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Windows Offline Deployment

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Windows Offline Deployment

This article will walk you through the procedure to install and deploy Bitwarden to your own Windows server in an **offline or air-gapped** environment. Please review Bitwarden software release support documentation.

> ⚠ **Warning**
>
> **Manual installations should be conducted by advanced users only.** Only proceed if you are very familiar with Docker technologies and desire more control over your Bitwarden installation.
>
> Manual installations lack the ability to automatically update certain dependencies of the Bitwarden installation. As you upgrade from one version of Bitwarden to the next you will be responsible for changes to required environment variables, changes to nginx `default.conf`, changes to `docker-compose.yml`, and so on.
>
> We will try to highlight these in the release notes on GitHub. You can also monitor changes to the dependency templates used by the Bitwarden installation script on GitHub.

Requirements

	Minimum	Recommended
Processor	x64, 1.4GHz	x64, 2GHz Dual Core
Memory	6GB RAM	8+ GB RAM
Storage	76GB	90GB
Docker Version	Engine 26+ and Compose[a]	Engine 26+ and Compose[a]

[a] – Docker Compose can be installed via Docker Desktop, which includes Engine and Compose. Install Docker Desktop for Engine and Compose.

During this setup, you must **uncheck** the **Use WSL2 instead of Hyper-V (recommended)** option.

Additionally, ensure the following requirements are met:

- Using a machine with internet access, you have downloaded the latest `docker-stub-US.zip` or `docker-stub-EU.zip` file from the Bitwarden Server repository's releases page and transferred this file to your server.
- An offline SMTP server is setup and active in your environment.
- (**Optional**) OpenSSL Windows binaries are installed and ready to use on your server. You may use a self-signed certificate instead of OpenSSL if you wish.

Nested virtualization

Running Bitwarden on a Windows Server requires use of nested virtualization. Please check your Hypervisor's documentation to find out if nested virtualization is supported and how to enable it.

> **Tip**
>
> If you are running Windows Server as an Azure VM, we recommend a **Standard D2s v3 Virtual Machine running Windows Server 2022**, which meets all system requirements including support for nested virtualization. You will also need to select **Security Type**: **Standard** rather than the default **Trusted launch virtual machines**.

Installation procedure

Configure your domain

By default, Bitwarden will be served through ports 80 (`http`) and 443 (`https`) on the host machine. Open these ports so that Bitwarden can be accessed from within and/or outside the network. You may opt to choose different ports during installation.

> **Tip**
>
> **If you are using Windows Firewall**, Docker Desktop for Windows will not automatically add an exception for itself in Windows Firewall. Add exceptions for TCP ports 80 and 443 (or chosen alternative ports) to prevent related errors.

We recommend configuring a domain name with DNS records that point to your host machine (for example, `bitwarden.example.com`), especially if you are serving Bitwarden over the internet.

Create Bitwarden local user & directory

Open PowerShell and create a Bitwarden local user by running the following command:

```Bash
PS C:\> $Password = Read-Host -AsSecureString
```

After running the above command, enter the desired password in the text input dialog. After specifying a password, run the following command:

```Bash
New-LocalUser "Bitwarden" -Password $Password -Description "Bitwarden Local Admin"
```

As the newly created user, create a Bitwarden folder under `C:\`:

```Bash
PS C:\> mkdir Bitwarden
```

Once you install Docker Desktop, navigate to **Settings** → **Resources** → **File Sharing** and add the created directory (`C:\Bitwarden`) to the Resources list. Select **Apply & Restart** to apply your changes.

We recommend logging in as the newly created user before completing all subsequent procedures in this document.

Configure your machine

To configure your machine with the assets required for your Bitwarden server:

> **Tip**
>
> If you have created a Bitwarden user & directory, complete the following as the `Bitwarden` user.

1. Create a new directory in `C:\Bitwarden` named `bwdata` and extract `docker-stub-US.zip` (or `docker-stub-EU.zip`) to it.

   Once unzipped, the `bwdata` directory will match what the `docker-compose.yml` file's volume mapping expects. You may, if you wish, change the location of these mappings on the host machine.

