Seed

The challenge of creating a Smalltalk Kernel

Nicolás Paez
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FACULTAD DE INGENIERIA
Universidad de Buenos Aires

Pharo

RMod

INRIA

A little about me..

- Software Engineer at Southworks
  - Cloud Computing, Federated Identity,

- Teaching Assistant at UBA
  - Object-oriented programming, Smalltalk, Java, etc

- Guest engineer at Inria, RmoD team
  - Pharo, Seed, remodularization

The problem

Why do we need a Kernel?

- Better modularization

- Reduced image size

- Custom images

Seed

Vision

Pharo has a **minimal clean kernel** able to **evolve** into a **fully functional system**

There are related projects, but...

Use a special VM

With different Goals

No support

The team

- Director
  - Stef Ducasse

- Engineers
  - Benjamin Van Ryseghem
  - Gabriel Barbuto
  - Nicolás Paez

- Collaborators
  - Pavel Krivanek
  - Marcus Denker

Some Technical Context

What's inside an image?

System dictionary

Special objects

Common Objects

Interesting points

- What to put inside the new System Dictionary?

- What to do with things that you don't put in the image?

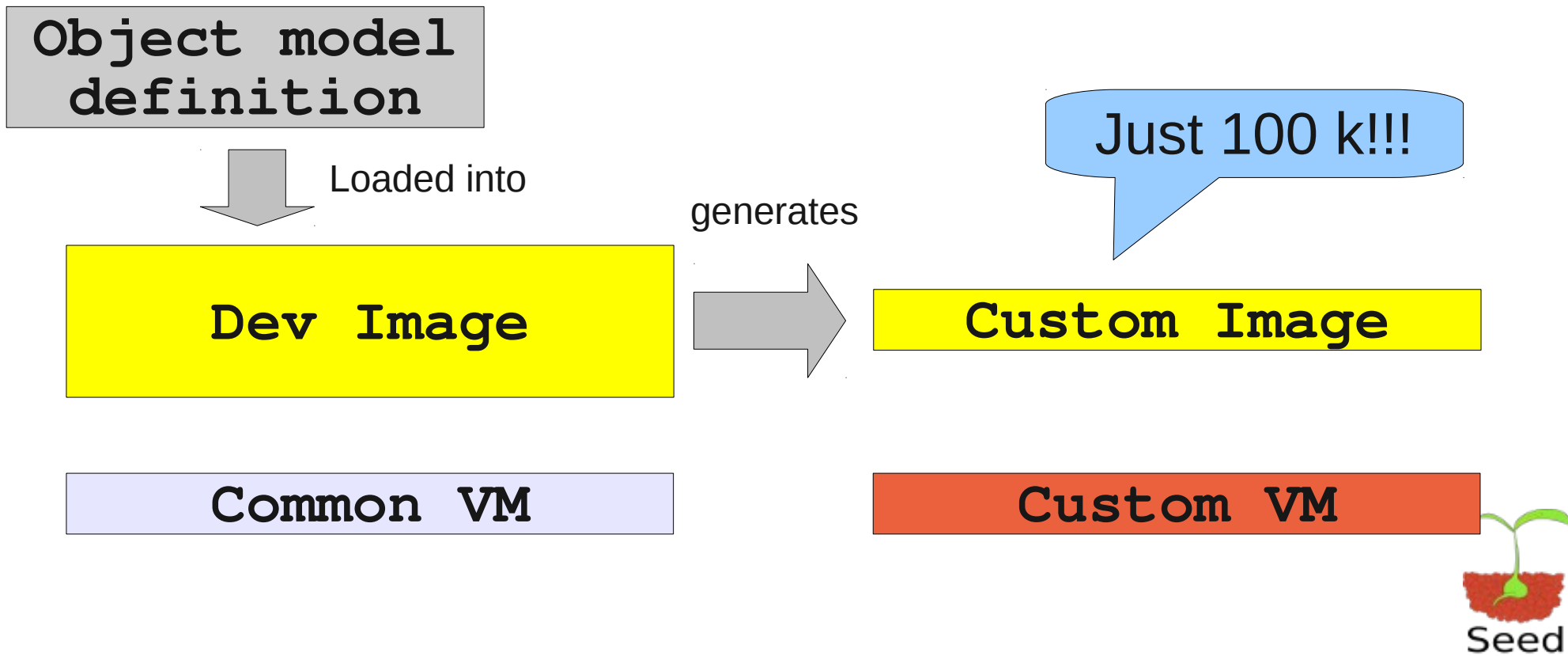- How to populate System Dictionary?

