Measuring the Impact of Docker on Network I/O Performance

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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

Docker Networking Mode

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

Packet Generator

Data Collection

Switch

System Under Test

(Fast machine)

UDP

UDP

copy
copy
Density Functions

Histogram

CDF

Source: http://howtohop.blogspot.be
Results: Baseline

Number of Probes: 1 million packets

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<thead>
<tr>
<th></th>
<th>in µs</th>
<th>Median</th>
<th>95%</th>
<th>99.9%</th>
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With Docker

No_Docker
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

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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?