Docker Images for Mathematical Software

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Q: What is Docker?
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Q: Why should we use VMs and Docker?
Main advantages of software in VMs

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Advantages of VMs

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- Software distributed via VM images works on many OS
- Software runs in a predefined enviroment
- Easy to keep distributed software up-to-date
Why Docker

Advantages of Docker to other VMs

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- Easy distribution of images via DockerHub
- Many hosts (*Google*, *Amazon*) support Docker
Advantages of Docker

Users point of view

Easy to use: to get a working GAP, just type `docker run -it gapsystem/gap-docker gap`.
Low performance loss
Low disk space requirements
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Developers point of view

Docker is available for many OS, so software can be released in consistent, predefined environment and will work for every user. Images can be created out of containers, via a git-flavoured interface. Images can be stacked and reused, therefore the same base image can be used for many applications (Example: A basic GAP installation with different sets of packages). Creation of images can be automated completely via Dockerfiles. Distribution of images is easy via Docker Hub.
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GAP

Includes GAP, Pari/GP, 4ti2,...

gapsystem/gap-docker
Where we use Docker

GAP
Includes GAP, Pari/GP, 4ti2,...
gapsystem/gap-docker

DFG SPP Computeralgebra
Includes GAP, Singular, Polymake, Normaliz,...
sebasguts/sppdocker
Basic steps in Docker

- Select a base image, like the spp image
  
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- Start a container from that image
  
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  docker run --name="my_container" -it sebasguts/sppdocker
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- Install additional software

- Create image out of the container, containing the installed software
  
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- Release it by uploading it to Docker Hub
  
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