



University of Amsterdam
Master's Programme in System and Network Engineering

Measuring the Impact of Docker on Network I/O Performance

Author: Rohprimardho
2 July 2015

Research Question

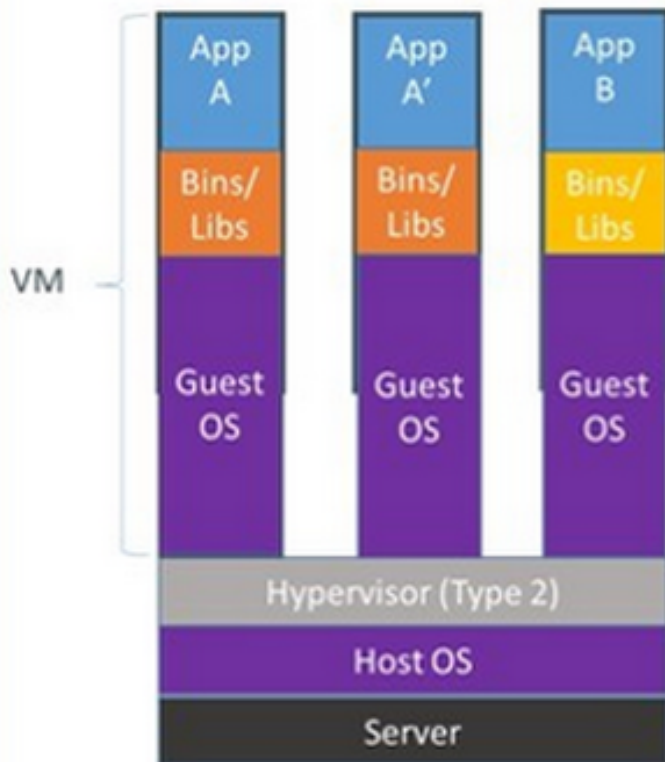
How big is the impact of Docker on network I/O performance?

Docker

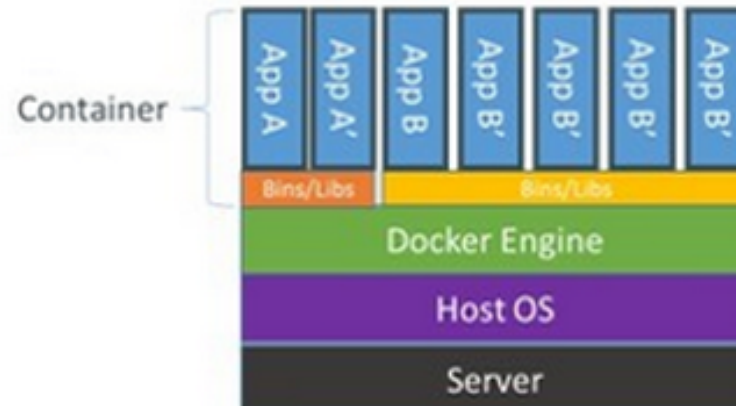
- Docker containers wrap software in a complete filesystem that contains everything it needs to run.



Docker vs VM Comparison



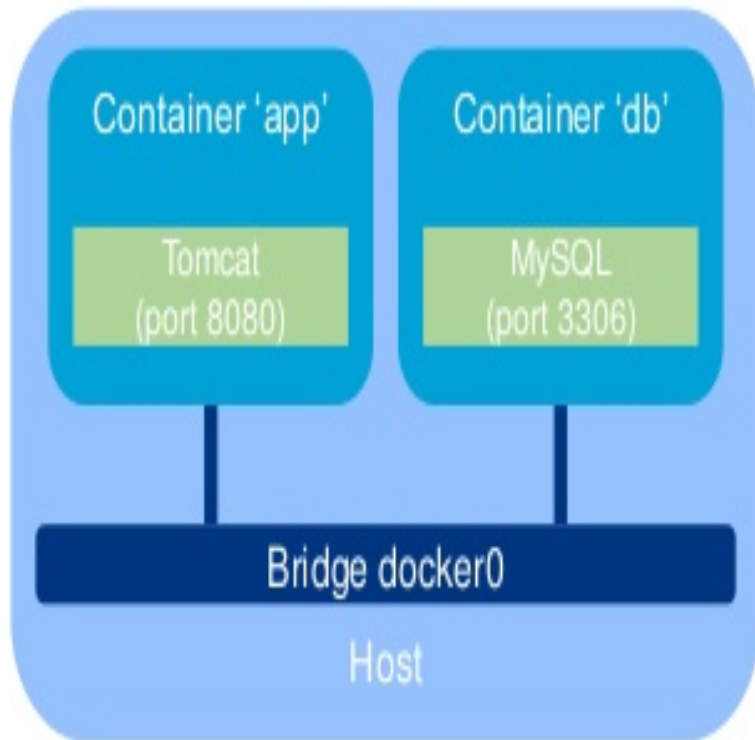
Containers are isolated, but share OS and, where appropriate, bins/libraries



