

## Objectives

- Docker: Dockerfiles
- Agile Development

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## RAP Center Tour

- Winner: Friday, March 11
- Sign up for time slot (only one more person at 12:20)

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## Review: Containerization

- Compare and contrast containers and virtual machines
- What is docker?
  - What are some of its components?
  - What are the commands? What do they do? How are they useful?

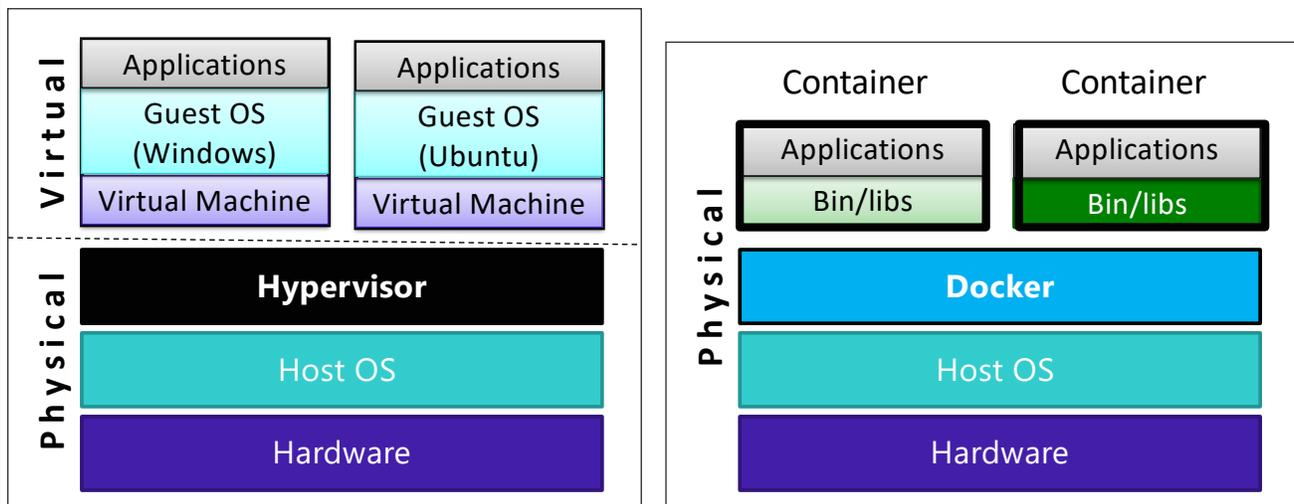
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## Review: Virtual Machine vs Container



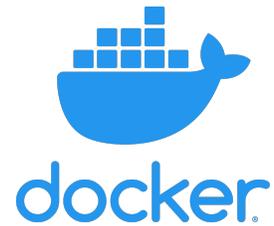
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## Docker



- Provides an interface on top of underlying containerization designs
  - Popularized containers
  - Interesting case in commercializing existing OS functionality
- Packages a filesystem in a docker image
  - Provides more of a “virtual machine” notion
  - But processes still running on existing kernel

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## Docker

- Installed on forth, fortran, java, logo, prolog, postscript
- Everyone in this class should have permission to run
  - Typically, only usable as `sudo`
- Update: if need to use bind mounts, will need to do in a “public” directory, e.g., `/tmp`
  - Looking into alternatives; may need to set up a directory for these

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# docker Commands Summary

Command	Purpose	Options

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# docker Commands Summary

Command	Purpose	Options
run	Runs a command in a new container	-it interactive mode --name name the container
start	Start the existing named container, with same command as specified with run initially	
rm	Delete the container's files	
image prune	Delete images not in use	
ps	List running containers	-a all containers
build	Build a new image	
stop	Stops a container	

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## Docker Images

- Docker Hub
  - Repository of docker images
- Dockerfile
  - Create your own image

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## Docker Components

- Image: blue print for the container
- Containers: running process
- Bind mounts: allows files on the home system to be used by the container
- Dockerfile: file with commands describing an image

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## Dockerfile

- Write instructions for your own images in a Dockerfile

```
FROM ubuntu:20.04
RUN apt update
RUN apt install -y cowsay
RUN apt install -y ack git wget
CMD ["/bin/bash"]
```

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## docker-compose

- Allow running multi-container Docker applications from a docker-compose.yml file

```
version: "2"
services:
  my-application:
    build: ./
    ports:
      - "8000:8000"
    environment:
      - CONFIG_FILE
  db:
    image: postgres
  redis:
    image: redis
    command: redis-server --save "" --appendonly no
    ports:
      - "6379"
```

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# Containers

MAN, DOCKER IS BEING USED FOR EVERYTHING. I DON'T KNOW HOW I FEEL ABOUT IT. STORY TIME!

