

Gestion de versions et outils de build

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Why

Apply patterns to project build infrastructure to provide a coherent view of software projects.

Provides a way to help with managing:

- **Builds**
- **Dependencies**
- **Software Configuration Management**
- Documentation
- Reporting
- Releases

Objectives

- Make the development process visible or transparent
- Provide an easy way to see the health and status of a project
- Decreasing training time for new developers
- Bringing together the tools required in a uniform way
- Preventing inconsistent setups
- Providing a standard development infrastructure across projects
- Focus energy on writing applications

Benefits

- Standardization
- Fast and easy to set up a powerful build process
- Dependency management (automatic downloads)
- Project website generation, Javadoc
- Repository management
- Extensible architecture

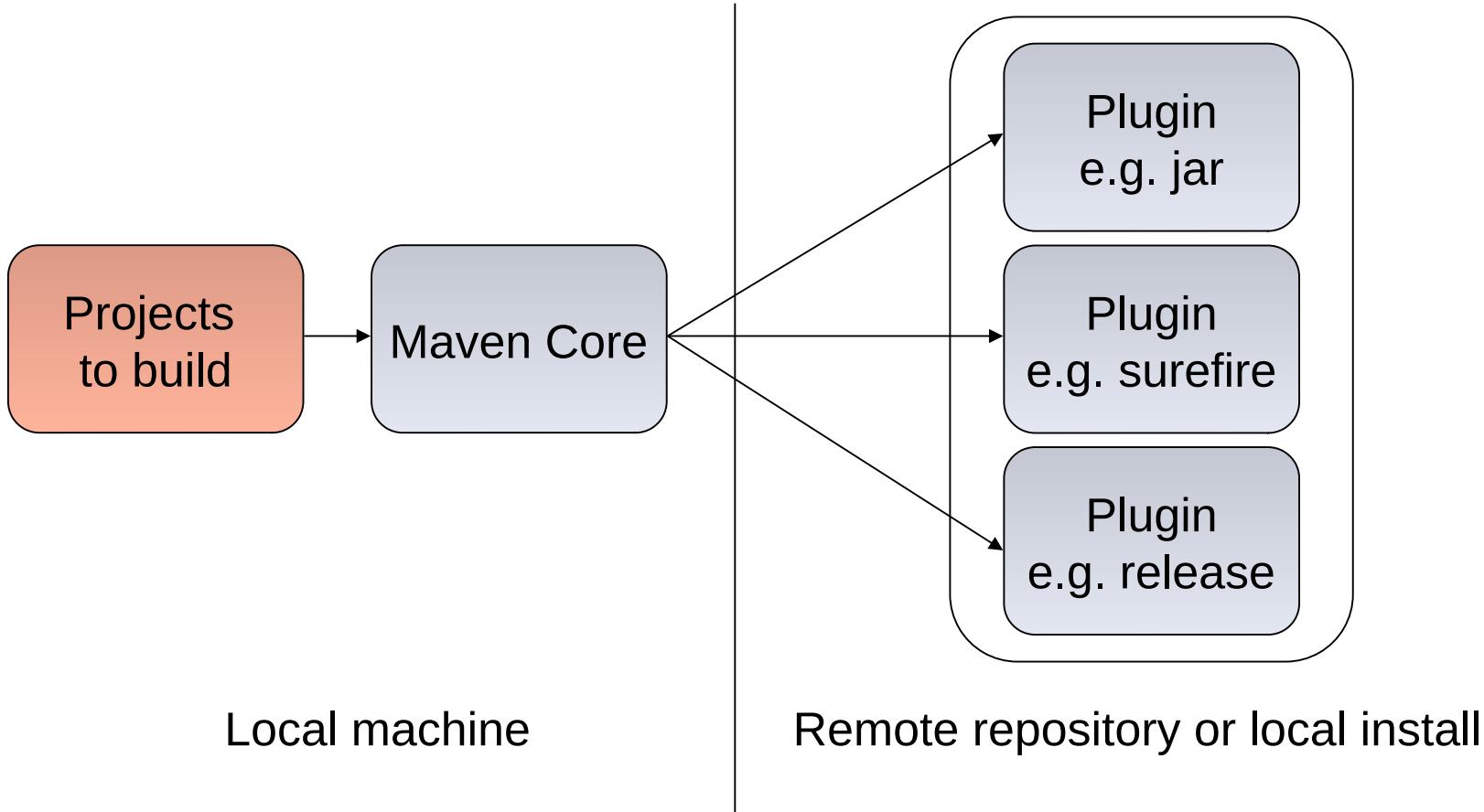
Un premier exemple avec Maven

Pour le côté historique

What is Maven?

- A build tool
- A dependency management tool
- A documentation tool

What is Maven?



Common project metadata format

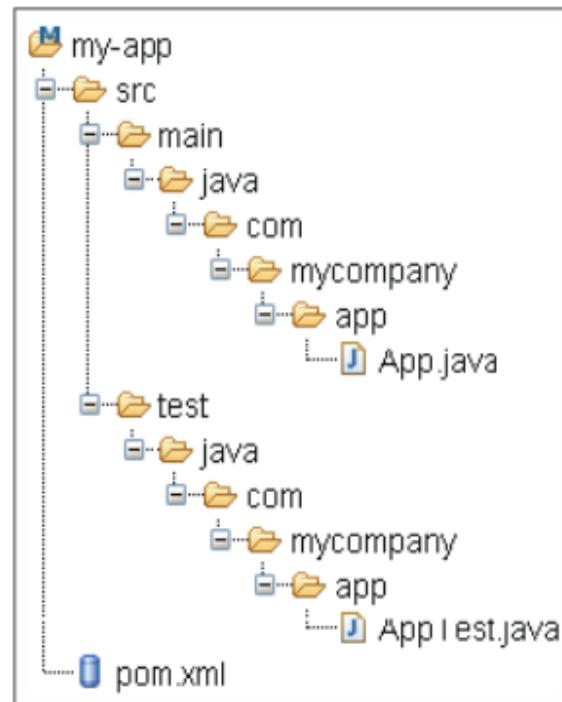
- POM = Project Object Model = pom.xml
- Contains metadata about the project
- Location of directories, Developers/Contributors, Issue tracking system, Dependencies, Repositories to use, etc
- Example:

```
<project>
  <modelVersion>4.0.0</modelVersion>
  <groupId>org.codehaus.cargo</groupId>
  <artifactId>cargo-core-api-container</artifactId>
  <name>Cargo Core Container API</name>
  <version>0.7-SNAPSHOT</version>
  <packaging>jar</packaging>
  <dependencies/>
  <build/>
  [...]
```

