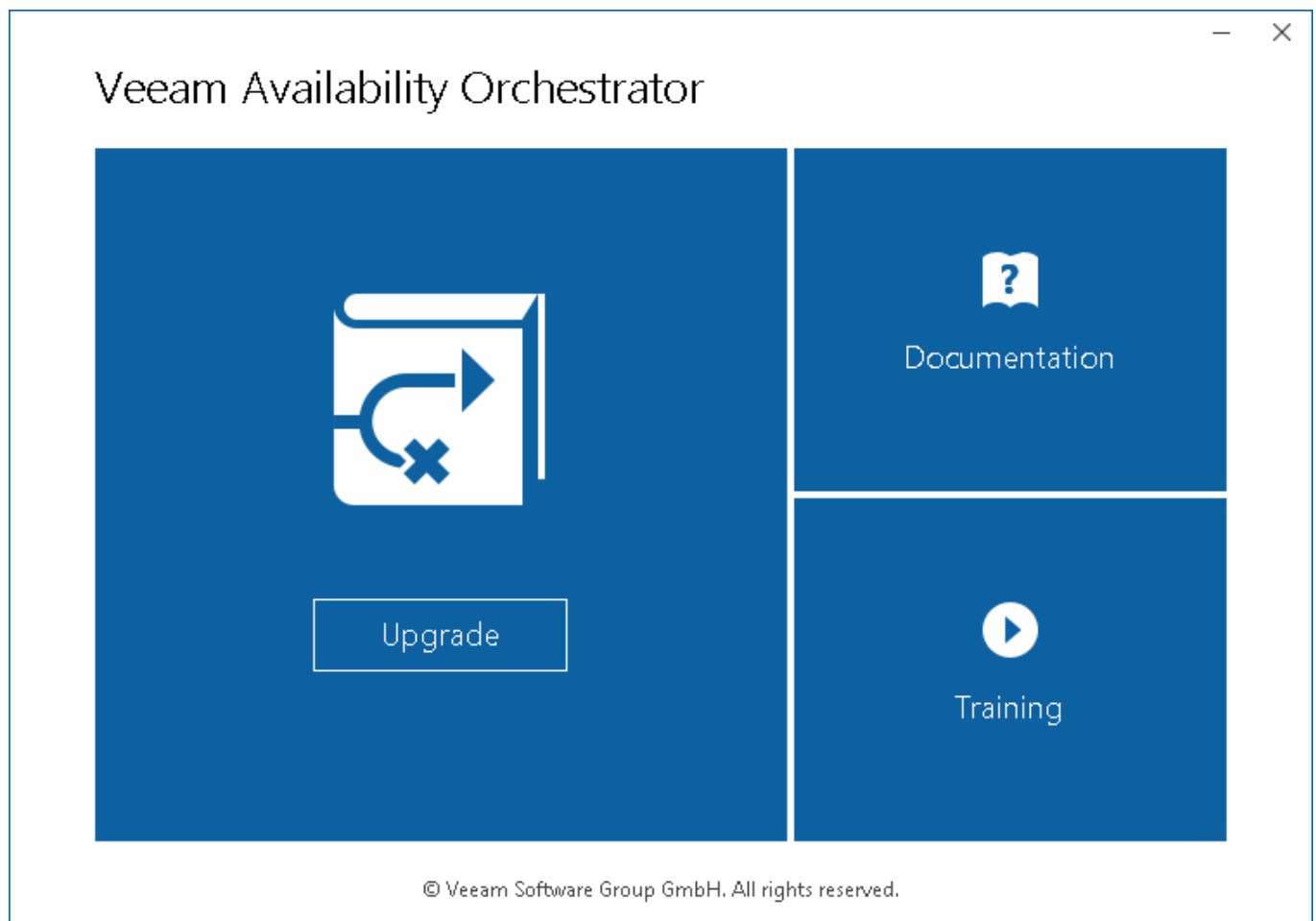
1. Make sure the machine where VAO will be installed meets the prerequisite conditions described in section [System Requirements](#).
2. Download the latest version of the product installation image from the [Veeam downloads page](#). You can burn the downloaded image file to a CD/DVD or mount the installation image to the target machine using disk image emulation software.
3. [Start the setup wizard](#).
4. [Accept the license agreement](#).
5. [Review components to upgrade](#).
6. [Provide a license file](#).
7. [Specify service account credentials](#).
8. [Review SQL server connection settings](#).
9. [Begin upgrade](#).
10. [Upgrade standalone Veeam Backup & Replication servers to version 10](#).
11. [Optional] [Upgrade additional Veeam ONE Monitor Client instances to version 10](#).

12. [Optional] [Upgrade the VAO UI if installed remotely.](#)

Step 1. Launch Splash Window and Start Setup Wizard

To start the setup wizard, perform the following steps:

1. Log in to the machine where the Veeam Availability Orchestrator Server Service component is installed. Use an account with the local Administrator rights.
2. Make sure that all active VAO UI sessions are closed.
3. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open a splash screen with VAO installation options.
4. Click **Upgrade** to launch the **Veeam Availability Orchestrator Setup** wizard.



