A Puppet Approach To Application Deployment And Automation In Nokia

Oliver Hookins

Principal Engineer – Services & Developer Experience

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Who am I?

- Rockstar SysAdmin

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Who am I?

- Puppet User since 0.23
- Working in Nokia's Location-Based Services for 1.5 years
- Previously at Anchor Systems (manages GitHub infrastructure with Puppet)
- Love/Hate Relationship with Ruby

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What do we do?

- “Location Based Services”
- Diverse collection of applications
- Rapidly moving environment, competing directly with well-known giants in the services arena
- Large, traditionally-organised company with heavy change control

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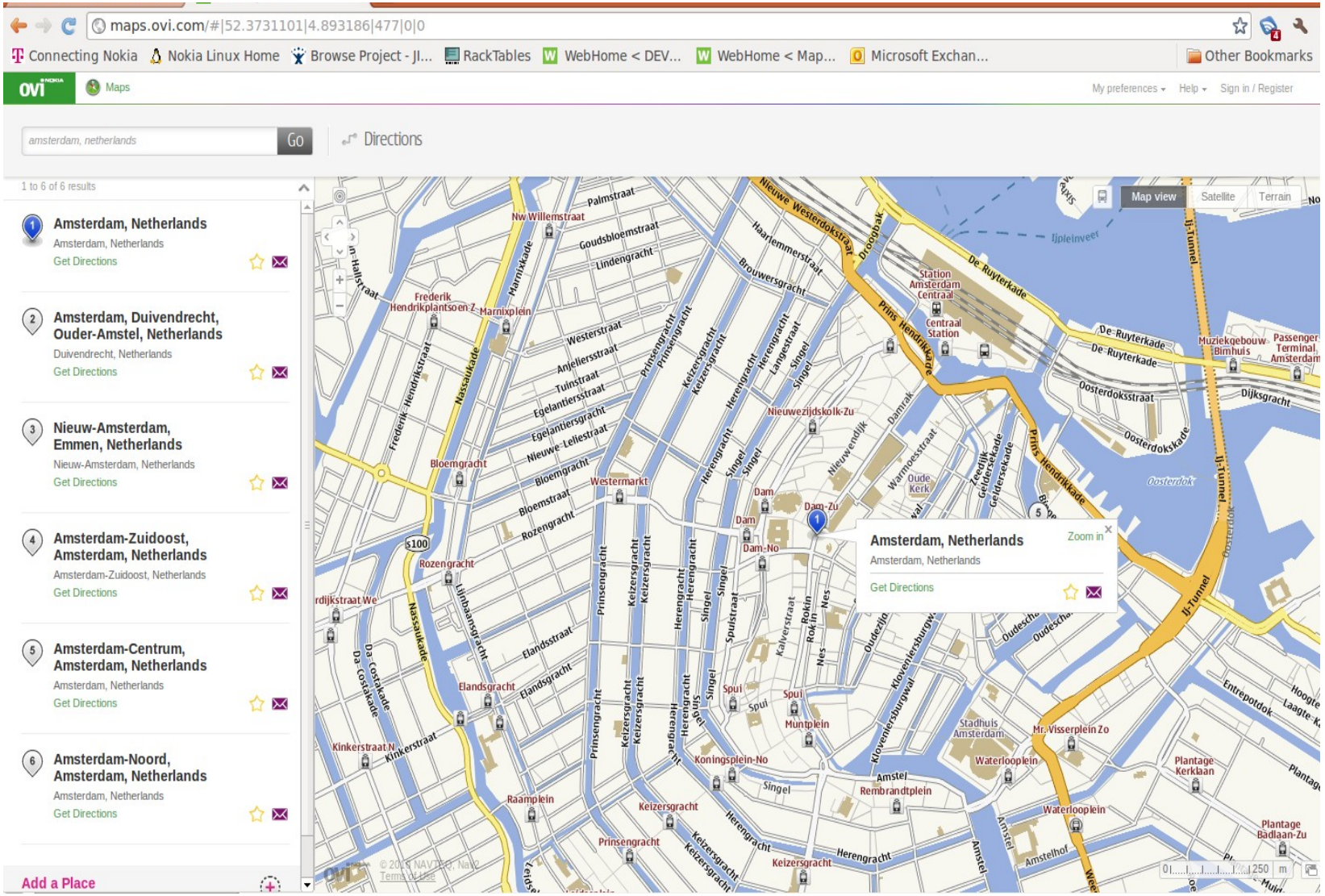
What do we do?