Standard directory organization

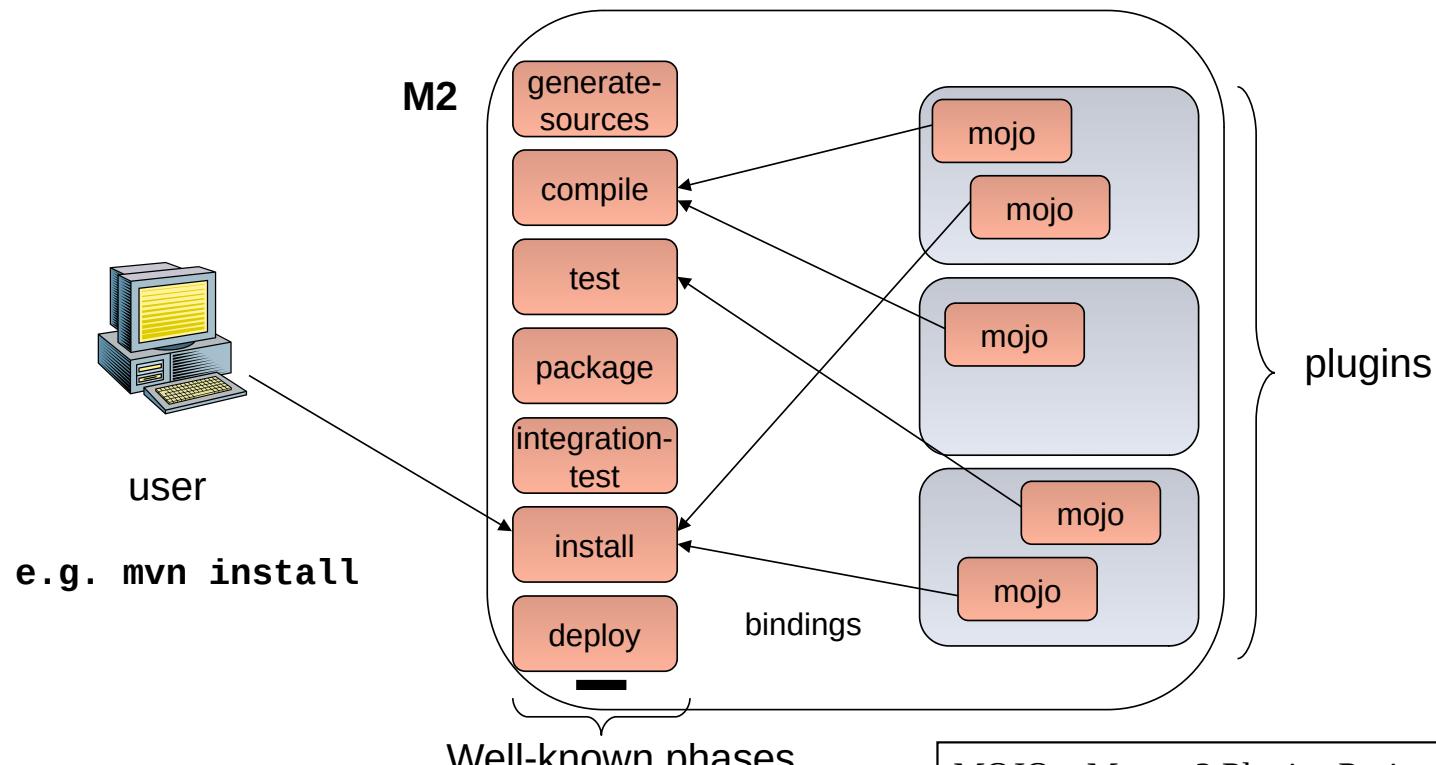
- Having a common directory layout would allow for users familiar with one Maven project to immediately feel at home in another Maven project.

src/main/java	Application/Library sources
src/main/resources	Application/Library resources
src/main/filters	Resource filter files
src/main/assembly	Assembly descriptors
src/main/config	Configuration files
src/main/webapp	Web application sources
src/test/java	Test sources
src/test/resources	Test resources
src/test/filters	resource filter files
src/site	Site resources
LICENSE.txt	Project's license
README.txt	



Convention over configuration

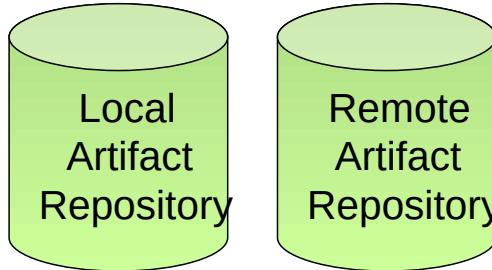
Common way to build applications



MOJO – Maven 2 Plugins Project
<http://mojo.codehaus.org/>

Artifact repositories (1/3)

- Used to store all kind of artifacts
 - JARs, EARs, WARs, NBMs, EJBs, ZIPs, plugins, ...
- All project interactions go through the repository
 - No more relative paths!
 - Easy to share between team