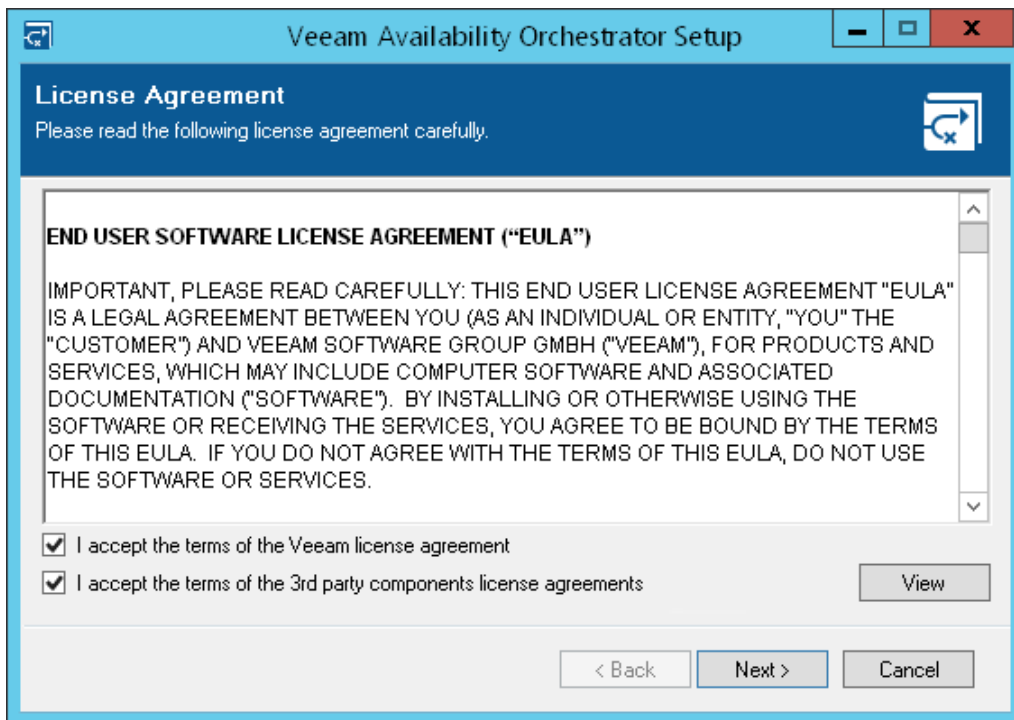
NOTE

Before proceeding with installation, the installer will check whether you have Microsoft .NET Framework 4.7.2 installed on the machine. In case the required version is missing, the installer will offer to install it automatically. To do that, click **OK**.

Installation will require performing a reboot. Click **Reboot** in the warning message to acknowledge the reboot.

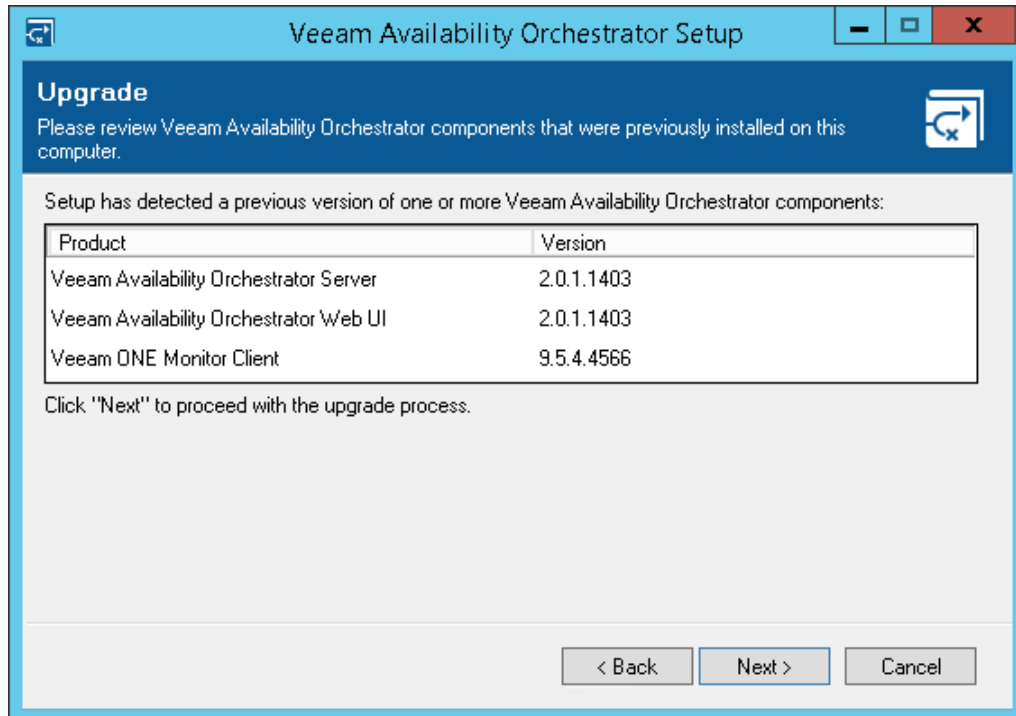
Step 2. Accept License Agreement

At the **License Agreement** step of the wizard, read and accept both the Veeam license agreement and the 3rd party components license agreement. If you reject the agreements, you will not be able to continue installation.