2. In `bwdata\env\global.override.env`, edit the following environment variables:

   - `globalSettings__baseServiceUri__vault=`: Enter the domain of your Bitwarden instance.
   - `globalSettings__sqlServer__ConnectionString=`: Replace the `RANDOM_DATABASE_PASSWORD` with a secure password for use in a later step.
   - `globalSettings__identityServer__certificatePassword=`: Set a secure certificate password for use in a later step.
   - `globalSettings__internalIdentityKey=`: Replace `RANDOM_IDENTITY_KEY` with a random alphanumeric string.
   - `globalSettings__oidcIdentityClientKey=`: Replace `RANDOM_IDENTITY_KEY` with a random alphanumeric string.
   - `globalSettings__duo__aKey=`: Replace `RANDOM_DUO_AKEY` with a random alphanumeric string.
   - `globalSettings__installation__id=`: Enter an installation id retrieved from https://bitwarden.com/host.
   - `globalSettings__installation__key=`: Enter an installation key retrieved from https://bitwarden.com/host.
   - `globalSettings__pushRelayBaseUri=`: This variable should be blank. See Configure Push Relay for more information.

     > **Tip**
     >
     > At this time, consider also setting values for all `globalSettings__mail__smtp__` variables and for `adminSettings__admins`. Doing so will configure the SMTP mail server used to send invitations to new organization members and provision access to the System Administrator Portal.
     >
     > Learn more about environment variables.

3. Generate a `identity.pfx` certificate for the identity container. You can do using OpenSSL or using any tool to generate a self-signed certificate. If you're using OpenSSL, run the following commands:

```
Bash

openssl req -x509 -newkey rsa:4096 -sha256 -nodes -keyout identity.key -out identity.crt -subj
"/CN=Bitwarden IdentityServer" -days 10950
```

and

```
Bash

openssl pkcs12 -export -out ./identity/identity.pfx -inkey identity.key -in identity.crt -passou
t pass:IDENTITY_CERT_PASSWORD
```

In the above command, replace `IDENTITY_CERT_PASSWORD` with the certificate password created and used in **Step 2**.

4. Move `identity.pfx` to the mapped volume directory (by default, `.\bwdata\identity`).
5. Copy `identity.pfx` to the `.\bwdata\ssl` directory.
6. Create a subdirectory in `.\bwdata\ssl` named for your domain.
7. Provider a trusted SSL certificate and private key in the newly created `.\bwdata\ssl\bitwarden.example.com` subdirectory.

> **Note**
> This directory is mapped to the NGINX container at `\etc\ssl`. If you can't provide a trusted SSL certificate, front the installation with a proxy that provides an HTTPS endpoint to Bitwarden client applications.

8. In `.\bwdata\nginx\default.conf`:
    1. Replace all instances of `bitwarden.example.com` with your domain, including in the `Content-Security-Policy` header.
    2. Set the `ssl_certificate` and `ssl_certificate_key` variables to the paths of the certificate and private key provided in **Step 6**.
    3. Take one of the following actions, depending on your certificate setup:
        - If using a trusted SSL certificate, set the `ssl_trusted_certificate` variable to the path to your certificate.
        - If using a self-signed certificate, comment out the `ssl_trusted_certificate` variables.
9. In `.\bwdata\env\mssql.override.env`, replace `RANDOM_DATABASE_PASSWORD` with the password created in **Step 2**.
10. In `.\bwdata\web\app-id.json`, replace `bitwarden.example.com` with your domain.

Download & transfer images

To get docker images for use on your offline machine:

1. From an internet-connected machine, download all `bitwarden/xxx:latest` docker images, as listed in the `docker-compose.yml` file in `docker-stub.zip`.