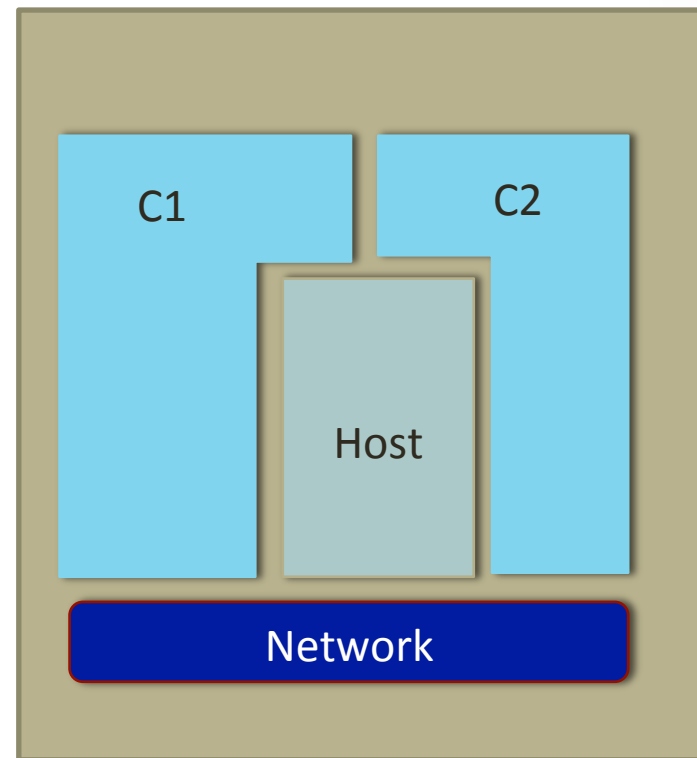
Source: <http://www.zdnet.com/article/what-is-docker-and-why-is-it-so-darn-popular/>