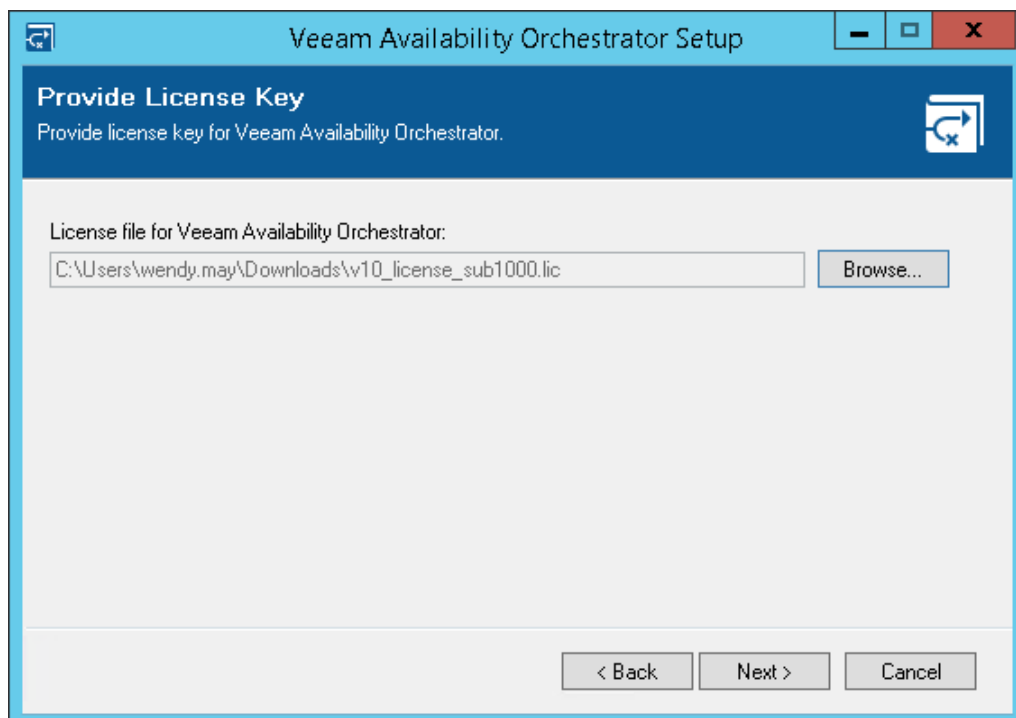
Step 3. Review Components to Upgrade

The installer will automatically detect components of the previous version installed on the machine. At the **Upgrade** step of the wizard, review the components to upgrade.



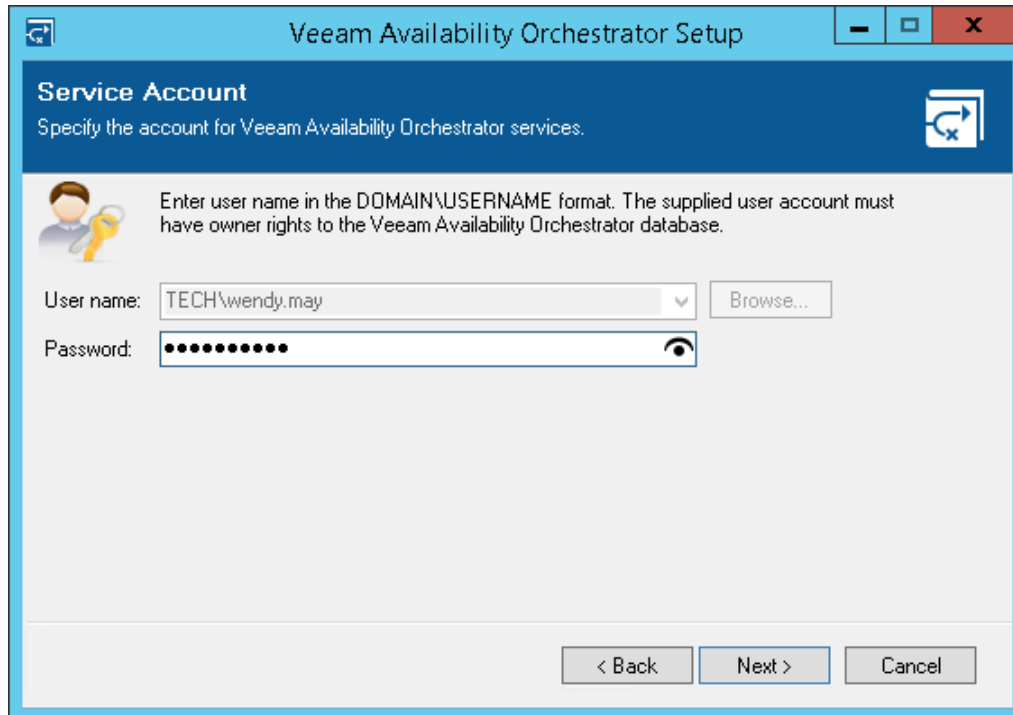
Step 4. Provide License File

At the **Provide License Key** step of the wizard, click **Browse** to locate the license file supplied to you by Veeam. You will not be able to continue installation without providing a license



Step 5. Specify Service Account Credentials

At the **Service Account** step of the wizard, enter credentials of the account under which the VAO Service will run. The account must be a member of the local *Administrators* group. The user name must be specified in the *DOMAIN\USERNAME* format.



The screenshot shows the 'Service Account' step of the 'Veeam Availability Orchestrator Setup' wizard. The window has a blue title bar with the text 'Veeam Availability Orchestrator Setup' and standard Windows window controls. Below the title bar is a dark blue header area with the text 'Service Account' and a sub-instruction: 'Specify the account for Veeam Availability Orchestrator services.' To the right of the header is a circular arrow icon. The main content area is light gray and contains a user icon, a text instruction: 'Enter user name in the DOMAIN\USERNAME format. The supplied user account must have owner rights to the Veeam Availability Orchestrator database.', and two input fields. The 'User name:' field is a text box containing 'TECH\wendy.may' with a dropdown arrow and a 'Browse...' button to its right. The 'Password:' field is a text box filled with dots and a toggle icon (an eye) to its right. At the bottom of the window are three buttons: '< Back', 'Next >', and 'Cancel'.

Veeam Availability Orchestrator Setup

Service Account
Specify the account for Veeam Availability Orchestrator services.