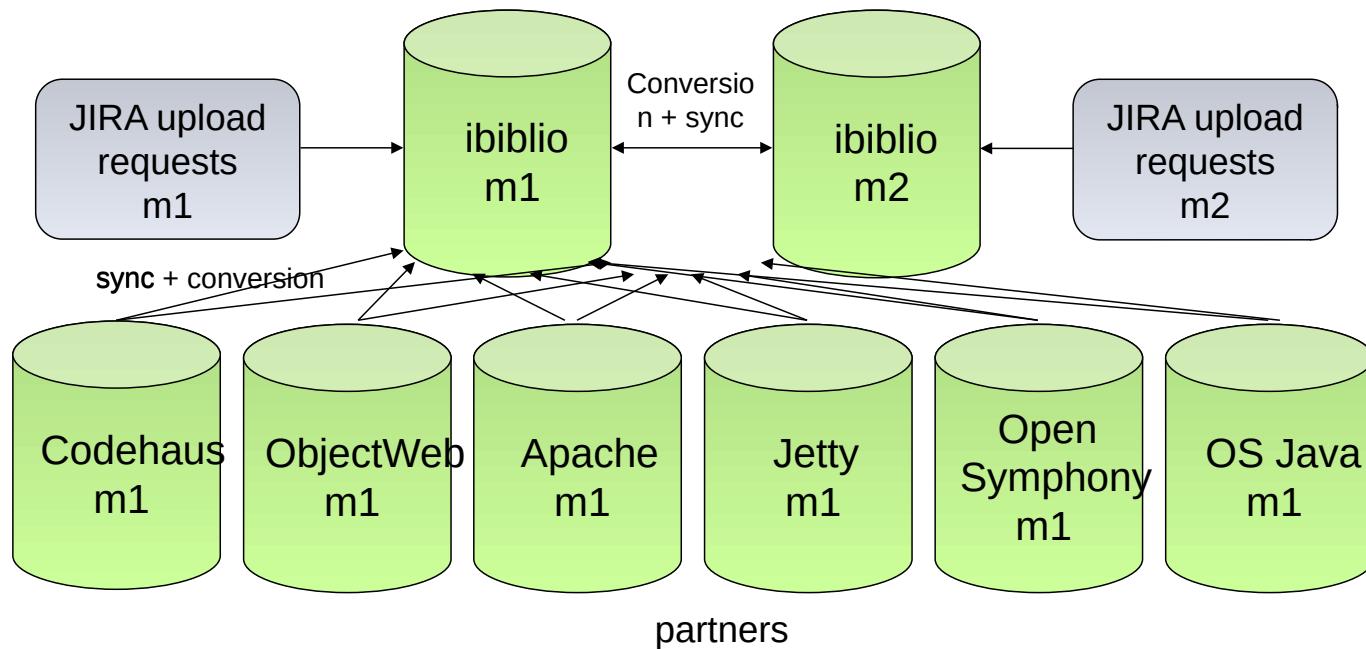


e.g. <http://ibiblio.org/maven2>

```
<repositories>
  <repository>
    <id>maven2-snapshot</id>
    <releases>
      <enabled>true</enabled>
    </releases>
    <name>Maven Central Development Repository</name>
    <url>http://snapshots.maven.codehaus.org/maven2</url>
    <layout>legacy|default</layout>
  </repository>
</repositories>
```

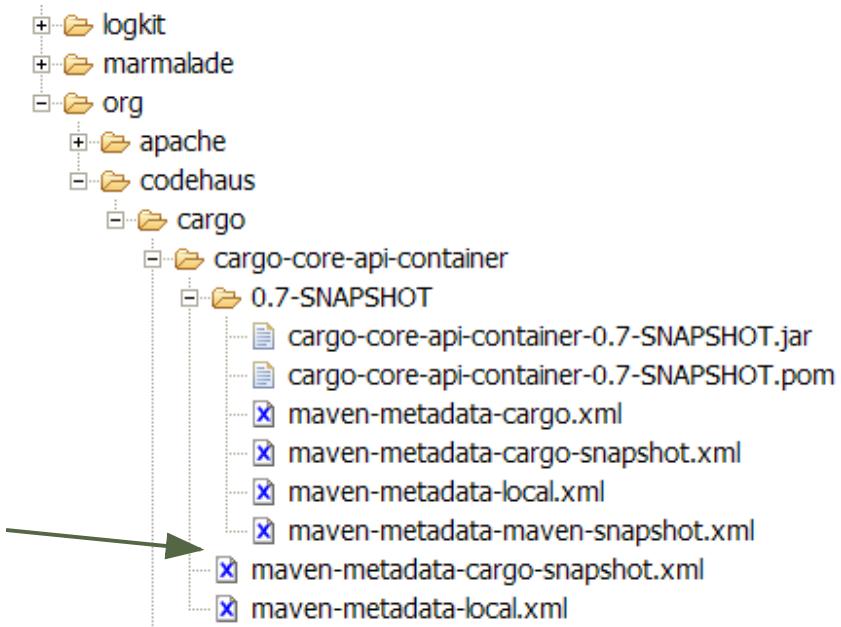
Artifact Repositories (2/3)

Some public remote repositories



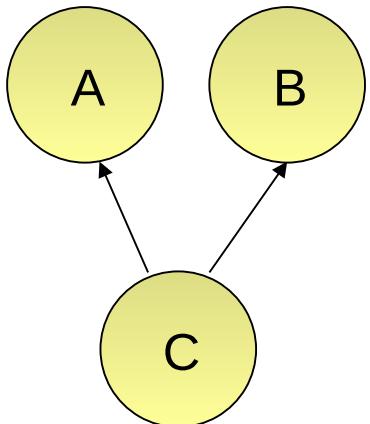
Artifact repositories (3/3)

- Hierarchical structure
- Automatic plugin download
- Plugins are read directly from the repository
- Configurable strategies for checking the remote repositories for updates
 - Daily check by default for plugin and ranges updates
- Remote repositories contain Metadata information
 - Releases, latest, and more to come