Interesting points (2)

- How to ensure the resulting image is "complete"?

- How to make the resulting image able to evolve?

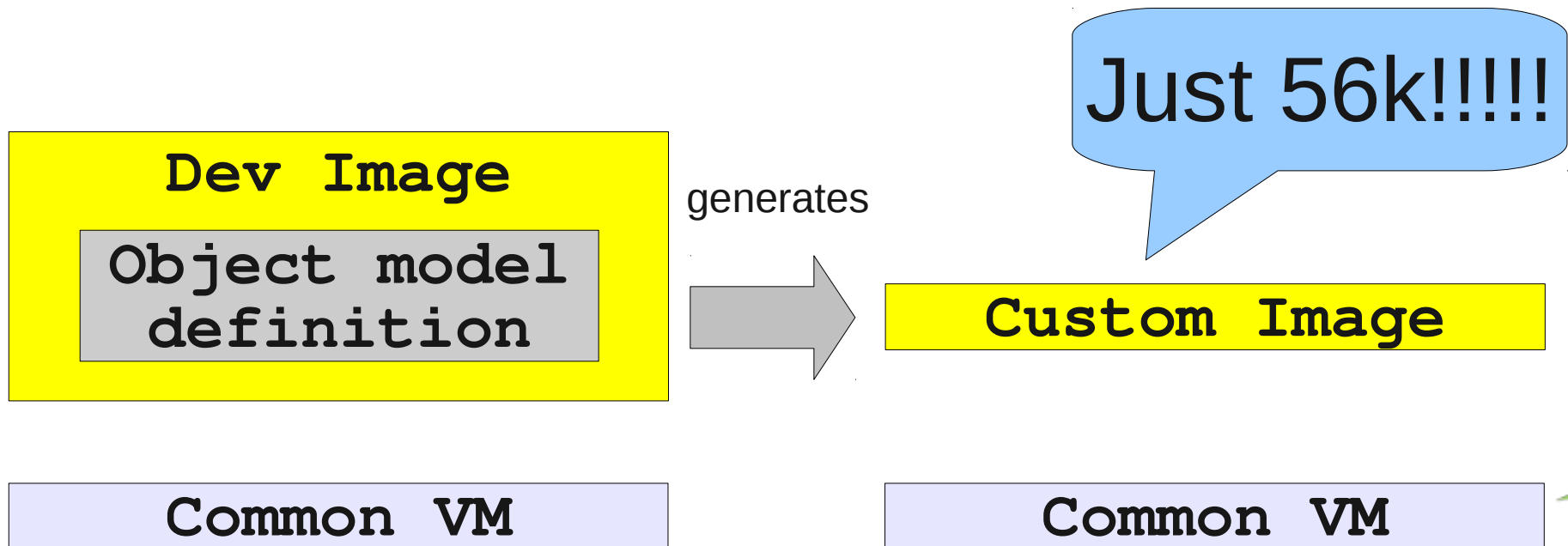- How to work on Pharo while it is still evolving?

