CONTENTS

OPEN MAINFRAME PROJECT

What is Docker?

Docker is the leading container platform. Docker Inc. is the original author and primary sponsor of the Docker open source project.

Docker is a comprehensive platform that includes the means to create a digital container, which is the function it is most strongly associated with in casual conversation. However, it also enables the standardization of legacy, microservices and ISV apps within uniform packaging and with common APIs and shared, integrated tooling. Also, containers are "self-contained," coming with everything needed to run, which eliminates any dependencies to the hosting system. It is built on top of Linux kernel functionality (primarily name spaces and control groups).

"The key difference between containers and virtual machines (VMs) is that while the hypervisor abstracts an entire device, containers just abstract the operating system kernel," explains Steven J. Vaughan-Nichols in a ZDNet post.

According to a 451 Research report, containers, most of which were Docker, generated $762 million in 2016. And, going forward, containers will see the fastest growth compared to other segments in the cloud-enabling technologies market.

Docker is trending red hot and has been for years now with no cooling period in sight.

Docker Quick Facts

- Docker Container Downloads—8 billion and counting
- GitHub Stars—32,000+
- Dockerized apps in Docker Hub—500,000 and counting
- Third-party projects using Docker—100,000+
- Community Contributors—3000 +
- Meetup Groups in 70+ countries—270 and counting

Where is Docker being used?

Use Cases:

- PayPal, an online payments system, uses Docker to containerize existing apps for added security.
- Visa, a major payments technology company, chose Docker Enterprise Edition to help them move towards a microservices application model while also modernizing their data center operations.
- Splunk, a big data platform for machine data mining and analysis, uses Docker Datacenter (Containers as a Service) to deliver its "House of Demos" to custom bundle demos to match new users' needs and preferences.
- Metlife, a global provider of insurance, shipped a new modern UI with Docker Enterprise Edition that allows customers and agents to have a holistic view of their relationship with the company.

Industries:

In a word: all of them. Docker is widely adopted across industries.

Why Docker on the Mainframe?

Today, mainframe computing is in heavy use in very large organizations across industries including banking and finance, investing, retailing, airlines, and governments.

Docker makes it easier to develop and deploy applications anywhere, including on mainframes. Further, modifying applications or replacing components in upgrades or newer versions are much easier and faster tasks. For example, rolling updates allows better control over new feature and update deployments. Progress can be monitored through performance metrics, allowing roll outs to be sped up or even rolled back as needed.

The mainframe's scale-up and scale-out capabilities allow for higher flexibility when building a solution: a large number of micro services can run on one

CONTENTS

OPEN MAINFRAME PROJECT

physical host (scale-out), which eliminates any network latencies on a physical fabric. The ability to scale up can combine lots of micro services with larger, more monolithic parts of a solution. Runtime characteristics of any software can vary depending on the platform. However, Docker isn't "just" a tool to build and deploy software, but rather the platform adds a holistic approach including security and IT infrastructure optimization to the software pipeline which, among other things, ensures the execution of containers will retain platform attributes like performance and resiliency. Thus, containers can fully leverage mainframe strengths like platform resiliency or performance advantages (e.g. through large caches, high clock rates, an excellent SMP curve and a powerful instruction set).

Not only does Docker adhere to the new and highly agile DevOps approaches to building, packaging, shipping, and managing applications, it also better aligns with the new open source app trends on mainframes too. Indeed, Linux for the Mainframe is seeing record adoption rates. Growth in support of The Open Mainframe Project, a Linux Foundation effort, is just one example of how fast Linux for the Mainframe is growing.

Indeed, it has sparked a new wave of dev-ops function on z.

Linux on z Systems, or more simply Linux on z, are umbrella terms for the Linux Operating System complied to run on IBM mainframes, specifically IBM z Systems and IBM LinuxONE servers. When Docker containers are also used, the speed of innovation in DevOps by using these combined technologies is greatly accelerated.

Mainframe vs x86 for Docker

With the shift to Linux in mainframe computing comes a plethora of new opportunities for innovation that simply were not possible earlier. Since Docker enables developers to reuse micro-services rather than recreate them every time, and to interconnect them in various ways, speed to production quickens significantly. This creates the perfect scenario for far more agile DevOps in mainframe environments than was previously possible.

Having the increased flexibility, agility and computing power with Linux in Mainframe, open source apps, and Docker positions very large organizations to best competitive advantage.

Specific advantages include:

Virtualization – The best of both worlds. Combines the same kinds of apps in the same deployment paradigm on z as on x86, but retains the more sophisticated virtualization management only available on z systems.

Application Portability – Applications can easily be moved from distributed platforms to z. Portability makes it easier to retain the z Systems flavor too, certainly on z Systems but eventually in environments that currently exist in the distributed space now.

Workload consolidation – Docker containers further expand z Systems consolidation capabilities and open the door for new types of workload consolidation too.

Security – Docker running in virtualized environments provides optimum workload and tenant isolation with the mature management capabilities necessary to heightening security and compliance to enterprise grade and beyond.

Docker provides a consistent build, deployment and operational paradigm across platforms. This allows developers to pick the best platform mix for an overall business solution -- using the best of all worlds.

CONTENTS

OPEN MAINFRAME PROJECT

Where can you learn more?

Containers 101: Linux containers and Docker explained

Docker Container Tutorials

The New Wave Begins

Docker containers are extremely popular and for good reasons. Chief among them is the ability to stuff a lot more applications on a physical server than you could pack into a virtual machine (VM).

The primary reason for that extra application load capability is that containers don't require full copies of operating systems (OS) -- and the corresponding hardware information that the OS needs in order to run. Indeed, containers use shared operating systems.

Further, you can create a portable and highly stable operating environment with containers which makes shipping between environments much easier. For example, moving applications from development to production is much simpler than with other tools and methods.

Added to that are the numerous advantages the rest of the Docker platform provides from security to infrastructure optimization.

All told, this makes Docker a prime and logical pick for developers and sysadmins in packaging apps inside Linux containers in either cloud or datacenter environments.

Upstream and downstream challenges

That is not to say that containers are perfect in every respect. There are challenges associated with the very nature of compartmentalizing functions. Namely, with containers you know what you have thus preventing downstream problems, but you don't necessarily know what you're depending on upstream. Thus, quality assurance can be a bit of a challenge too.

Bottom line, containers are outstanding and efficient technology but like all technology, has its pros and cons. The Docker platform leverages the pros and addresses the cons.

Are you interested in learning more about the advantages of running Docker on the mainframe? Visit our community forum to learn more from mainframe experts.