Enter user name in the DOMAIN\USERNAME format. The supplied user account must have owner rights to the Veeam Availability Orchestrator database.

User name: TECH\wendy.may Browse...

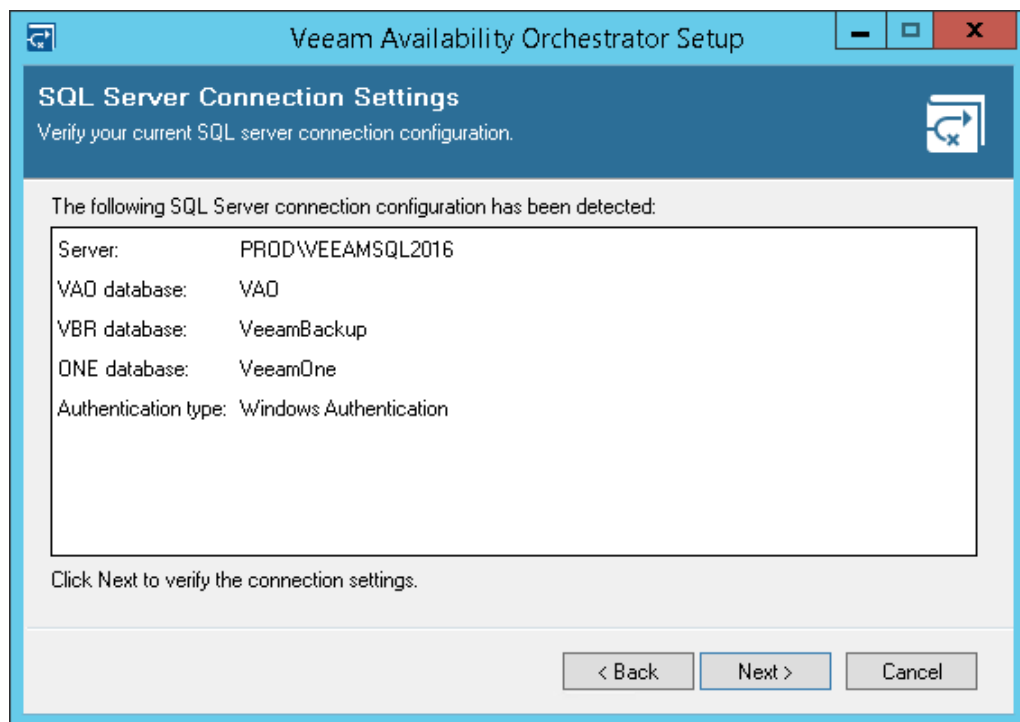
Password: [masked] [toggle icon]

< Back Next > Cancel

Step 6. Review SQL Server Connection Settings

The installer will automatically detect the Microsoft SQL Server instance (installed locally or remotely) that was previously used to host the VAO, Veeam Backup & Replication and Veeam ONE databases. The installer will also detect credentials for an account used by VAO components to access the databases.

At the **SQL Server Instance** step of the wizard, review configuration information and click **Next**.



Step 7. Review Installation Summary

At the **Ready to Install** step of the wizard, click **Install** to begin upgrade.

NOTE

When the setup wizard upgrades the VAO server, the embedded Veeam Backup & Replication server and the Veeam ONE server are automatically upgraded as well.

Step 8. Upgrade to Veeam Backup & Replication 10

It is essential that you upgrade to version 10 cumulative patch 2 every standalone Veeam Backup & Replication server connected to VAO. This version contains numerous enhancements and fixes required for the VAO integration. To perform upgrade of Veeam Backup & Replication to version 10, follow the instructions provided in the Veeam Backup & Replication User Guide, section [Upgrading to Veeam Backup & Replication 10](#), and in [this Veeam KB article](#).

After the upgrade process completes, do the following:

1. Open the Veeam Backup & Replication console on each standalone Veeam Backup & Replication server to update configured virtual labs. To perform the update, follow the steps of the **Edit Virtual Lab** wizard.

For more information on editing Veeam Backup & Replication virtual labs, see the Veeam Backup & Replication User Guide, section [Editing and Deleting Virtual Labs](#).

2. Open the Veeam Backup & Replication console on each standalone Veeam Backup & Replication server to update Veeam Backup & Replication components installed on all managed servers. To perform the update, follow the steps of the **Components Update** wizard.

For more information on updating server components, see the Veeam Backup & Replication User Guide, section [Server Components Upgrade](#).

3. Open the VAO UI and make sure all VAO agents running on standalone Veeam Backup & Replication servers have also been upgraded successfully.

To do that, switch to the **Administration** tab, navigate to **VAO Agents** and check the status of each connected Veeam Backup & Replication server. If you encounter a connection issue with a VAO agent, repair the agent as described in section [Repairing VAO Agents](#).