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What do we do?


Amsterdam
Netherlands
577km
Koog Aan De
Zaan
Ilpendam
Den Ilp
Oostzaan
Landsmeer
N516
A10
E22
E35
Amsterdam
Diemen
Duivendrecht
Schiphol
Noord
Schiphol
Oost
Amstelveen
Ouder-Amstel
Amsterdam-Zui
N231
2.5MB
Nes Aan De
Menu
List

The Problem Domain

- Deployment consistent across environments
- Reduce duplication of effort (and as a by-product, human errors)
- Increase testing, feedback of errors, reliability.

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The Legacy System

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The 1.0 Puppet System

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New Problems

- Node definitions
- Lack of trust built-in
- Code constantly evolving
- Not enough testing to counter poor Puppet knowledge
- Victim of our own success

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BDD

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Goals

- Approach more like traditional software development
- Better versioning of components
- Testing, testing, testing!
- Automation using Jenkins
- Easier deployments
- Better developer tools

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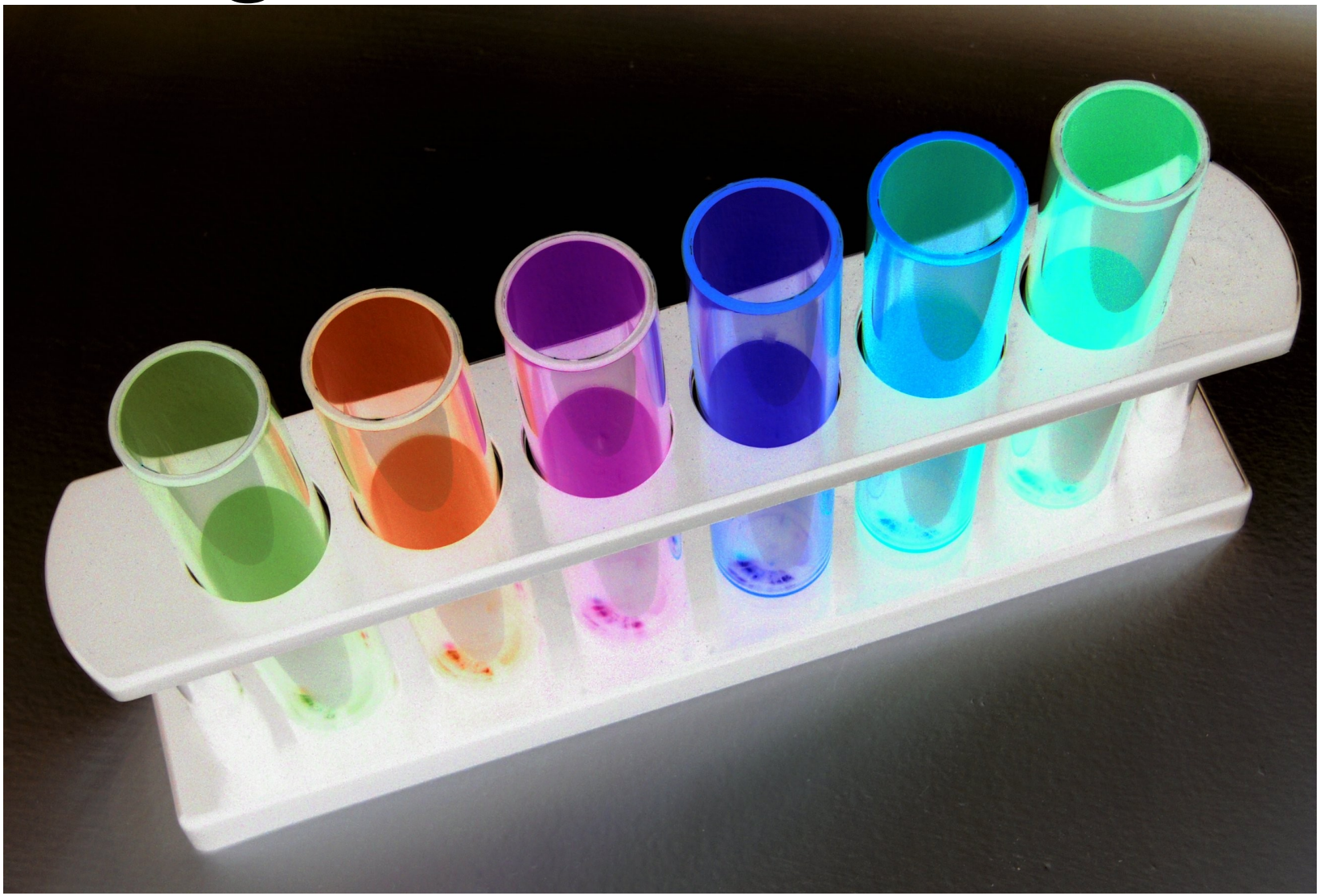
Testing