Existing projects

Gweneal Bootstrap

- Implemented by Gweneal Cassacio for his Phd
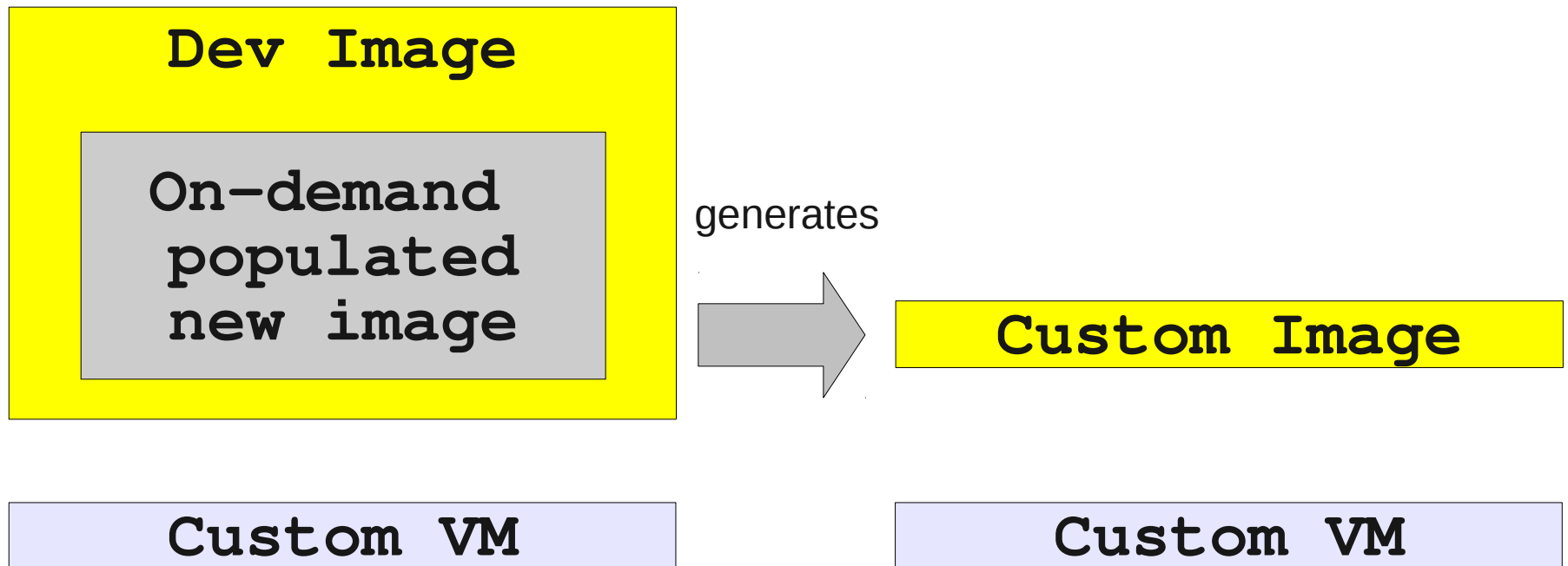
- Goal: support for Object Spaces.

MicroSqueak

- Created by John Maloney on 2004
- Based on Squeak V2
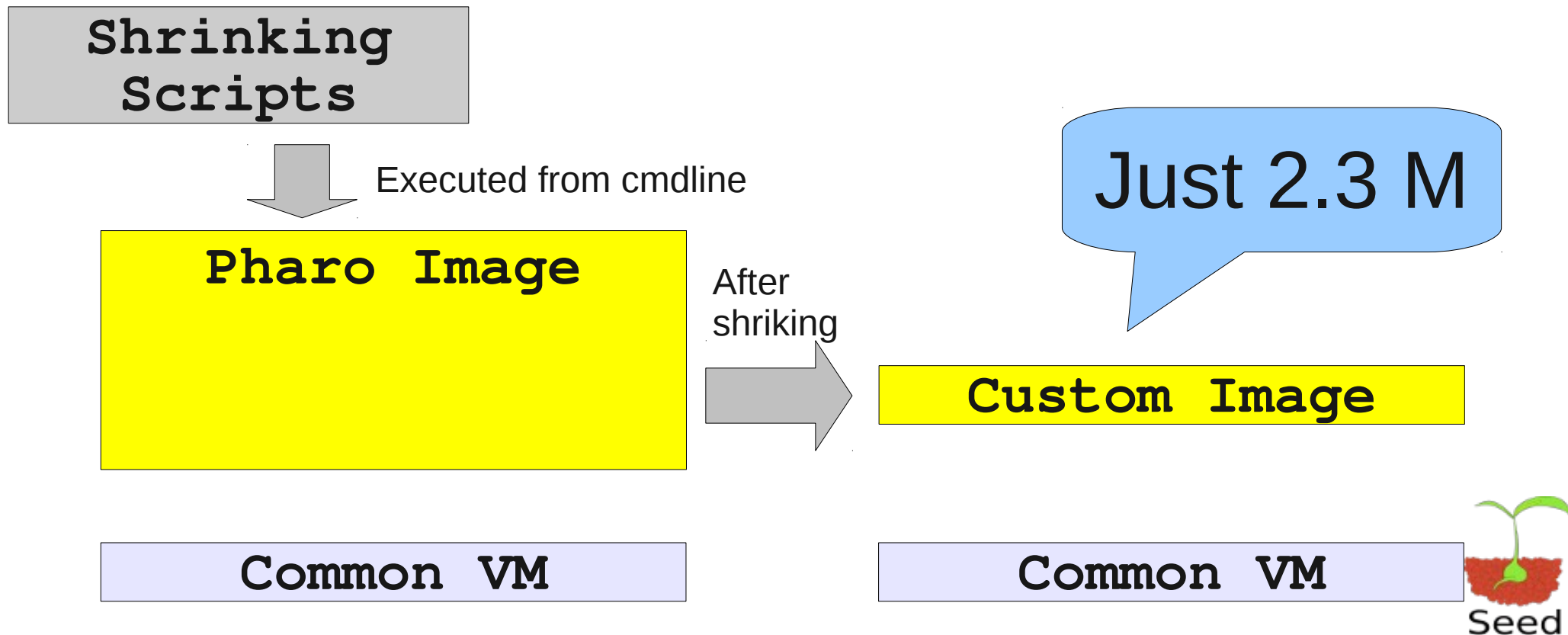- Goal: the smallest image possible