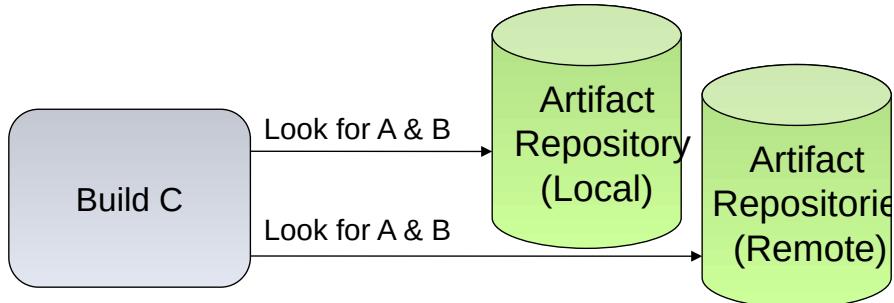
Dependency management

- Maven uses binary dependencies



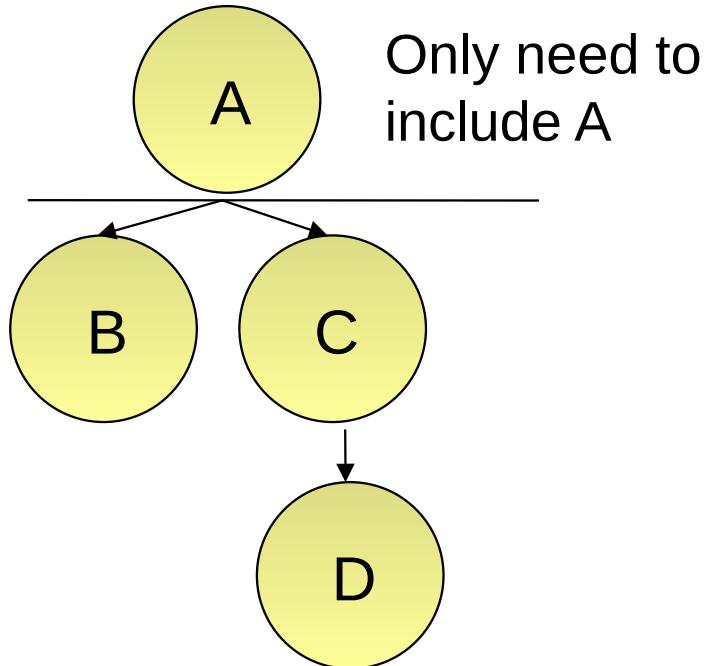
« any version after 1.0 »

```
<dependencies>
  <dependency>
    <groupId>com.acme</groupId>
    <artifactId>B</artifactId>
    <version>[1.0,)</version>
    <scope>compile</scope>
  </dependency>
</dependencies>
```



Dependency management

- Transitive dependencies
 - Possibility to exclude some dependencies
 - Need good metadata
 - Ideally projects should be split
- SNAPSHOT handling
 - Always get latest
- Automatic dependency updates
 - By default every day



Installation and Setup

- Download Maven 3 from <http://maven.apache.org/>
- Add Maven's bin directory to PATH
- Ensure JAVA_HOME is set to SDK
- Run mvn --version to test install

```
$ mvn --version
Apache Maven 3.8.7
Maven home: /usr/share/maven
Java version: 17.0.8.1, vendor: Private Build, runtime: /usr/lib/jvm/java-17-openjdk-amd64
Default locale: fr_FR, platform encoding: UTF-8
OS name: "linux", version: "6.2.0-060200-generic", arch: "amd64", family: "unix"
```

Overview of common Goals

- **clean** – clean the current project
- **validate** - validate the project is correct and all necessary information is available
- **compile** - compile the source code of the project
- **test** - test the compiled source code using a suitable unit testing framework. These tests should not require the code be packaged or deployed
- **package** - take the compiled code and package it in its distributable format, such as a JAR
- **integration-test** - process and deploy the package if necessary into an environment where integration tests can be run
- **install** - install the package into the local repository, for use as a dependency in other projects locally
- **deploy** - done in an integration or release environment, copies the final package to the remote repository for sharing with other developers and projects

Creating project website

```
mvn site
```

- Let the build run, it'll start downloading and creating things left and right
- Eventually in the target dir you end up with a site dir, with an apache-style project website
- Javadoc, various reports, and custom content can be added

More stuff

- Automatically generate reports, diagrams, and so on through Maven / the project site
- Internationalization – create different language project websites
- Create projects within projects (more pom.xml files inside sub dirs\jars), with different build stats and so on
- Maven can make .war files, EJBs, etc.

Using Maven Plugins

- Whenever you want to customise the build for a Maven project, this is done by adding or reconfiguring plugins
- For example, configure the Java compiler to allow JDK 5.0 sources

```
...
<build>
  <plugins>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-compiler-plugin</artifactId>
      <configuration>
        <source>1.5</source>
        <target>1.5</target>
      </configuration>
    </plugin>
  </plugins>
</build>
...
```

Maven Plugins

- AlmostPlainText
- Maven Cobertura
- Dbunit
- Debian Package
- Maven DotUml
- Doxygen
- FindBugs
- Maven flash
- Maven IzPack
- Java Application
- Kodo
- Maven Macker
- SDocBook
- Maven SpringGraph
- Strutsdoc
- Tasks
- Maven Transform
- Maven Vignette
- WebSphere 4.0
- WebSphere 5 (5.0/5.1)
- Maven WebLogic
- Canoo WebTest
- Wiki
- XML Resume
- Maven DotUml
- Middlegen
- Maven News
- ...

Archetypes

- For reuse, create archetypes that work as project templates with build settings, etc
- An archetype is a project, with its own pom.xml
- An archetype has a descriptor called archetype.xml
- Allows easy generation of Maven projects

Good things about Maven

- Standardization
- Reuse
- Dependency management
- Build lifecycle management
- Large existing repository
- IDE aware
- One directory layout
- A single way to define dependencies
- Setting up a project is really fast
- Transitive dependencies
- Common build structure
- Use of remote repository
- Web site generation
- Build best practices enforcement
- Automated build of application
- Works well with distributed teams
- All artifacts are versioned and are stored in a repository
- Build process is standardized for all projects
- A lot of goals are available
- It provides quality project information with generated site
- Easy to learn and use
- Makes the build process much easier at the project level
- Promotes modular design of code

References

- [Maven Home](#)
- [Maven Getting Started Guide](#)
- [Maven Integration for Eclipse](#)

L'écosystème JS

Project Tools

No matter the Editor

Project Tools

- NPM, Yarn & Bower
 - Install Node.js packages or client libraries
- Grunt & Gulp
 - Tasks runner
 - Create different tasks for build/development/test cases
- Yeoman
 - Scaffolding of applications
 - One-line-of-code to create a project template with views/routes/modules/etc...

