Placement Empowerment Program

Cloud Computing and DevOps Centre

Installing Docker and Running Your First Container on Windows

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Introduction and Overview

Docker is a powerful tool that allows developers to create, deploy, and run applications in isolated environments called containers. These containers ensure that applications run consistently across different systems, eliminating compatibility issues.

In this guide, we will go through the step-by-step process of installing Docker on Windows, setting up a basic Nginx web server inside a container, and accessing it through a browser.

Objective

- To install Docker on Windows and verify its functionality.
- To learn how to pull and run a basic Nginx container.
- To understand how to access a containerized web application using a browser.
- To gain hands-on experience with containerization and Docker commands.

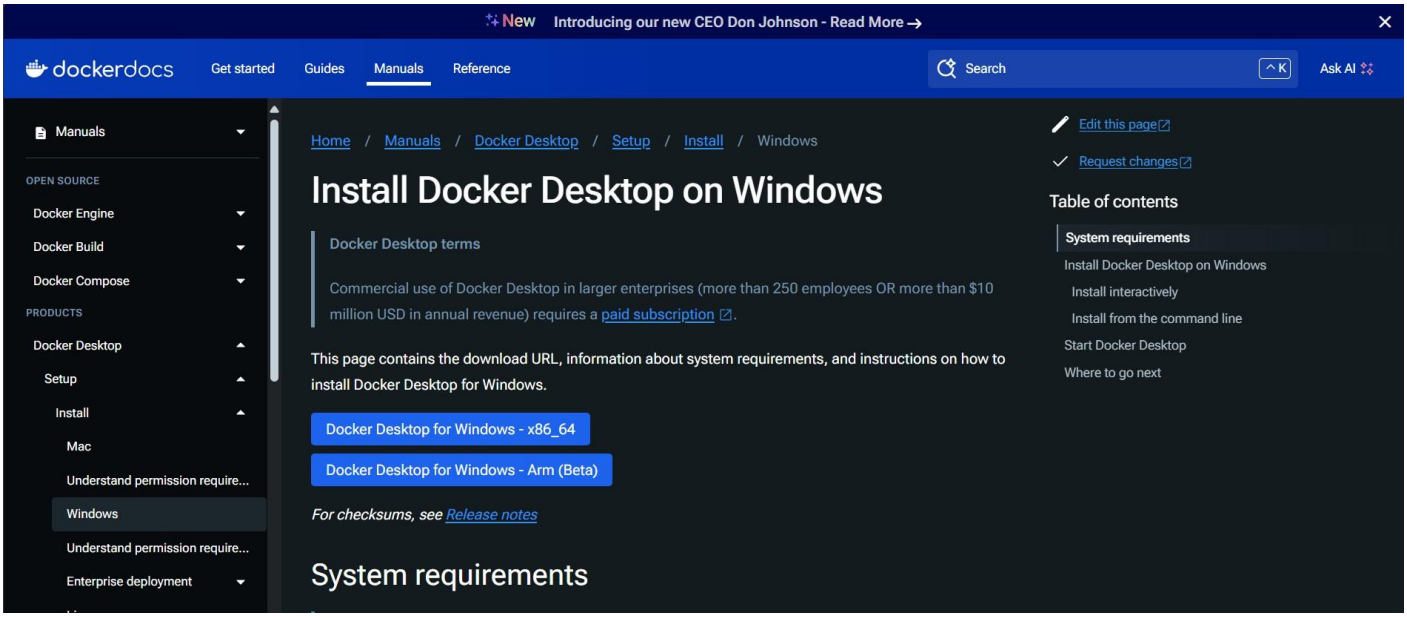
Importance

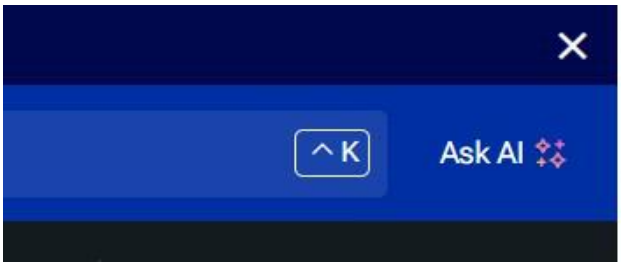
- Simplifies Deployment – Containers eliminate compatibility issues by packaging applications with all their dependencies.
- Improves Efficiency – Docker containers are lightweight and use system resources more effectively than virtual machines.
- Enhances Portability – Applications run consistently across different environments (local, cloud, or server).
- Boosts Scalability – Docker makes it easier to scale applications up or down based on demand.
- Speeds Up Development – Developers can quickly create isolated environments for testing and debugging**.**

