INTRODUCTION TO DOCKER

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Container Solutions

SO WHAT IS DOCKER?

SIMILAR TO A LIGHTWEIGHT VM

- Both provide *isolated environments*
- Docker is much more efficient
- 64-bit Linux only (currently)

CONTAINERIZATION

A Docker container is a *portable* store for a *single component* and its *dependencies*

THE SHIPPING METAPHOR

- Traditionally, cargo was shipped as "bulk" and "break bulk"
- Think sacks of coffee beans, barrels of oil etc.
- Lots of manual work

MEET THE INTERMODAL CONTAINER

- Holds goods of different shapes and sizes
- Shipping company doesn't care as long as it comes in a standard container
- Cranes, ships, forklifts, lorries all support standard containers
- Huge gain in efficiency

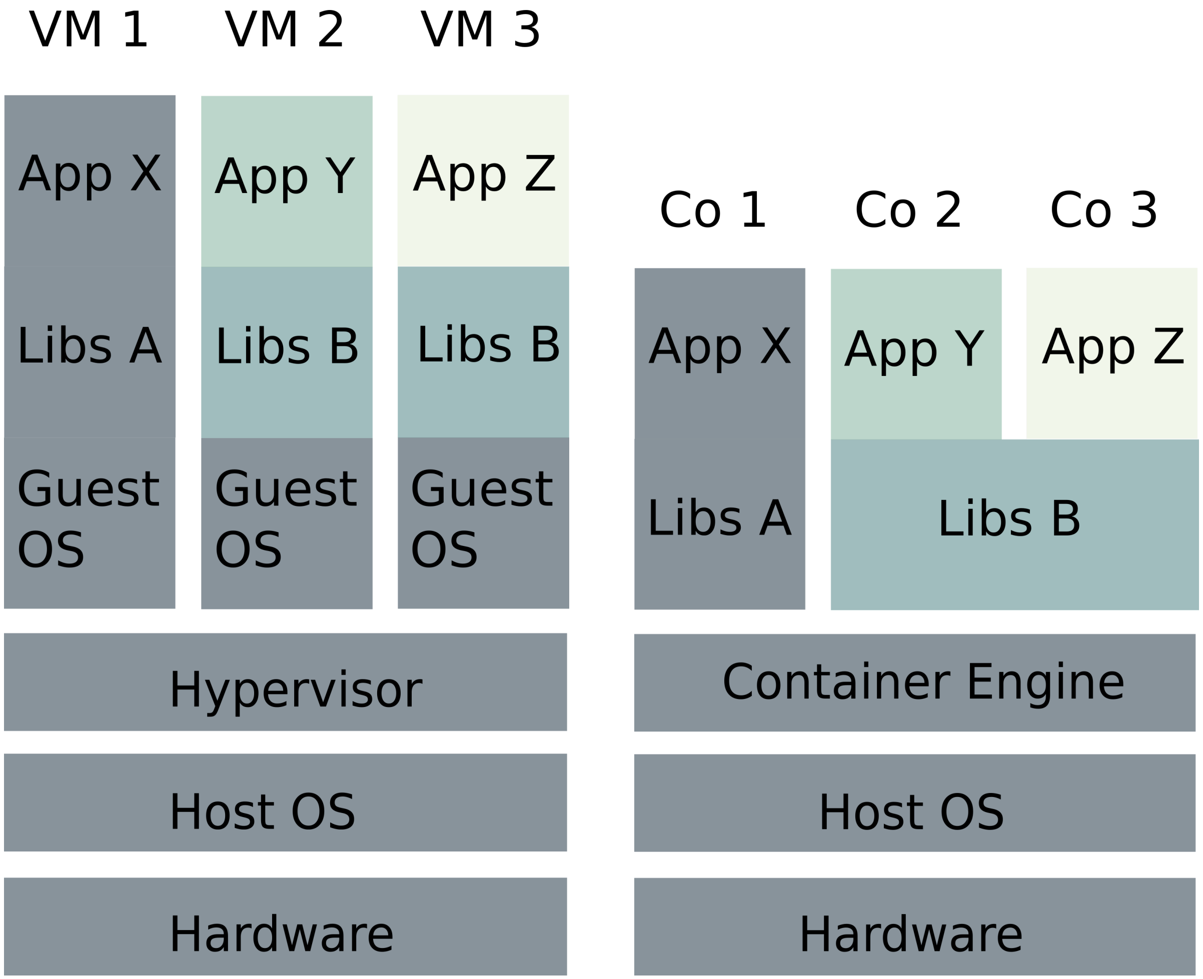
THE SOFTWARE SITUATION

- Modern applications have lots of components
    - database, webserver, loadbalancer..
- And lots of enivronments
    - developer's laptop, testing VM, staging server, cloud
- Problems moving between them

