

# Improving Container Security and Performance with Docker Multi-Staging Builds and Distroless Images

## What is Docker ?

Docker is a containerization platform that allows developers to package their applications and dependencies into portable containers for consistent and efficient deployment across different environments. However, building and deploying Docker containers can be challenging, especially when dealing with complex applications and multiple dependencies.

**Multi-staging build:** Docker multi-staging builds is an approach to building Docker images that involves breaking up the build process into multiple stages, each of which performs a specific task.

For Example, one stage is used to compile the application. You will typically need a compiler or build tool that is appropriate for your application's programming language and technology stack. For Java application, you might use Maven or Gradle to compile the source code into a binary format. Building a Node.js application, you might use the npm package manager to install dependencies & compile the code.

While the final stage can be used to run the application. You need runtime environment to run the application (The runtime environment is a software environment in which your applications run & includes the necessary components to execute your applications code). For running python application you need python interpreter, for java you need jvm, for javascript JavaScript engine such as NodeJs.

## What is Distroless Image ?

A distroless image is a Docker image that does not include any Linux Distribution Packages or tools. Instead, it only includes the application and its runtime dependencies.

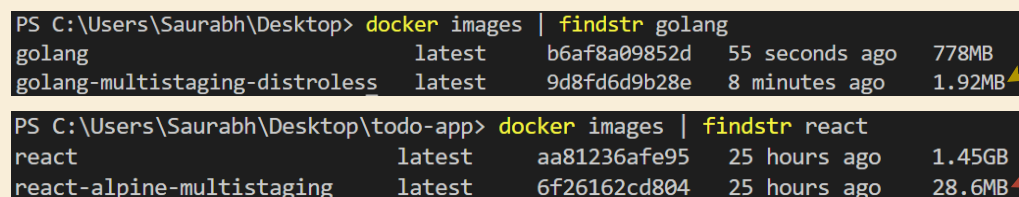
## ➡ Benefits of using multi-staging with Distroless images in Docker

- Smaller image size: optimizing container startup time, reducing storage costs.

```
PS C:\Users\Saurabh\Desktop> docker images | findstr golang
golang                latest          b6af8a09852d   55 seconds ago   778MB
golang-multistaging-distroless latest          9d8fd6d9b28e   8 minutes ago   1.92MB
```

```
PS C:\Users\Saurabh\Desktop\todo-app> docker images | findstr react
react                latest          aa81236afe95   25 hours ago     1.45GB
react-alpine-multistaging latest          6f26162cd804   25 hours ago     28.6MB
```



- Improved Security: Distroless images offer a high level of security because they contain only the bare minimum necessary to run an application and do not include any unnecessary components or libraries so our applications are not exposed to any operating system related vulnerabilities.

Overall, Using multi-staging with distroless images in Docker can lead to smaller, more secure, and faster images, which can improve both development and production workflows.