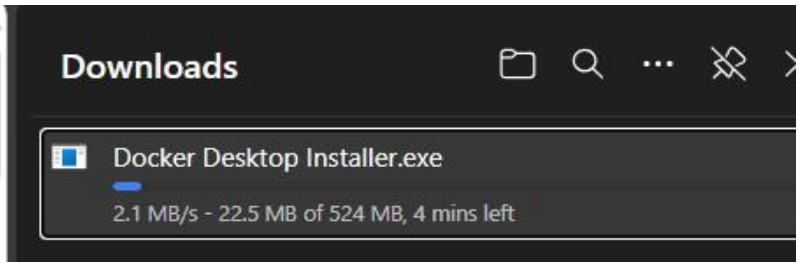
Step-by-Step Overview

Step 1: Install Docker Desktop.

1. Download **Docker Desktop for Windows** from the official website: https://www.docker.com/products/docker-desktop/
2. Run the installer and follow the on-screen instructions.
3. Ensure **WSL 2** is enabled (Docker requires this for Windows).
4. Restart your PC and launch **Docker Desktop**.







Step 2: Verify Docker Installation

- Open PowerShell and check if Docker is installed by running the version command.
- Verify that Docker is running properly by checking its system information.

- If there are any errors, ensure Docker Desktop is open and running in the background

```
PS C:\Users\santhoshini> docker images
REPOSITORY   TAG       IMAGE ID       CREATED       SIZE
nginx        latest    b52e0b094bc0   3 weeks ago   192MB
PS C:\Users\santhoshini> docker version
Client:
 Version:           27.5.1
 API version:       1.47
 Go version:        go1.22.11
 Git commit:        9f9e405
 Built:             Wed Jan 22 13:41:44 2025
 OS/Arch:           windows/amd64
 Context:           desktop-linux

Server: Docker Desktop 4.38.0 (181591)
 Engine:
  Version:          27.5.1
  API version:      1.47 (minimum version 1.24)
  Go version:       go1.22.11
  Git commit:       4c9b3b0
  Built:            Wed Jan 22 13:41:17 2025
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.7.25
  GitCommit:        bcc810d6b9066471b0b6fa75f557a15a1cbf31bb
 runc:
  Version:          1.1.12
  GitCommit:        v1.1.12-0-g51d5e946
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
```

Step 3: Pull the Nginx Docker Image

- Use the Docker pull command to download the latest Nginx image from Docker Hub.
- Once the image is downloaded, verify it by listing all available images in Docker.

```
PS C:\Users\santhoshini> docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
Digest: sha256:9d6b58feebd2dbd3c56ab5853333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Image is up to date for nginx:latest
docker.io/library/nginx:latest
```

Step 4: Run the Nginx Container

- Start an Nginx container by running it in detached mode and mapping it to port 8080.
- Verify that the container is running by listing all active containers.