Package Management

NPM, Yarn & Bower

Package Management: NPM

- Node.js Package Management (NPM)
- Package manager for Node.js modules

```
npm init #in CMD (Win) or Terminal (MAC/Linux)
```

- Initializes an empty Node.js project with package.json file

```
npm init
//enter package details
name: "NPM demos"
version: 0.0.1
description: "Demos for the NPM package management"
entry point: main.js
test command: test
git repository: http://github.com/user/repository-name
keywords: npm, package management
author: doncho.minkov@telerik.com
license: BSD-2-Clause
```

Package Management: NPM

- Installing modules

```
npm install package-name [--save][--save-dev][--save-optional]  
# Installs a package to the Node.js project
```

- *-S, --save*: Package will appear in your dependencies in package.json
- *-D, --save-dev*: Package will appear in your devDependencies
- *-O, --save-optional*: Package will appear in your optionalDependencies.

```
npm install express --save-dev
```

Before running the project

```
npm install ## Installs all missing packages from package.json
```

Package Management: Bower (Deprecated)

- Bower is a package management tool for installing client-side JavaScript libraries
 - Like jQuery, KendoUI, AngularJS, etc...
 - It is a Node.js package and should be installed first

```
npm install -g bower
bower init # in CMD (Win) or Terminal (Mac/Linux)
```

- Asks for pretty much the same details as *\$ npm init* - Creates bower.json file to manage libraries

Package Management: Bower

- Searching for libraries

```
bower search kendo
```

```
Search results: -  
kendo-ui git://github.co  
angular-kendo-ui git://g  
kendo-backbone git://git  
knockout-kendo git://git  
kendo-global git://githu
```

- Installing libraries

```
bower install kendo-ui
```

```
bower cached      git://gith  
bower validate    2014.1.318  
i.git#*  
bower cached      git://gith  
bower validate    2.0.3 agai  
.0.3  
bower resolution  Removed un  
bower install     kendo-ui#2  
bower install     jquery#2.0  
kendo-ui#2014.1.318 bower_comp  
└── jquery#2.0.3  
jquery#2.0.3 bower_components\
```

Tasks Runner

Grunt & Gulp & NPM

Tasks Runner

- Grunt/Gulp are Node.js task runners
 - They can run different tasks, based on configuration
 - Tasks can be:
 - Concat and minify JavaScript/CSS files
 - Compile SASS/LESS/Stylus
 - Run jshint, csshint
 - Run Unit Tests
 - Deploy to Git, Cloud, etc...
 - And many many more

Task Runner

- Why use a task runner?
 - Task runners gives us automation, even for different profiles:

DEVELOPMENT	TEST	BUILD
jshint	jshint	jshint
stylus	stylus	stylus
csshint	csshint	csshint
connect	mocha	concat
watch		uglify
		copy
		usemin

Yeoman

Application Scaffolding

Yeoman

- Yeoman is a Node.js package for application scaffolding
 - Uses bower & NPM to install the js package
 - Has lots of generators for many types of applications:
 - MEAN, AngularJS, Kendo-UI, WebApp, WordPress, Backbone, Express, etc...
 - Each generators install both needed Node.js packages and client-side JavaScript libraries
 - Generated Gruntfile.js for build/test/serve

Yeoman

Install Yeoman:

```
npm install -g yo
```

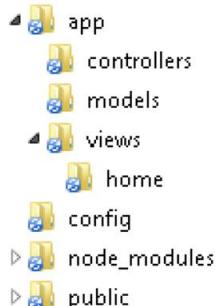
Install Yeoman generator:

```
npm install -g generator-jhipster
```

Scaffold Express application:

```
cd path/to/app/directory  
yo jhipster
```

Generates:



L'écosystème Python

L'écosystème Python

Python est langage fantastique, mais il y a un point qui laisse à désirer par rapport aux environnements plus récents comme node ou rust : le gestionnaire de package.

Pip

- Pour déclarer les dépendances d'une application python,
 - requirements.txt listant tous les packages nécessaires avec leur version

```
redis==2.10.6  
rq==0.13
```

- on peut mettre une version exacte (par exemple redis==2.10.6)
- ou des bornes pour définir une plage de versions acceptables, par exemple redis>=2.1.3,<3 accepte toutes les versions supérieures à la version 2.1.3 et inférieures à la version 3.0.0

Il est cependant vivement recommandé d'utiliser des versions exactes pour éviter que les versions sélectionnées par Pip changent sans prévenir au cours du temps.

Pip

Pour l'installation, on utilise ensuite la commande :

```
pip install -r requirements.txt
```

Les problèmes

- L'isolation des applications
- Les jeux de dépendances multiples

L'isolation des applications

- Pip n'a pas de notion d'application ou de projet:
 - si on utilise naïvement cette commande depuis deux applications, Pip va mixer les dépendances des deux applications et créer un système généralement inutilisable
- Pour isoler chaque application, besoin d'un autre outil: **virtualenv** ce qui va compliquer tout de suite la création de l'environnement de développement et l'installation de l'application en production

Les jeux de dépendances multiples

Les mises à jour

- Comme toutes les versions des packages doivent être manuellement spécifiées dans les fichiers requirements, il est très facile de créer des incompatibilités et Pip, s'il détecte le problème, n'aide pas du tout à le résoudre.

```
redis==2.10.6
rq==0.13
```