Step 9. Upgrade to Veeam ONE 10

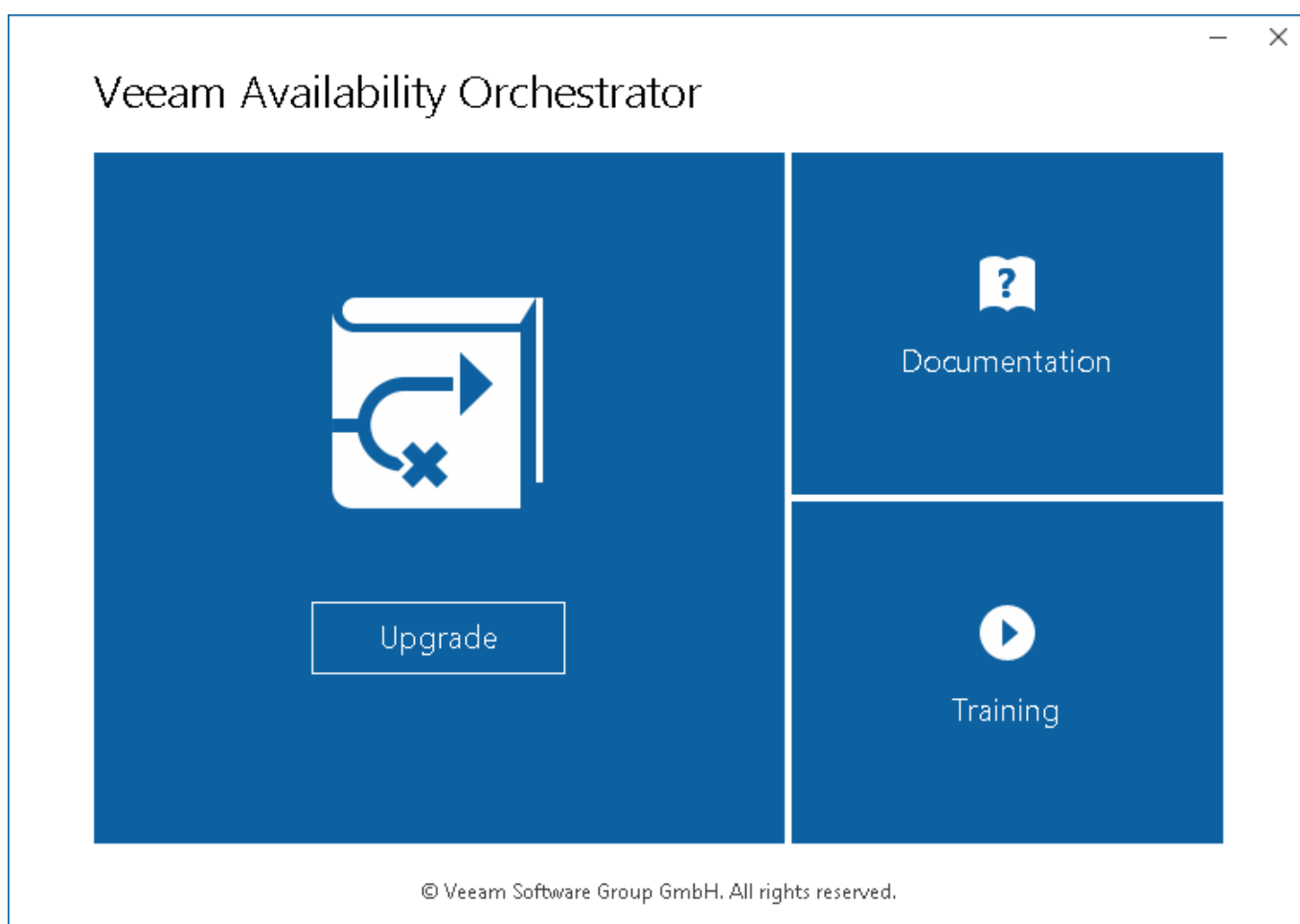
It is essential that you upgrade to version 10 every additional instance of Veeam ONE Monitor Client used to access the Veeam ONE functionality remotely. This version contains numerous enhancements and fixes required for the VAO integration. To perform upgrade of Veeam ONE Monitor Client to version 10, follow the instructions provided in the Veeam ONE Deployment Guide, section [Upgrading Veeam ONE Monitor Client](#).

Step 10. Upgrade VAO UI

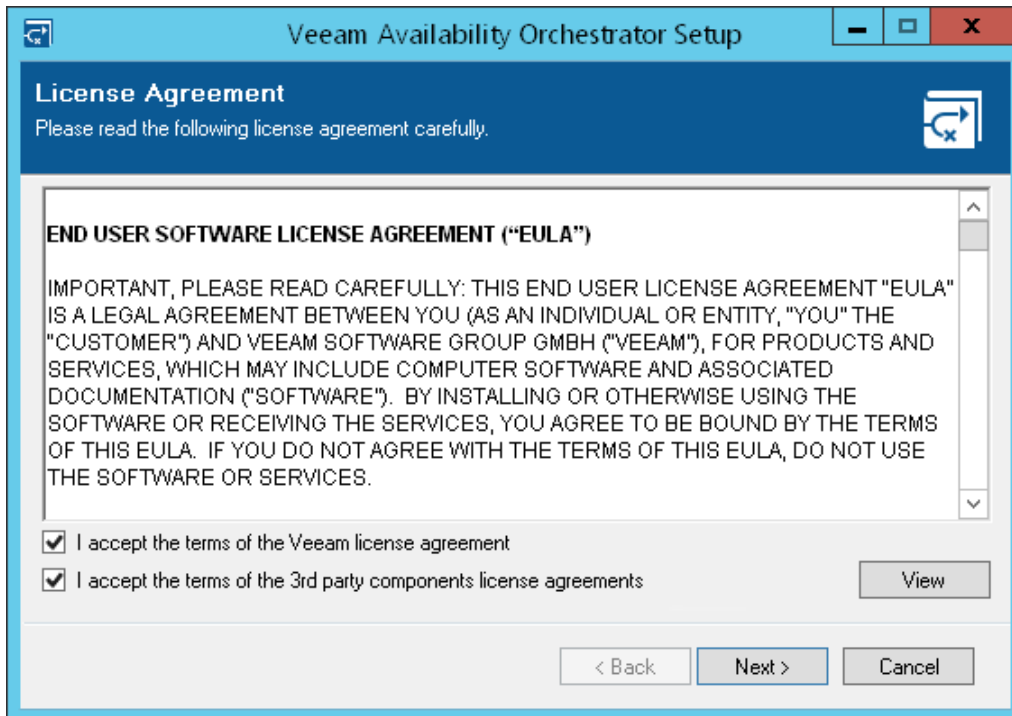
In case of distributed product installation, upgrade the VAO UI installed remotely after you upgrade the VAO server.