Chacharas

- Gestation & **nutrition**

- Nutrition: check at runtime what is needed and add it
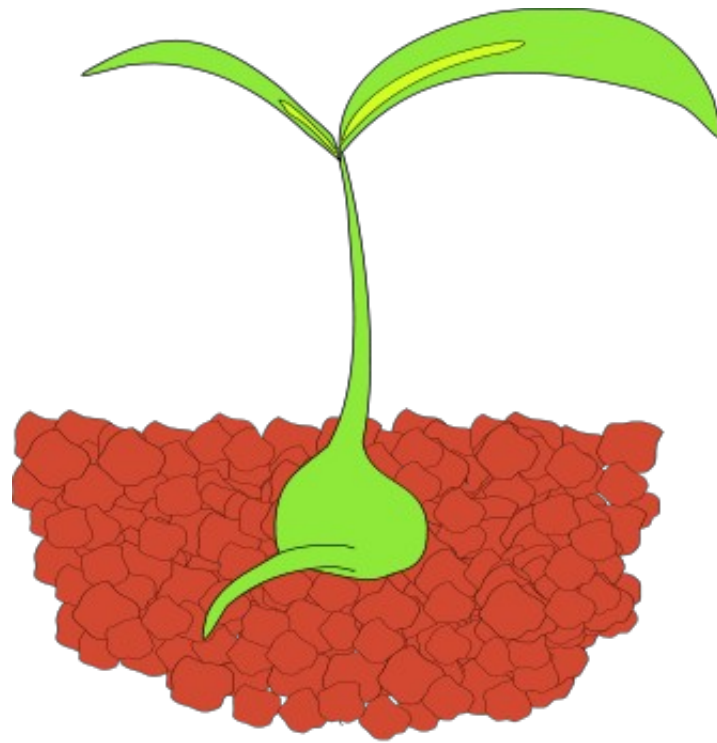
- A similar approach is used by Spoon

Pavel Kernel

- Shrinking approach based on package selection

- Very important to enable remodularization of core image

Shrinking Scripts

Executed from cmdline

Pharo Image

After shriking

Just 2.3 M

Custom Image
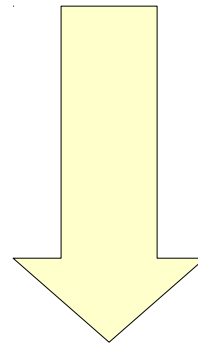
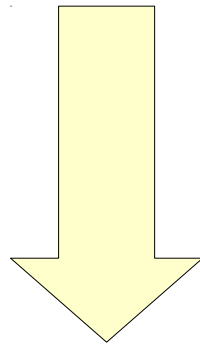Common VM

Common VM

Seed

The Seed Way

Our Strategy

- Work on the image side

- No modification in the VMs

- Create different kernel images for different purposes
  - Pine Kernel
  - Haselnut Kernel
  - Walnut Kernel
  - Coconut Kernel

2 work branches

Package Remodularization

Kernel creation

Cononut Kernel

In a parallel thread...

- Virtual machine modifications (E. Miranda)

  - Ability to manage arbitrary object formats

  - Ability to bootstrap a full image

Where we are

- Research "completed"

- Support tools
  - KernelBrowser
  - KernelBuilder

- Engineering work in progress
  - Pharo packages remodularization
  - Pine kernel migration from MicroSqueak

Thanks!

Contact info:

Nicolás Paez, npaez@fi.uba.ar,
Http://nicopaez.wordpress.com

Stef Ducasse, stephane.ducasse@inria.fr

Resources

- Internal project repository
  - https://scm.gforge.inria.fr/svn/lse/Papers/SeedProject

- Squeak Source
  - http://www.squeaksource.com/Seed.html