> Ces deux packages sont incompatibles car rq dépend de redis \geq 3.0.0. Voilà le comportement de Pip:

```
$ pip install -r requirements.txt
Collecting redis==2.10.6 (from -r requirements.txt (line 1))
  Using cached https://files.pythonhosted.org/packages/3b/f6/7a76333cf0b9251ecf49efff635015171843d9b977e4ffcf59f9c4428052/r
Collecting rq==1.0 (from -r requirements.txt (line 2))
  Using cached https://files.pythonhosted.org/packages/ee/f6/dbcf2a28e5621e1fcf6be6937da9777ad9ab03c7d3cb7d6ee835adc43329/r
Collecting click>=5.0 (from rq==1.0->-r requirements.txt (line 2))
  Using cached https://files.pythonhosted.org/packages/fa/37/45185cb5abbc30d7257104c434fe0b07e5a195a6847506c074527aa599ec/C
ERROR: rq 1.0 has requirement redis $\geq$ 3.0.0, but you'll have redis 2.10.6 which is incompatible.
Installing collected packages: redis, click, rq
Successfully installed click-7.0 redis-2.10.6 rq-1.0
```

Les jeux de dépendances multiples

Les mises à jour

Pip affiche bien un message d'erreur, mais le package rq est maintenant inutilisable et il va falloir trouver à la main, par essai-erreur, une combinaison de versions qui fonctionne.

On se retrouve généralement dans cette situation en essayant de faire une mise à jour : on modifie la version d'un package et la nouvelle version introduit une incompatibilité. Ce problème rend les mises à jour de versions dans les fichiers requirements **pénibles** et **dangereuses**.

Risque important pour la sécurité

Les jeux de dépendances multiples

Les packages résiduels

Au fil du temps, les dépendances d'une application vont évoluer : on va rajouter des dépendances mais aussi en supprimer et Pip ne fournit aucun moyen utilisable pour supprimer une dépendance.

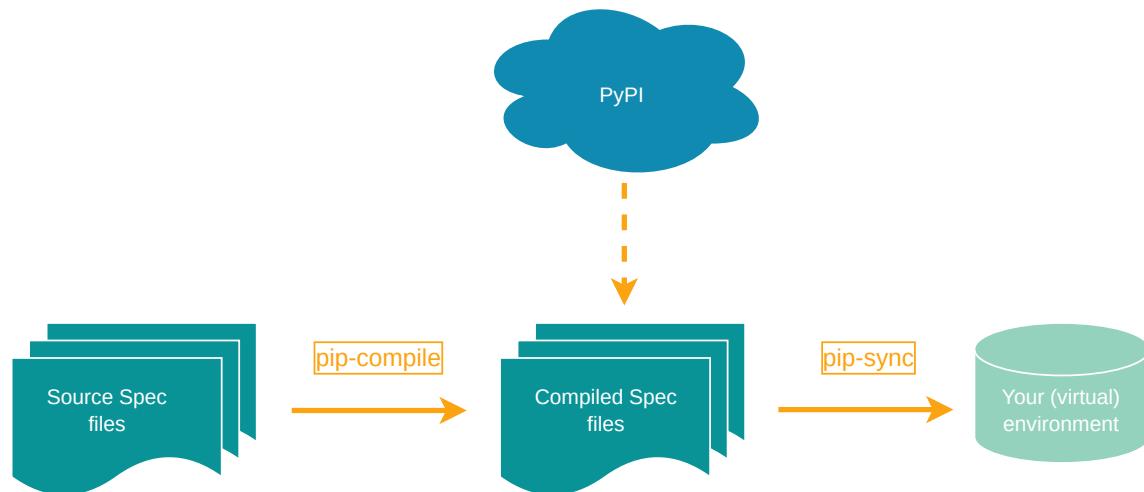
En pratique, le seul moyen de s'assurer que l'environnement ne contient pas de packages résiduels est de supprimer le virtualenv et de relancer l'installation complète. Ces packages résiduels peuvent induire deux types d'erreurs :

- on utilise sans s'en rendre compte un package non déclaré dans le requirements.txt et tout fonctionne jusqu'à ce que l'on crée un nouvel environnement
- la simple présence d'un package peut altérer le comportement d'un autre : on peut donc avoir de subtiles différences de comportement entre les environnements amenées par la présence d'un package résiduel

Les contre-mesures

Pip-tools (<https://github.com/jazzband/pip-tools>)

A set of command line tools to help you keep your pip-based packages fresh, even when you've pinned them. You do pin them, right? (In building your Python application and its dependencies for production, you want to make sure that your builds are predictable and deterministic.)



Les contre-mesures

Pip-tools (<https://github.com/jazzband/pip-tools>)

les pip-tools adressent uniquement les problèmes de mise à jour de versions et de packages résiduels. Pour isoler son environnement et gérer différents jeux de dépendances, il faudra recourir au mêmes techniques qu'avec Pip (virtualenv).

Les contre-mesures

Pipenv (<https://github.com/pypa/pipenv>)

Pipenv is a Python virtualenv management tool that supports a multitude of systems and nicely bridges the gaps between pip, python (using system python, pyenv or asdf) and virtualenv. Linux, macOS, and Windows are all first-class citizens in pipenv.

Pipenv automatically creates and manages a virtualenv for your projects, as well as adds/removes packages from your Pipfile as you install/uninstall packages. It also generates a project Pipfile.lock, which is used to produce deterministic builds.

Les contre-mesures

Poetry (<https://python-poetry.org/>)

Python packaging and dependency management made easy

- Poetry comes with an exhaustive dependency resolver, which will always find a solution if it exists
- Poetry either uses your configured virtualenvs or creates its own to always be isolated from your system
- Poetry's commands are intuitive and easy to use, with sensible defaults while still being configurable

L'écosystème Rust

L'écosystème Rust

Rust is an amazing language to work with. However, it comes with an oft-misunderstood tool known as Cargo.

What is Cargo in Rust?

Cargo is Rust's build system and package manager. With this tool, you'll get a repeatable build because it allows Rust packages to declare their dependencies in the manifest, `Cargo.toml`.