To upgrade the VAO UI, perform the following steps:

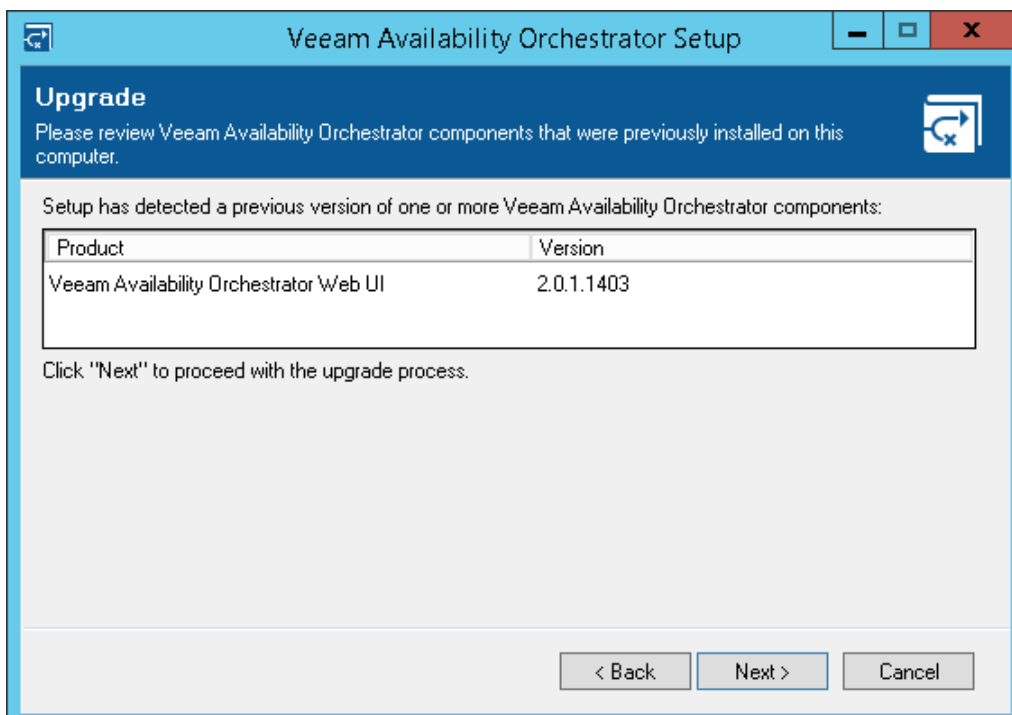
1. Log in to the machine where the VAO UI component is installed. Use an account with the local Administrator rights.
2. Make sure that all active VAO UI sessions are closed.
3. Insert the installation disc into the CD/DVD drive or mount the installation image. The setup will open a splash screen with VAO installation options.
4. Click **Upgrade** to launch the **Veeam Availability Orchestrator Setup** wizard.



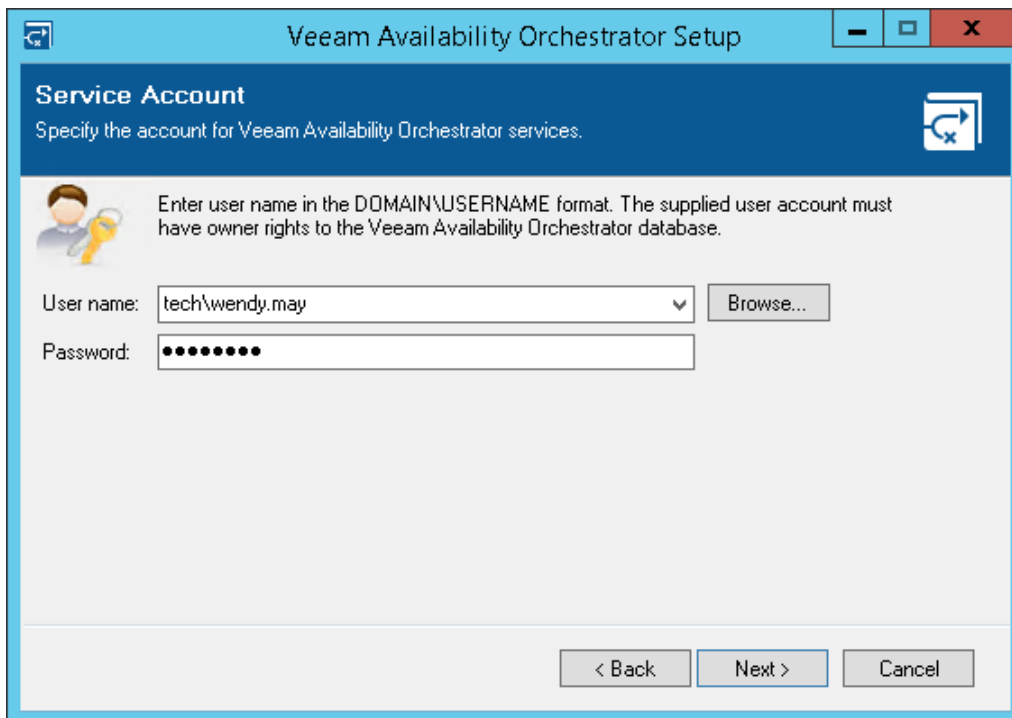
- At the **License Agreement** step of the wizard, read and accept both the Veeam license agreement and the 3rd party components license agreement. If you reject the agreements, you will not be able to continue installation.