2. Save each image to a `.img` file, for example:

```
Bash

docker image save -o mssql.img bitwarden/mssql:version
```

3. Transfer all `.img` files to your offline machine.

4. On your offline machine, load each `.img` file to create your local docker images, for example:

```
Bash

docker image load -i mssql.img
```

Start your server

Start your Bitwarden server with the following command:

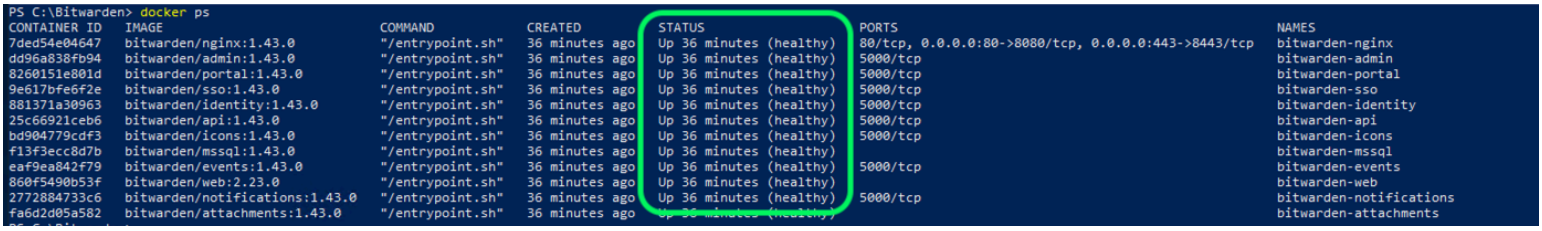
```
Bash

docker compose -f ./docker/docker-compose.yml up -d
```

Verify that all containers are running correctly:

```
Bash

docker ps
```



```
PS C:\Bitwarden> docker ps
CONTAINER ID   IMAGE                              COMMAND                  CREATED          STATUS                    PORTS                                                  NAMES
7ded54e04647   bitwarden/nginx:1.43.0             "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   80/tcp, 0.0.0.0:80->8080/tcp, 0.0.0.0:443->8443/tcp   bitwarden-nginx
dd96a838fb94   bitwarden/admin:1.43.0             "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-admin
8260151e801d   bitwarden/portal:1.43.0            "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-portal
9e617bfe6f2e   bitwarden/sso:1.43.0               "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-sso
881371a30963   bitwarden/identity:1.43.0          "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-identity
25c66921ceb6   bitwarden/api:1.43.0               "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-api
bd904779cdf3   bitwarden/icons:1.43.0             "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-icons
f13f3ecc8d7b   bitwarden/mssql:1.43.0             "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)                                                          bitwarden-mssql
eaf9ea842f79   bitwarden/events:1.43.0            "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-events
860f5490b53f   bitwarden/web:2.23.0               "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)                                                          bitwarden-web
2772884733c6   bitwarden/notifications:1.43.0     "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)   5000/tcp                                               bitwarden-notifications
fa6d2d05a582   bitwarden/attachments:1.43.0       "/entrypoint.sh"         36 minutes ago   Up 36 minutes (healthy)                                                          bitwarden-attachments
```

List showing Healthy Containers

Congratulations! Bitwarden is now up and running at `https://your.domain.com`. Visit the web vault in your browser to confirm that it's working.

You may now register a new account and log in. You will need to have configured SMTP environment variables (see Environment Variables) in order to verify the email for your new account.

Next Steps:

- If you are planning to self-host a Bitwarden organization, see self-host an organization to get started.
- For additional information see self hosting FAQs.

Update your server

Updating a self-hosted server that has been installed and deployed manually is different from the standard update procedure. To update your manually-installed server:

1. Download the latest `docker-stub.zip` archive from the releases pages on GitHub.
2. Unzip the new `docker-stub.zip` archive and compare its contents with what's currently in your `bwdata` directory, copying anything new to the pre-existing files in `bwdata`.
   Do not overwrite your pre-existing `bwdata` directory with the contents of the newer `docker-stub.zip` archive, as this would overwrite any custom configuration work you've done.
3. Download the latest container images and transfer them to your offline machine as documented above.
4. Run the following command to restart your server with your updated configuration and the latest containers:

```Bash
docker compose -f ./docker/docker-compose.yml down && docker compose -f ./docker/docker-compose.yml up -d
```