Cargo helps you to compile your Rust program successfully. It **downloads dependencies, compiles** your packages, and **uploads** them to the Rust project registry, **crates.io**.

How Cargo works ?

- Cargo allows Rust packages to declare their dependencies. => **Cargo.toml**
- Cargo extracts all the necessary information about your dependencies and build information into the **Cargo.lock** file.

Cargo.lock vs. Cargo.toml

The first thing to note about Cargo.lock and Cargo.toml is that both contain dependencies for your project. However, Cargo.toml is written by the developer while Cargo.lock is maintained by Cargo.

The reason for using a Cargo.lock file in addition to a Cargo.toml file is to enable repeatable builds across all machines. While Cargo.toml file stores SemVer versions, Cargo.lock stores the exact version of dependency during a successful build.

To understand this better, let's imagine that there's no Cargo.lock file and the SemVer restrictions for our dependencies are:

```
[dependencies]
serde = "1.0"
serde json = "1.0"
```

When you build your project, the exact serde version that builds successfully is `serde = "1.0.124"`. If `serde` is updated and you share your project with a colleague, they may run into some errors because the `serde` update may not be compatible with your project. Cargo.lock resolves dependency issues by allowing Cargo to compare information in the Cargo.lock file.

Building a Rust application is impossible without Cargo

Cargo orchestrates a smooth build, compile, and runtime for your Rust project

Conclusion

Conclusion

- Les *packages manager* convergent sur les fonctionnalités
 - gestion de dépendances
 - download dependencies
 - pin of dependencies
 - upgrade management
 - build orchestration
 - makefile moderne
 - deploy
- Les lacunes encore importantes
 - peu de support intrinsèque pour lutter contre les campagnes d'attaque sur la supply chain
 - typosquatting
 - batch reporting ...

Questions

What is Sliderv?

Sliderv is a slides maker and presenter designed for developers, consist of the following features

-  **Text-based** - focus on the content with Markdown, and then style them later
-  **Themable** - theme can be shared and used with npm packages
-  **Developer Friendly** - code highlighting, live coding with autocompletion
-  **Interactive** - embedding Vue components to enhance your expressions
-  **Recording** - built-in recording and camera view
-  **Portable** - export into PDF, PNGs, or even a hostable SPA
-  **Hackable** - anything possible on a webpage

Read more about [Why Sliderv?](#)

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<Toc minDepth="1" maxDepth="1"></Toc>
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Navigation

Hover on the bottom-left corner to see the navigation's controls panel, [learn more](#)

Keyboard Shortcuts

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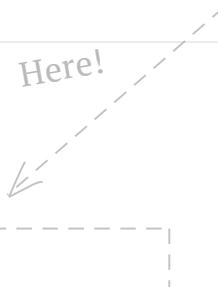
up

previous slide

down

next slide

Here!



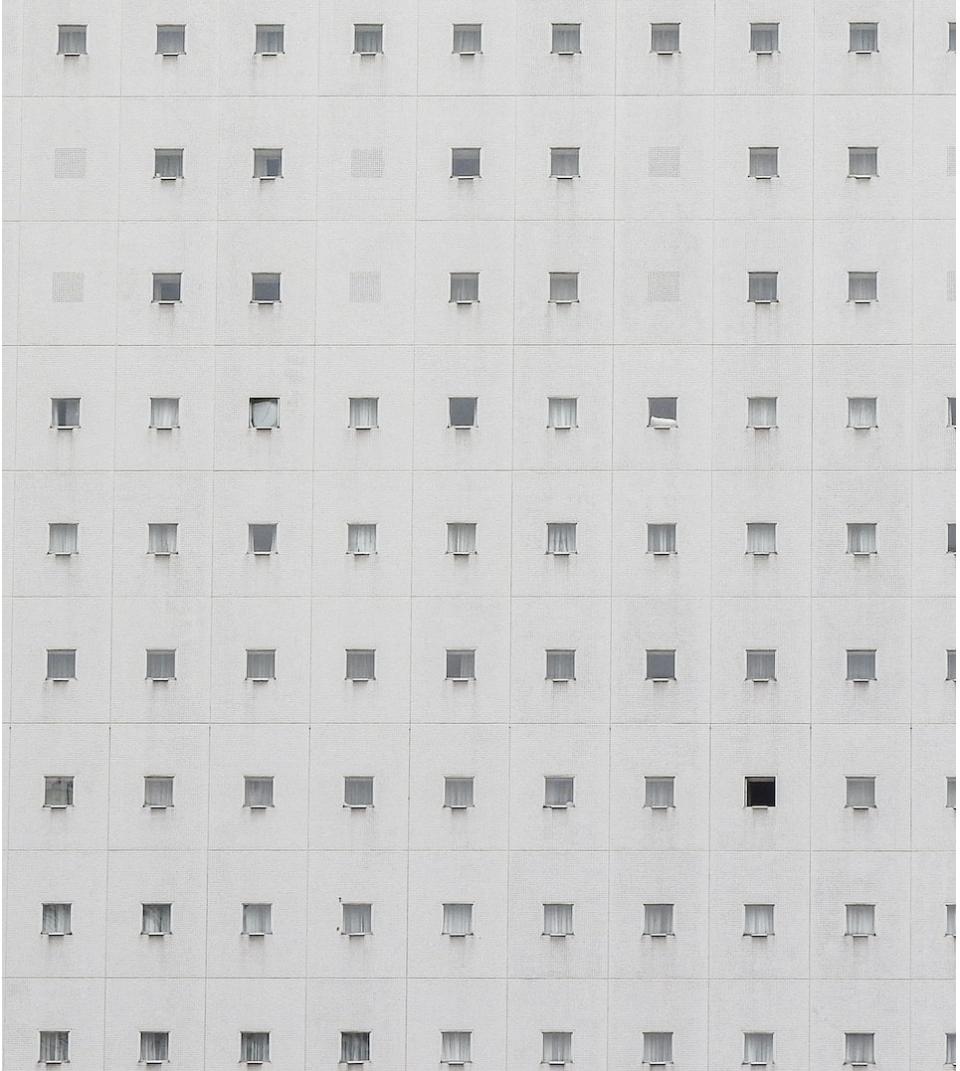
Code

Use code snippets and get the highlighting directly! [\[1\]](#)

```
interface User {  
    id: number  
    firstName: string  
    lastName: string  
    role: string  
}  
  
function updateUser(id: number, update: User) {  
    const user = getUser(id)  
    const newUser = { ...user, ...update }  
    saveUser(id, newUser)  
}
```



1. [Learn More](#)



Components

You can use Vue components directly inside your slides.