MEET THE DOCKER CONTAINER

- Put anything you like in a container
  - Database, Web server, proxy etc
- Ship it anywhere
  - Use the same container in development, testing and production
- Provides sandboxing
- Isolates dependencies

VMS VS CONTAINERS



ENOUGH THEORY!

DEMO TIME!

CONTAINERIZATION

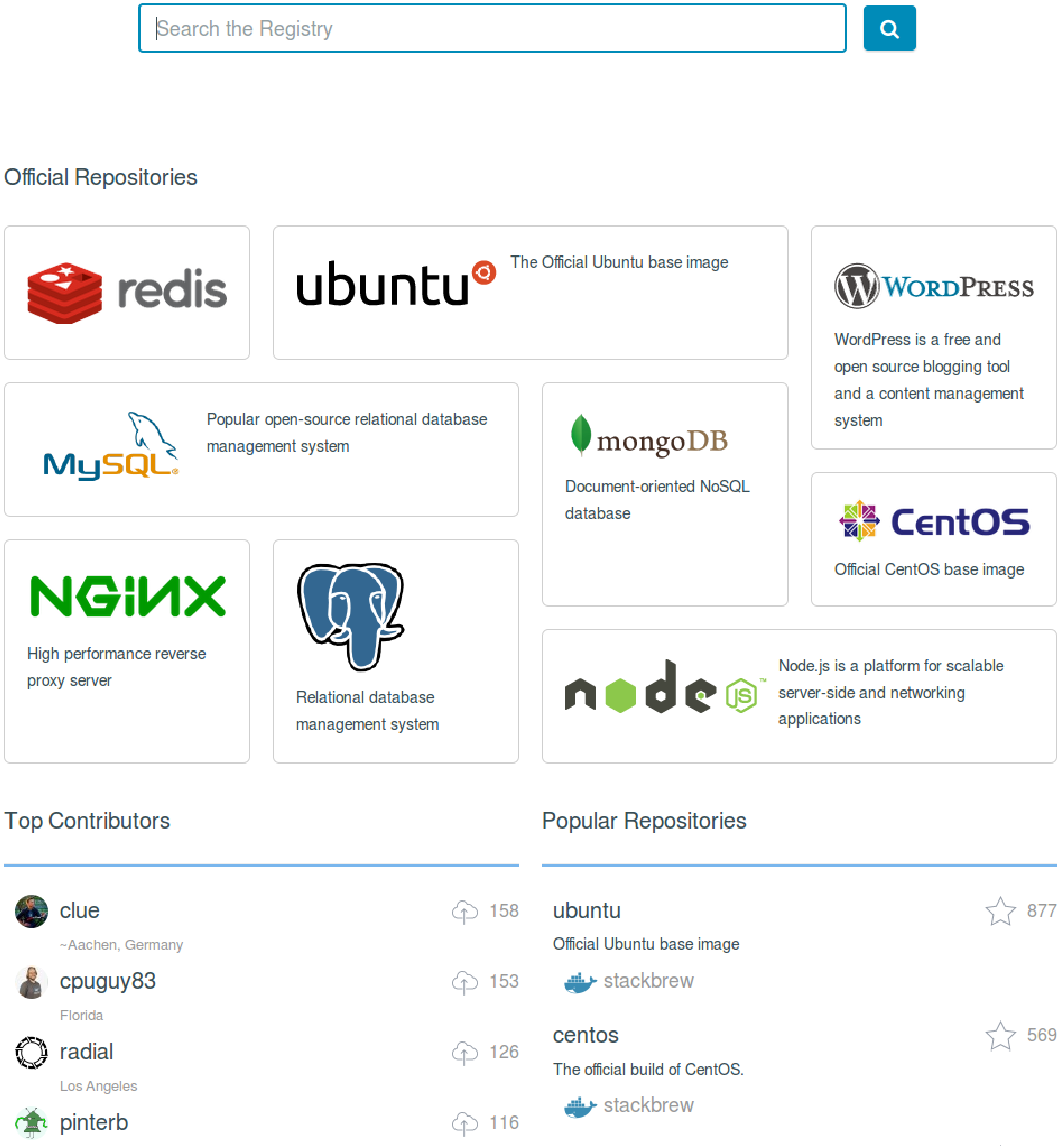
A Docker *image* is a *portable* store for a *single component* and its *dependencies*