Docker Networking Mode

Bridge

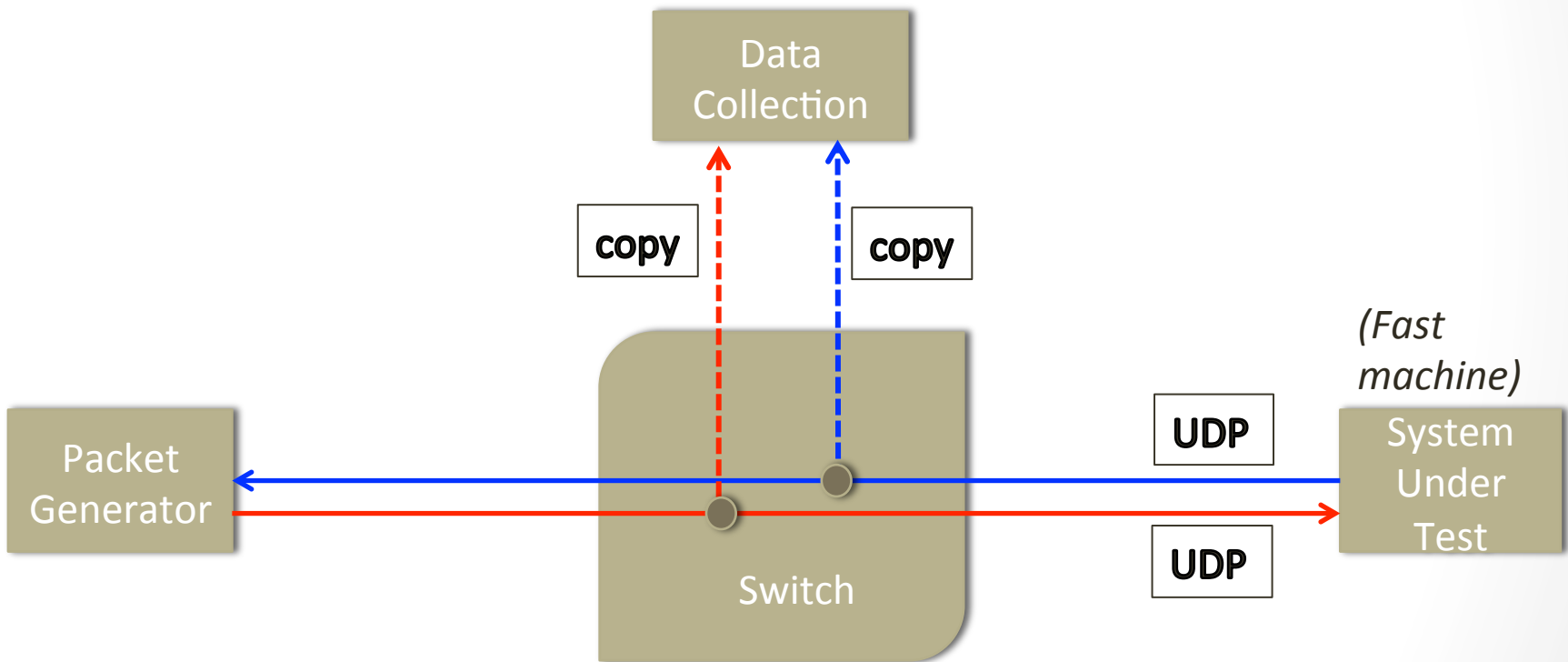


Host



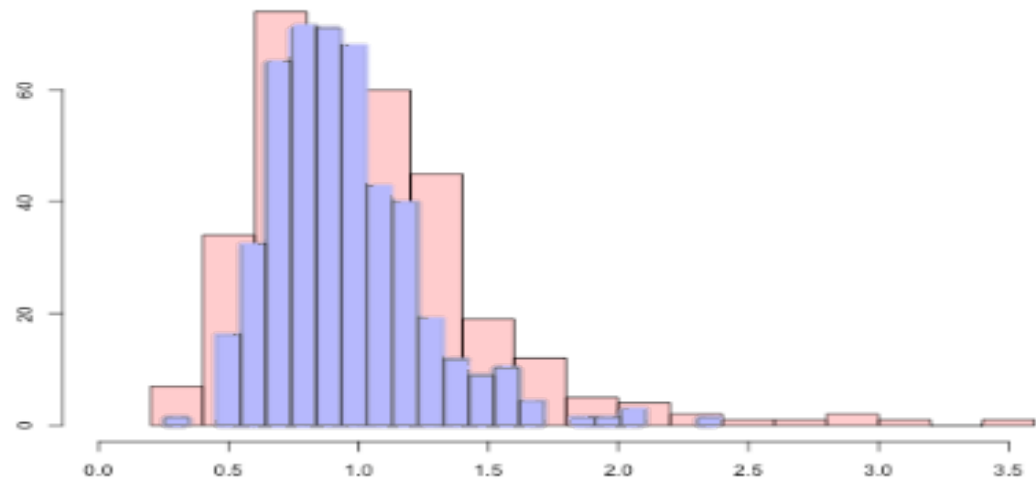
Source: <http://www.slideshare.net/adrienblind/docker-networking-basics-using-software-defined-networks>