ONCE, LONG AGO, I WANTED TO USE AN OLD TABLET AS A WALL DISPLAY.

I HAD AN APP AND A CALENDAR WEBPAGE THAT I WANTED TO SHOW SIDE BY SIDE, BUT THE OS DIDN'T HAVE SPLIT-SCREEN SUPPORT. SO I DECIDED TO BUILD MY OWN APP.



I DOWNLOADED THE SDK AND THE IDE, REGISTERED AS A DEVELOPER, AND STARTED READING THE LANGUAGE'S DOCS.

...THEN I REALIZED IT WOULD BE WAY EASIER TO GET TWO SMALLER PHONES ON EBAY AND GLUE THEM TOGETHER.

BUT YOU NEVER LEARNED TO WRITE SOFTWARE.

NO, I JUST LEARNED HOW TO GLUE TOGETHER STUFF THAT I DON'T UNDERSTAND.

I...OK, FAIR.

ON THAT DAY, I ACHIEVED SOFTWARE ENLIGHTENMENT.

<https://xkcd.com/1988/>

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DID YOU FINISH WRITING THE SOFTWARE? NO.

I SPENT THE LAST THREE DAYS SETTING UP MY PROGRAMMING ENVIRONMENT.

SO... YOU'VE DONE... NOTHING? NOTHING YOU'D UNDERSTAND.

@ScottAdamsSays  
Dilbert.com

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## Discussion: Should the CS Department use a Virtual or Physical Server?

- Physical Server: housed in the closet down the hall
- Virtual Server: housed in RAP Data Center
- What are your questions/considerations?

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## AGILE DEVELOPMENT

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## Agile Development

- Iterative approach to project management and software development
  - Work in small, launchable increments
  - Frequent review of requirements, plans, results
- Goals:
  - Respond to change quickly
  - Deliver application faster
  - Fewer conflicts about requirements

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## Agile Development Framework: Scrum

- Product owner creates a prioritized wish list: *product backlog*
- Team works in a *sprint*, usually 2-4 weeks
  - During planning, team picks a subset of wish list, *a sprint backlog*, and decides how to implement those pieces
  - Daily Scrum (“Stand up meeting”): team meets daily to assess its progress
    - Scrum Master keeps the team focused on its goal
  - At end of sprint, work should be potentially shippable:
    - Ready to hand to a customer, put on a store shelf, or show to a stakeholder
  - Sprint ends with a sprint review and retrospective
- Repeat sprint

<https://www.scrumalliance.org/>

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## Practicing with Scrum

- Project: Self Service
  - What are the software components of Self Service?

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## Practicing with Scrum

- Create a “story” for things that need to be done for Self Service
  - “Story” → like a user feature
    - As a {*type of user*}, I want {*goal*} so that I {*receive benefit*}.
    - As a customer, I want to be able to create an account so that I can see the purchases I made in the last year to help me budget for next year.
  - Add some subtasks