DOCKER IMAGES

- Like a stopped VM
- Built from Dockerfiles
- List of repeatable steps
- Mongo Dockerfile

BUT DOCKER IS MORE THAN THIS

- Aims to be an "open platform"
- Key to this is the Docker Hub



Official Repositories

The Official Ubuntu base image

WordPress is a free and open source blogging tool and a content management system

Popular open-source relational database management system

Document-oriented NoSQL database

Official CentOS base image

High performance reverse proxy server

Relational database management system

Node.js is a platform for scalable server-side and networking applications

Top Contributors

clue ~Aachen, Germany	158
cpuguy83 Florida	153
radial Los Angeles	126
pinterb	116

Popular Repositories

ubuntu Official Ubuntu base image stackbrew	☆ 877
centos The official build of CentOS. stackbrew	☆ 569

USE CASES

CONTINUOUS DELIVERY

- Fast deployment pipeline
- Automatic testing and integration
- Software is always production ready
- Can deploy new version at "push of a button"

WHERE DOCKER COMES IN

- Reduces difference between dev and production
- Devops tool
  - Developers define dependencies
  - Operations concentrate on hosting containers
- Faster system tests

MICROSERVICES

- Application made up of many small independent services
- As opposed to monolithic applications
- Can easily scale and replace services
- Problems
  - Deciding where to separate services
  - Larger system (more VMs)

PREREQUISITES

- Rapid Provisioning
- Basic Monitoring
- Rapid Application Deployment
- Devops Culture

http://martinfowler.com/bliki/MicroservicePrerequisites.html

WHERE DOCKER COMES IN

- Rapid Provisioning
  - Good cloud support
    - both private and public
  - Greater efficiency means less hardware
- Rapid Application Deployment
  - *Much* faster to spin up containers
  - Designed to be part of a pipeline
- Devops Culture
  - Docker is a DevOps tool!