- The installer will automatically detect the VAO UI component of the previous version installed on the machine. At the **Upgrade** step of the wizard, review the component to upgrade.



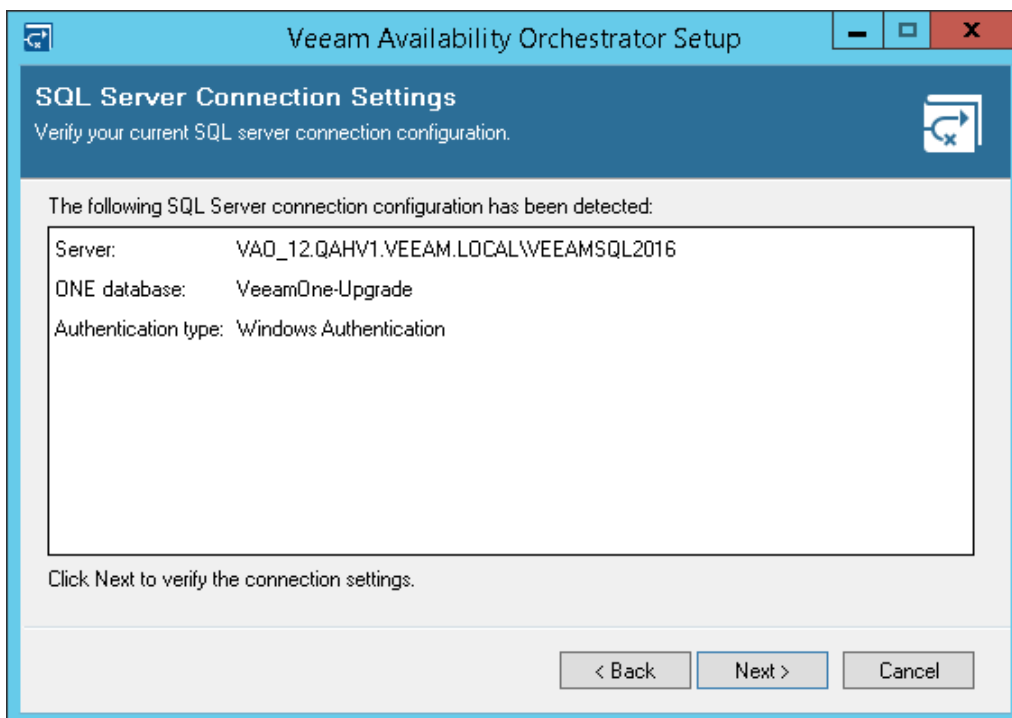
- At the **Service Account** step of the wizard, enter credentials of the account under which the VAO Service will run. The account must be a member of the local *Administrators* group. The user name must be specified in the *DOMAIN\USERNAME* format.



The screenshot shows the 'Service Account' step of the Veeam Availability Orchestrator Setup wizard. The window title is 'Veeam Availability Orchestrator Setup'. The subtitle is 'Specify the account for Veeam Availability Orchestrator services.' Below this, there is a text box with a key icon and the instruction: 'Enter user name in the DOMAIN\USERNAME format. The supplied user account must have owner rights to the Veeam Availability Orchestrator database.' The 'User name:' field contains 'tech\wendy.may' and has a 'Browse...' button next to it. The 'Password:' field is masked with dots. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

- The installer will automatically detect the Microsoft SQL Server instance that was previously used to host the Veeam ONE database. The installer will also detect credentials for an account used by the VAO UI component to access the database.

At the **SQL Server Instance** step of the wizard, review configuration information and click **Next**.



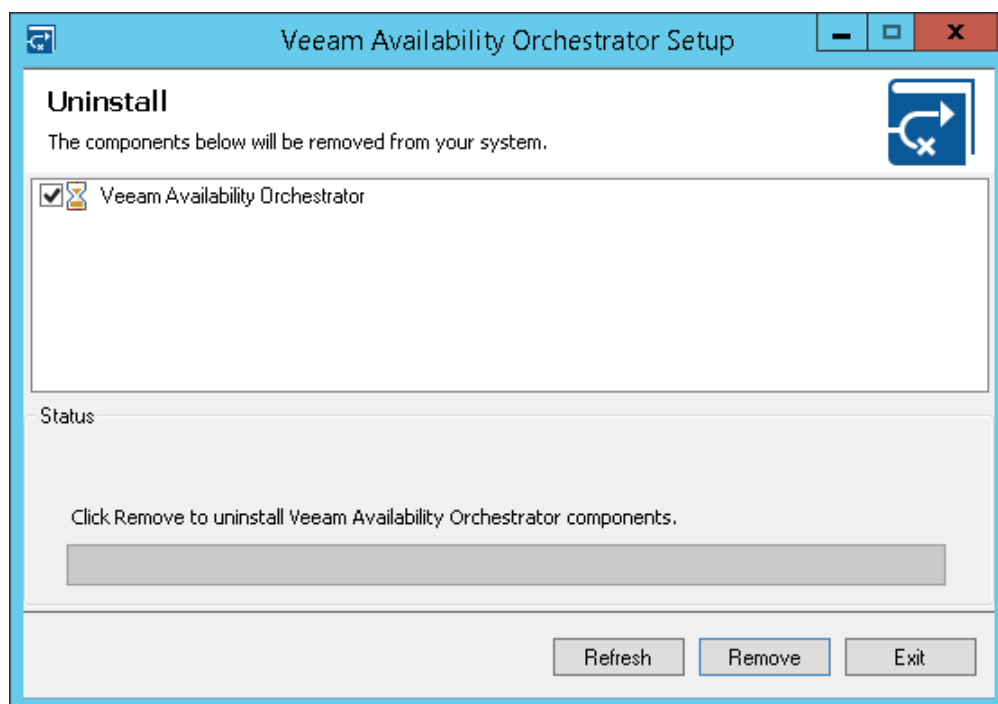
The screenshot shows the 'SQL Server Connection Settings' step of the Veeam Availability Orchestrator Setup wizard. The window title is 'Veeam Availability Orchestrator Setup'. The subtitle is 'Verify your current SQL server connection configuration.' Below this, there is a text box with the instruction: 'The following SQL Server connection configuration has been detected:'. The text box contains the following information: 'Server: VAO_12.QAHV1.VEEAM.LOCAL\VEEAMSQL2016', 'ONE database: VeeamOne-Upgrade', and 'Authentication type: Windows Authentication'. Below the text box, there is a note: 'Click Next to verify the connection settings.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