Topology

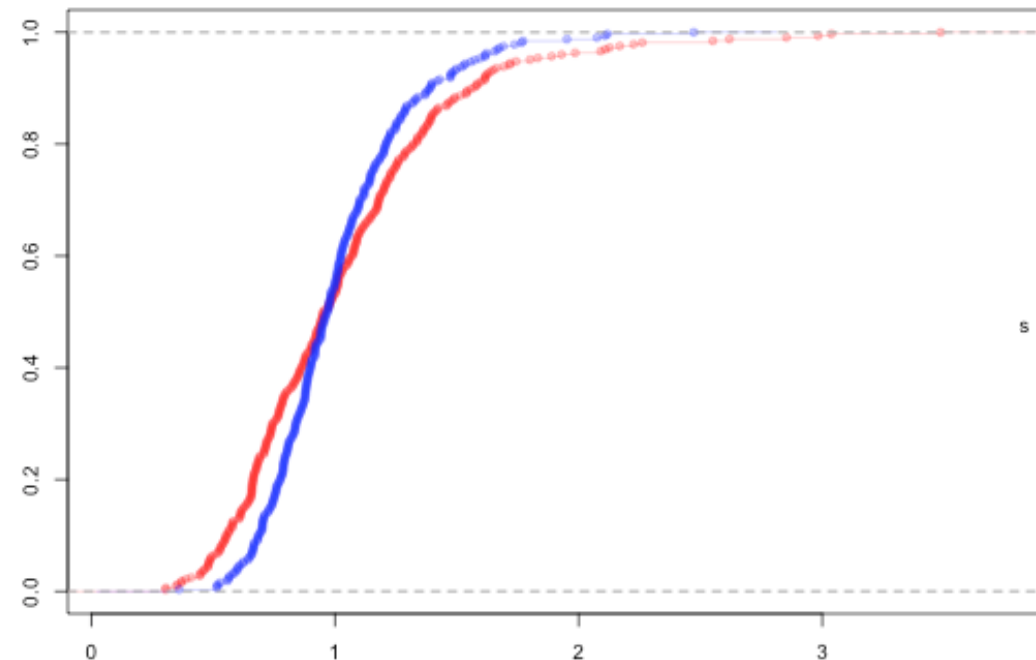


Density Functions

Histogram



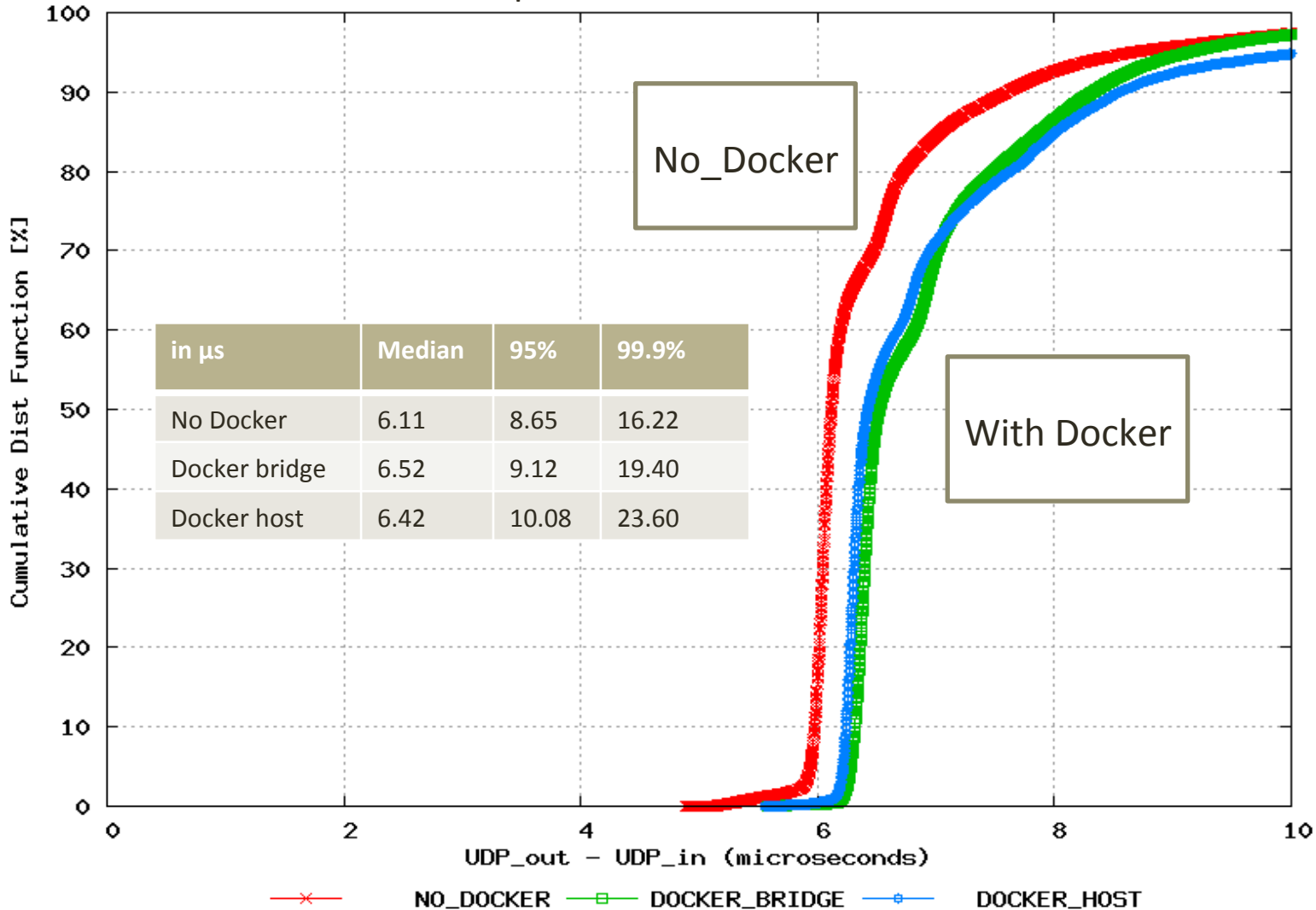
CDF



Source: <http://howtohop.blogspot.be>

Results: Baseline

Number of Probes: 1 million packets

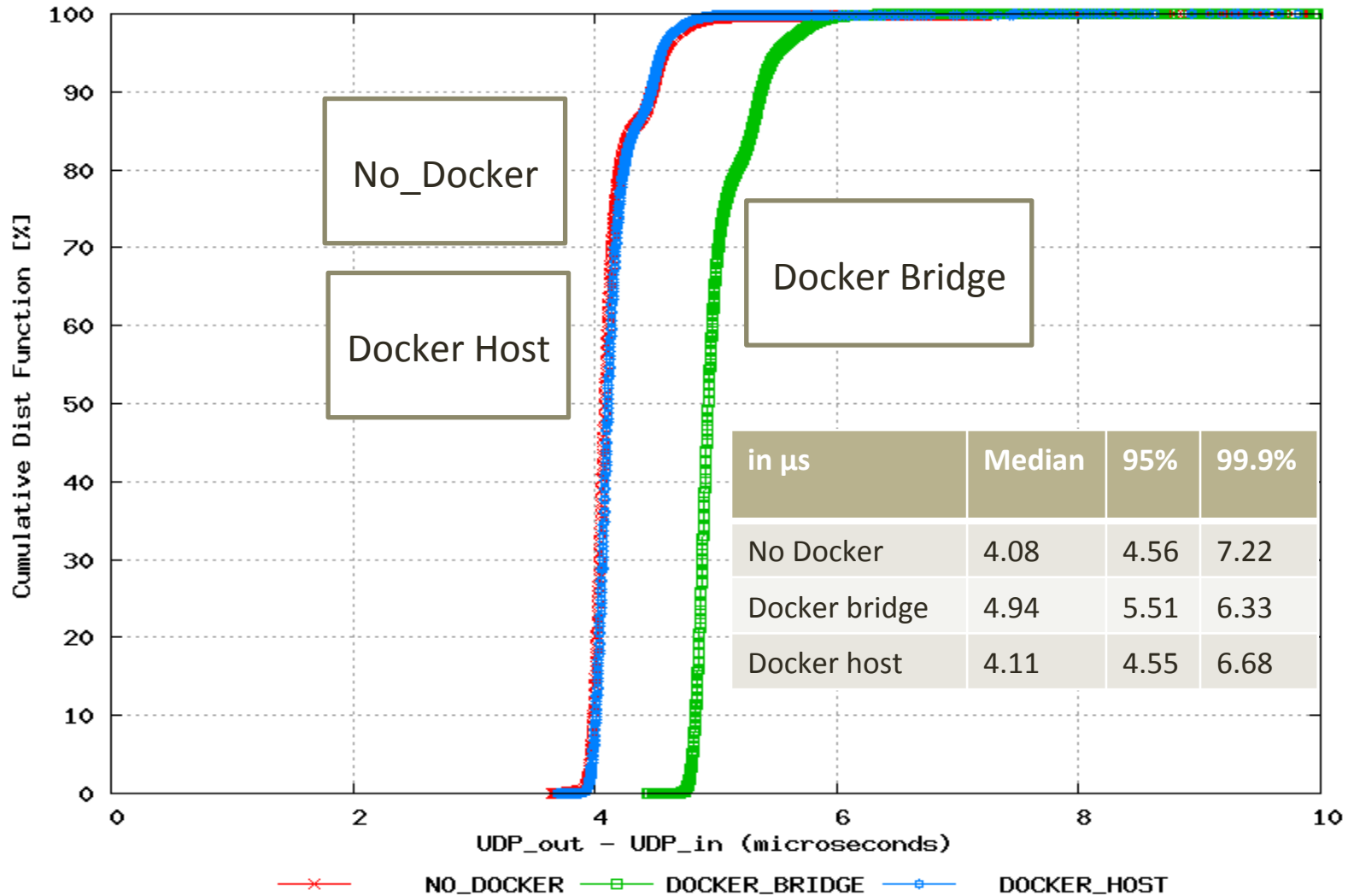


Optimizations

- Affinity: dedicate a single core to run the application (to reduce cache corruption)
- Spinning: continuously check for the arrival of new packets

Results: Optimized

Number of Probes: 1 million packets



Conclusions

- Network I/O performance of an application is degraded if it runs inside a Docker container
- However, by finely tuning the application and using “host” networking – we avoid this performance degradation

Questions?