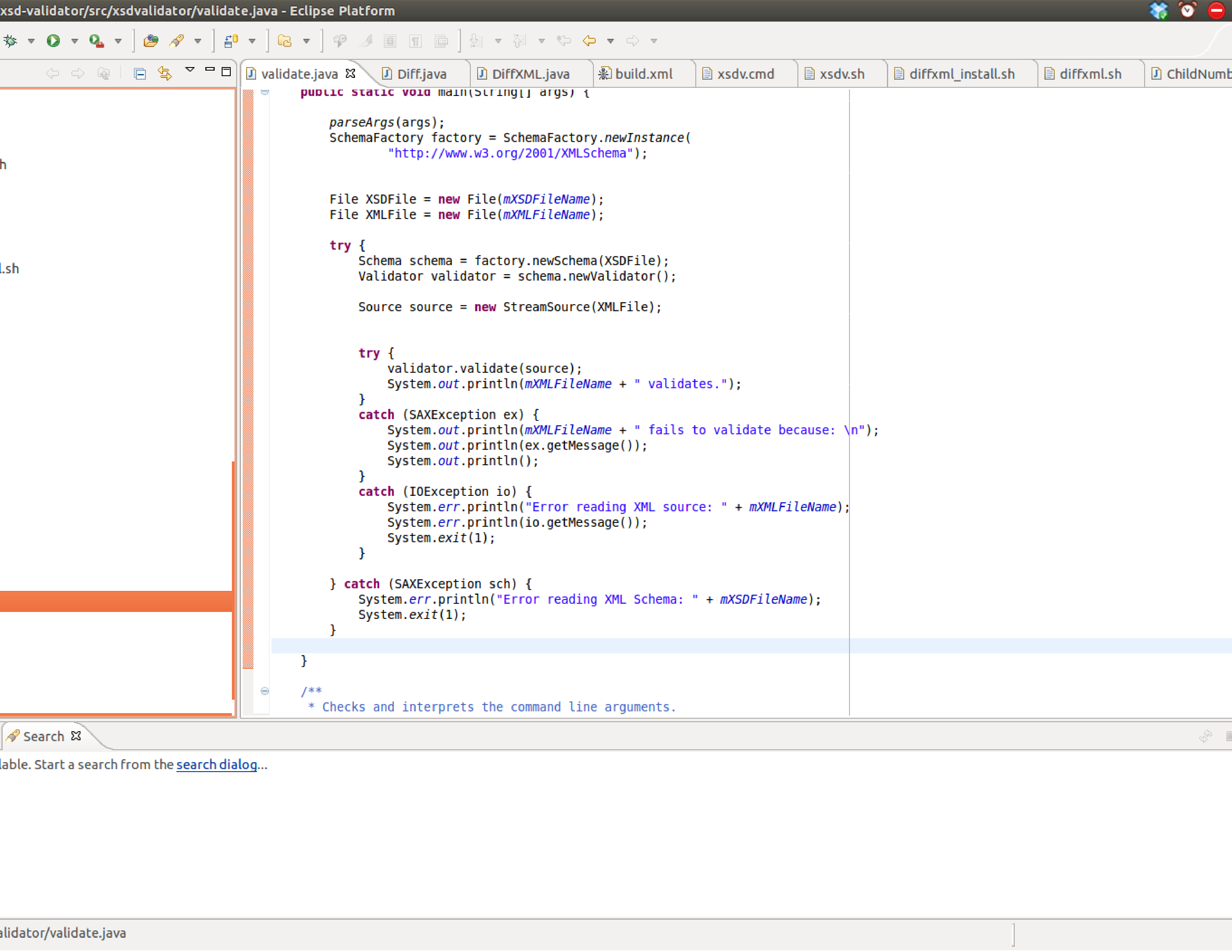
WRAPPING APPLICATIONS

- Putting applications in container
- Existing desktop apps
- GUI and command-line
- For normal end users

WHY?

- Easy Install
- Safe
- Portable
- Hub for Distribution

EXAMPLES



```
    public static void main(String[] args) {

        parseArgs(args);
        SchemaFactory factory = SchemaFactory.newInstance(
                "http://www.w3.org/2001/XMLSchema");


        File XSDFile = new File(mXSDFileName);
        File XMLFile = new File(mXMLFileName);

        try {
            Schema schema = factory.newSchema(XSDFile);
            Validator validator = schema.newValidator();

            Source source = new StreamSource(XMLFile);


            try {
                validator.validate(source);
                System.out.println(mXMLFileName + " validates.");
            }
            catch (SAXException ex) {
                System.out.println(mXMLFileName + " fails to validate because: \n");
                System.out.println(ex.getMessage());
                System.out.println();
            }
            catch (IOException io) {
                System.err.println("Error reading XML source: " + mXMLFileName);
                System.err.println(io.getMessage());
                System.exit(1);
            }

        } catch (SAXException sch) {
            System.err.println("Error reading XML Schema: " + mXSDFileName);
            System.exit(1);
        }

    }

    /**
     * Checks and interprets the command line arguments.
```

lable. Start a search from the search dialog...

DEVELOPMENT ENVIRONMENTS

- Share pre-configured set-up
- Plug-ins, source repositories, coding standards
- Also Vagrant

ERR, THIS?

- Fit of rage at Powerpoint
- Decided to try reveal.js
- Hard to install
    - Node, NPM, Grunt...

CONCLUSION

- Containers are the future!
- Likely to be ubiquitous
- Wide range of use cases
    - Some we haven't seen yet

- Chief Scientist @ Container Solutions
- http://www.container-solutions.com
- Writing "Using Docker" for O'Reilly
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