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## Practicing with Scrum

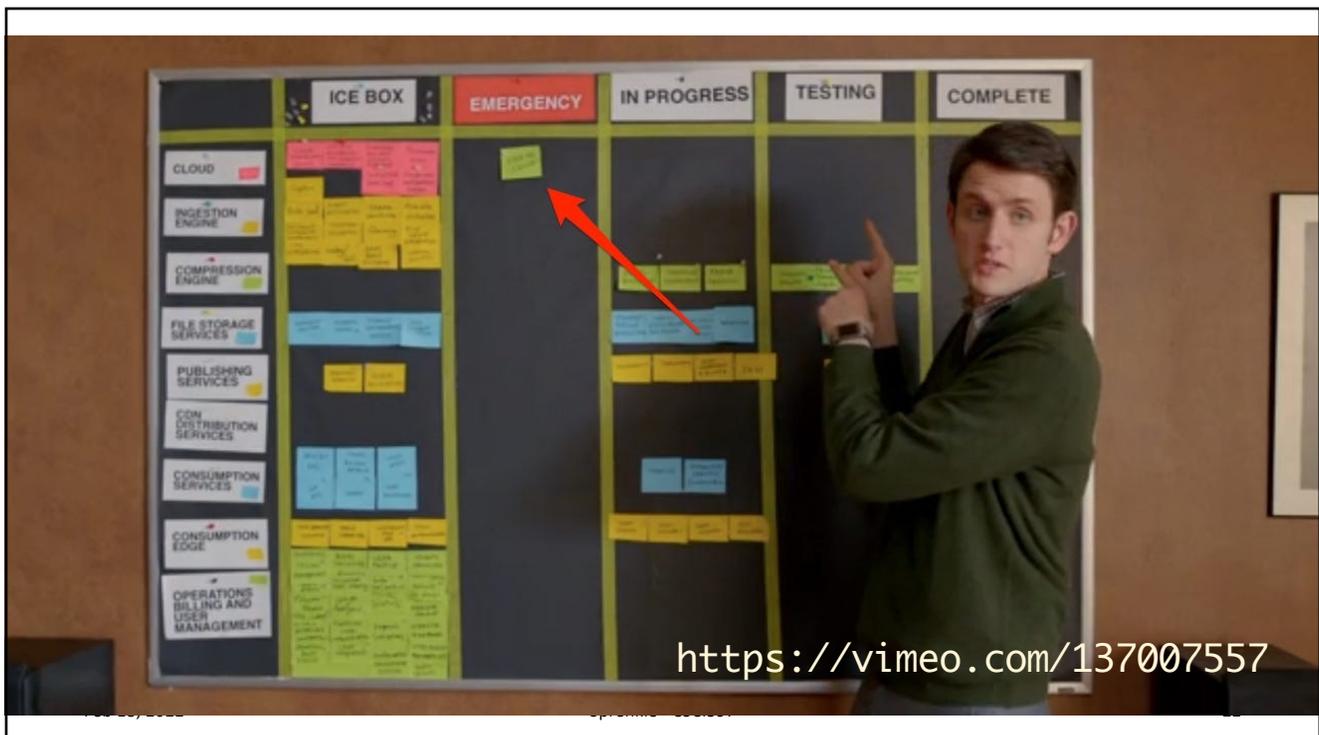
- Prioritize those stories (in Backlog)
- Estimate the stories
  - Time
  - Effort
    - .5, 1, 2, 3, 5, 8, 13, 20, 40, 100
- Create a sprint
  - How long is our sprint?
  - What stories belong in our first sprint?
  - What work can we complete in the amount of time?

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Projects / Beyond Gravity

### Board

⚡ ⌚ 4 days remaining Complete sprint ⋮

🔍 [ ] 👤 +3 Epic ▾ GROUP BY Choices ▾

TO DO 12	IN PROGRESS 4	IN REVIEW 4	DONE 4
<p>Implement feedback collector 🟢 NUC-205 9 👤</p>	<p>Update T&amp;C copy with v1.9 from the writers guild in all products that have cross country compliance 🔴 NUC-213 1 👤</p>	<p>Multi-dest search UI web 🟢 NUC-338 5 👤</p>	<p>Quick booking for accomodations - web 🟢 NUC-336 ✓ 4 👤</p>
<p>Bump version for new API for billing 🔴 NUC-206 3 👤</p>	<p>Tech spike on new stripe integration with paypal 🔵 NUC-215 3 👤</p>		<p>Adapt web app no new payments provider 🔴 NUC-346 ✓ 3 👤</p>
<p>Add NPS feedback to wallboard 🔵 NUC-208 1 👤</p>	<p>Refactor stripe verification key validator to a single call to avoid timing out on slow connections 🟢 NUC-216 3 👤</p>		<p>Fluid booking on tablets 🟢 NUC-343 ✓ 5 👤</p>
	<p>Change phone number field type to 'phone' 🔵 NUC-217 1 👤</p>		<p>Shoping cart purchasing error - quick fix required. 🔴 NUC-354 ✓ 1 👤</p>

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