We have provided a few built-in components like `<Tweet/>` and `<Youtube/>` that you can use directly. And adding your custom components is also super easy.

```
<Counter :count="10" />
```



Check out the guides for more.

```
<Tweet id="1390115482657726468" />
```

Slidev
@Slidevjs · Follow

1K Stars on the Launch Day?!
That's awesome! Thank you :)

BTW, v0.3.0 just released with LaTeX math support!

Presentation slides for developers 🎉🎉🎉

v0.3.0 2.6k/month docs & demos themes

Stars 1k

3:25 AM · May 6, 2021

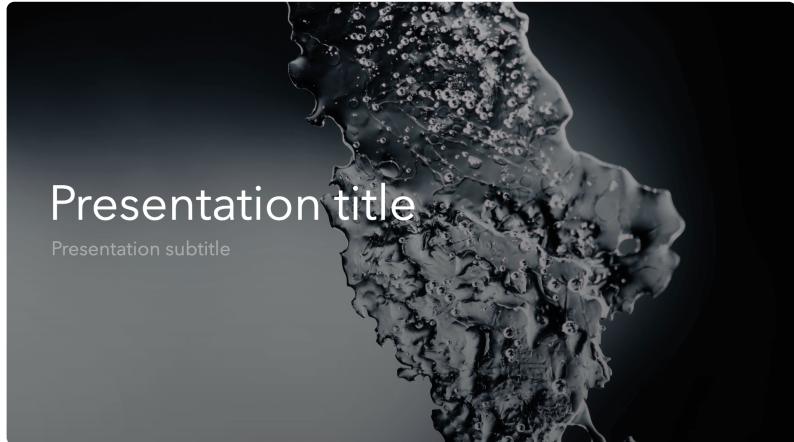
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Themes

Slidev comes with powerful theming support. Themes can provide styles, layouts, components, or even configurations for tools. Switching between themes by just **one edit** in your frontmatter:

```
---  
theme: default  
---
```



```
---  
theme: serifh  
---
```



Read more about [How to use a theme](#) and check out the [Awesome Themes Gallery](#).

Animations

Animations are powered by [@vueuse/motion](#).

```
<div
  v-motion
  :initial="{ x: -80 }"
  :enter="{ x: 0 }">
  Sliddev
</div>
```



LaTeX

LaTeX is supported out-of-box powered by [KaTeX](#).

Inline $\sqrt{3x - 1} + (1 + x)^2$

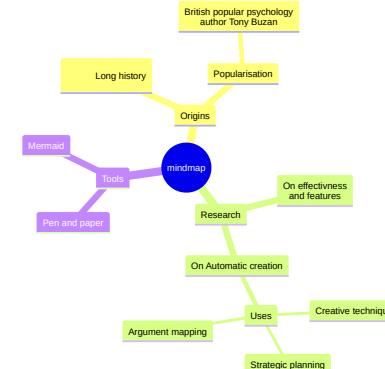
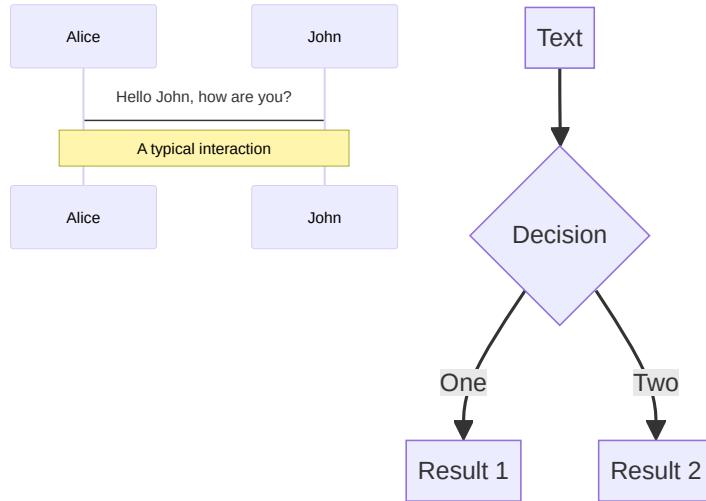
Block

$$\begin{aligned}\nabla \times \vec{\mathbf{B}} - \frac{1}{c} \frac{\partial \vec{\mathbf{E}}}{\partial t} &= \frac{4\pi}{c} \vec{\mathbf{j}} \nabla \cdot \vec{\mathbf{E}} &= 4\pi\rho \\ \nabla \times \vec{\mathbf{E}} + \frac{1}{c} \frac{\partial \vec{\mathbf{B}}}{\partial t} &= \vec{\mathbf{0}} \\ \nabla \cdot \vec{\mathbf{B}} &= 0\end{aligned}$$

[Learn more](#)

Diagrams

You can create diagrams / graphs from textual descriptions, directly in your Markdown.



```
PlantUML 1.2023.13beta2
[From string (line 27) ]

@startuml
package "Some Group" {
    HTTP - [First Component]
    [Another Component]
}

node "Other Groups" {
    FTP - [Second Component]
    [First Component] --> FTP
}

cloud {
    [Example 1]
}

database "MySQL" {
    folder "This is my folder" {
        [Folder 3]
    }
    frame "Foo" {
        [Frame 4]
    }
}

[Another Component]...-->[Example 1]
Syntax Error?
```

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