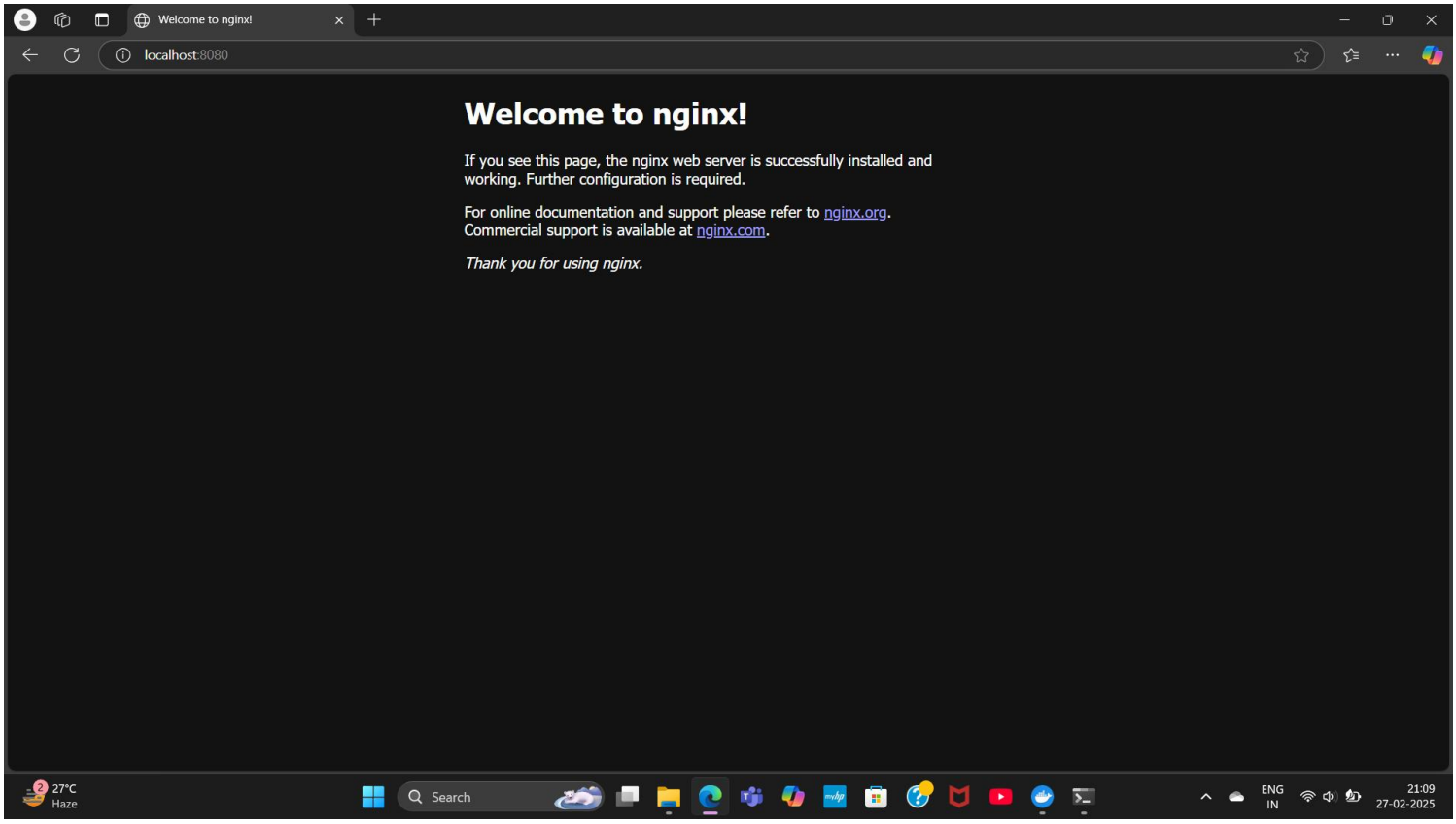
```
PS C:\Users\santhoshini> docker run -d -p 8080 : 80 --name my-nginx nginx
```

```
PS C:\Users\santhoshini> docker run -d -p 8080:80 --name my-nginx nginx
35de6413649c3660a7a7eae4409af02d2c1059c38c0182a2692938287af948d0
```

Step 5: Access the Nginx Web Page

- Open a web browser and go to http://localhost:8080.
- ```
  PS C:\Users\santhoshini> docker ps
  CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS                  NAME
  35de6413649c   nginx     "/docker-entrypoint.…"   23 seconds ago   Up 23 seconds   0.0.0.0:8080->80/tcp   my-n
  PS C:\Users\santhoshini> docker inspect my-nginx | Select-String '"HostPort": "8080"'

                          "HostPort": "8080"
                          "HostPort": "8080"
  ```
  If everything is set up correctly, the default Nginx welcome page should appear.
-
-
  ```


Welcome to nginx!
localhost:8080
Welcome to nginx!
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.
Thank you for using nginx.
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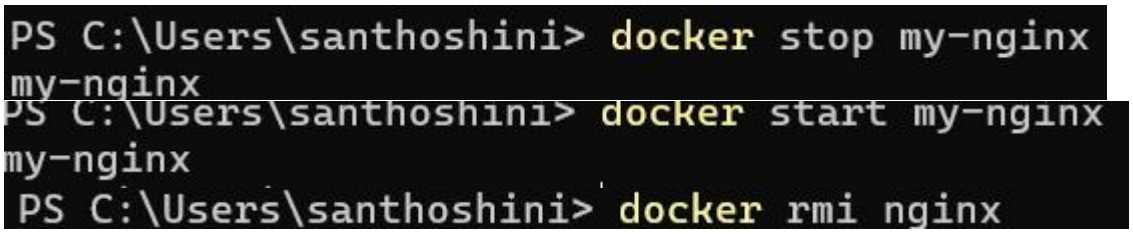
Step 6: Stop and Remove the Container

- If you no longer need the container, stop it using the stop command.
- Remove the stopped container from Docker.
- Optionally, remove the Nginx image if you want to free up space.



Expected Outcome

- Successful installation of **Docker Desktop** on Windows.
- Verification that Docker is running correctly through **PowerShell commands**.
- Pulling and running an **Nginx container** without errors.
- Accessing the **Nginx default welcome page** in a web browser at http://localhost:8080.
- Understanding basic **Docker commands** like pull, run, stop, and remove.