- At the **Ready to Install** step of the wizard, click **Install** to begin upgrade.

Uninstalling Veeam Availability Orchestrator

To uninstall VAO components, perform the following steps:

1. Log in as a local Administrator to the machine where VAO is installed.
2. From the **Start** menu, select **Control Panel > Programs and Features**.
3. Select **Veeam Availability Orchestrator**, click **Uninstall** and then click **Remove**.



Appendix. Reinstalling VAO Using Existing Databases

In some cases, you may need to migrate the VAO server to another machine or reinstall it using existing databases. To do that, follow the instructions provided in this section.

Step 1. Back Up Existing Databases

Before you reinstall VAO, you must create backups of databases used to store data collected from VAO, Veeam Backup & Replication and Veeam ONE, which were previously installed with the VAO server.

Step 2. Restore Backed Up Databases

Restore the backed up VAO, Veeam Backup & Replication and Veeam ONE databases to a new local or remote Microsoft SQL Server instance.

IMPORTANT

It is required that the restored databases are located on the same Microsoft SQL Server instance and have the same names as the previously installed databases.

Step 3. Install Veeam Availability Orchestrator

Run the VAO setup wizard and follow the instructions provided in section [Deploying Veeam Availability Orchestrator](#).

At the **SQL Server Database** step of the wizard, browse to the restored VAO database and specify names for new Veeam Backup & Replication and Veeam ONE databases.

NOTE

VAO reinstallation process does not involve the Veeam Backup & Replication and Veeam ONE databases restored at [Step 2. Restore Backed Up Databases](#).

To allow VAO to use the restored databases, you must perform reconfiguration of Veeam ONE and Veeam Backup & Replication servers. For more information, see [Step 4. Reinstall Veeam ONE and Veeam Backup & Replication](#).

Step 4. Reinstall Veeam ONE and Veeam Backup & Replication

As soon as the VAO installation process completes:

1. Open the **Services** snap-in and stop the Veeam Orchestrator Server Service, Veeam Orchestrator ONE Integration Service and Veeam Orchestrator Agent for Backup service.
2. Reconfigure Veeam ONE and Veeam Backup & Replication servers to use old databases instead of new ones created during VAO installation.

For more information, see these Veeam KB articles: [Moving Veeam ONE database to a different SQL Server](#) and [How to move the Veeam Backup & Replication software to another server](#).

3. Start the Veeam Orchestrator Server Service, Veeam Orchestrator ONE Integration Service and Veeam Orchestrator Agent for Backup service.

Step 5. Additional Configuration

Depending on the new database location, you will have to perform a number of additional actions.

Installing VAO on the same machine

If you have performed installation on the same machine that was used to run VAO earlier, no additional configuration is required.

Installing VAO on a new machine with the same name

If you have performed installation on a new machine with the same name as the machine that was used to run VAO earlier, do the following.

1. Open the VAO UI and switch to the **Administration** tab.
2. Navigate to **VAO Agents**. All VAO agents previously installed on the server will have the *Repair Required* status.
 - a. Select an agent and click **Repair**.
 - b. In the **Repair VAO Agent** window, enter passwords required for the remote access and service credentials.
 - c. Repeat the step for each agent with the *Repair Required* status.
3. Navigate to **VMware vCenter Servers**. All VMware servers previously connected to the server will have the *Disconnected* status.
 - a. Select a vCenter Server and click **Edit**.
 - b. In the **Edit VMware vCenter Server** window, enter a password required to connect to the server.
 - c. Repeat the step for each VMware server with the *Disconnected* status.
4. Navigate to **Plan Components > Credentials**.

Modify all manually added credentials managed by the VAO server.

 - a. Select a credential and click **Edit**.
 - b. In the **Edit VAO Credential** window, enter a password for the credential.
 - c. Repeat the step for each manually added credential.

NOTE

All credentials collected from standalone Veeam Backup & Replication servers will be automatically updated as soon as VAO agents installed on the servers connect to the VAO server.

5. [This step applies only if you have previously connected an SMTP server and enabled authorization]
Navigate to **Reporting > Email Subscriptions**.
 - a. Click **Edit**.
 - b. In the **SMTP Server** window, enter a password required for SMTP server authentication.

Installing VAO on a new machine with a new name

If you have performed installation on a new machine with a new name, follow the instructions provided in steps 1–5. No additional actions are required.

TIP

To make sure all the configuration changes are correct, after you perform the required actions, generate the **Plan Readiness Check Report** for each VAO plan. For more information on the report, see the Veeam Availability Orchestrator Operations Guide, section [Running Plan Readiness Check](#).