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Jenkins

- CI/build tool
- Split testing into stages
- simple tests (lint, --parseonly, templates) – take < 2min to run
- compile tests (Puppet Faces) – should take < 10min
- integration (full-deploy) - ??
- Use in production! (canary)
- Eventually: continuous deployment

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API Approach

- Expose a well-defined interface
- Remove host-, role-, DC- (etc) specifics from modules
- Drive configuration “through the front door”
- Remove need to look at the code (basically reverse engineering)

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- Write one!
  … or try Dashboard
- Seriously, it unlocks Puppet's potential

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Why not use extlookup?

- Equivalent of global variables in programming, ∴ bad!
- No well-defined interface to classes/defines
- Requires that you code-dive to find out how to use a class/define
- Well-defined API and general documentation should be sufficient
- Can't easily test code in isolation

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Class Introspection

```
# Prepare a hash to dump out the API
h = {}
h['class'] = {}
h['define'] = {}

# Inspect the PP file
file = 'foo.pp'
Puppet[:manifest] = file
File.open(file, 'r').readlines().each do |l|
  if /^(class|define)\s+([^\({\s]+)/
    tipe = $~[1] # capture the type of object we found
    id = $~[2] # we want the class/define name

    # Grab the arguments and class/define name
    args = Puppet::Resource::Type.find(id).to_pson_data_hash['arguments']
    klass = Puppet::Resource::Type.find(id).to_pson_data_hash['name']
  end
end

h[tipe][klass] = args
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Class Introspection

Now you have a YAML interface definition:

```
class:
  postfix:
    root_email: /dev/null
    relayhost:
    inet_interfaces: localhost
    alias_maps: hash:/etc/aliases
    mynetworks: ""
```

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Class Introspection

- “Canary” testing
- Interface documentation (have a look at the :doc string as well)
- Generate web forms

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Module Organisation

“Dist”

- **Provides “platform” services, as well as APIs for application modules to use**
- **Stable, defined release cycle**
- **Should be of sufficient quality that app teams cannot resist using it**
- **Eventually delegate maintenance to specialist teams**

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Module Organisation

“Dist”

- **Pull in things from Moduleforge, or just use Moduleforge (in future)**

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Module Organisation

“App”

- Blueprints for how to deploy applications
- Uses Dist APIs rather than reimplement functionality
- Sets up development environments for application – still unsure of correct approach for this

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Packaging

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Packaging

http://hunnur.com/blog/2010/10/dynamic-git-branch-puppet-environments/

- Modules under /etc/puppet/modules
- Each has metadata files (version of app, version of dist)
- Module path:

$confdir/environments/$environment/app:
$confdir/environments/$environment/dist

- Spec file creates symlinks from actual app and dist to above locations

Environment Change

```
def get_node_previous_environment(fqdn)
  factsdir = File.join(get_node_yamldir(), 'facts')
  File.directory?(factsdir) or raise NoFactsDirectoryError,
factsdir

  # Inspect the client machine's facts
  factsfile = File.join(factsdir, "#{fqdn}.yaml")
  if [nil, ''].include?fqdn or not File.exist?(factsfile)
    raise(NoClientFactsError,factsfile)
  end

  # Create a Puppet::Node object from the stored YAML object
  y = YAML.load_file(factsfile)
  p = Puppet::Node::Facts.new(y.name, y.values)
  p.values['environment']
end
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Environment Change

```
if node_puppetenvironment != oldenv then
  Puppet.notice("Changing environment from #{oldenv} to
                 #{node_puppetenvironment} for node #{fqdn}")
  y = {}
  y['parameters'] = {}
  y['environment'] = node_puppetenvironment
  y['classes'] = {}
  y['classes']['puppet::client'] = {}
  y['classes']['puppet::client']['puppet_environment'] =
                                  node_puppetenvironment.clone
  # YAML catches duplicate references
  y['classes']['puppet::client']['puppetmaster'] =
                                              node_puppetmaster
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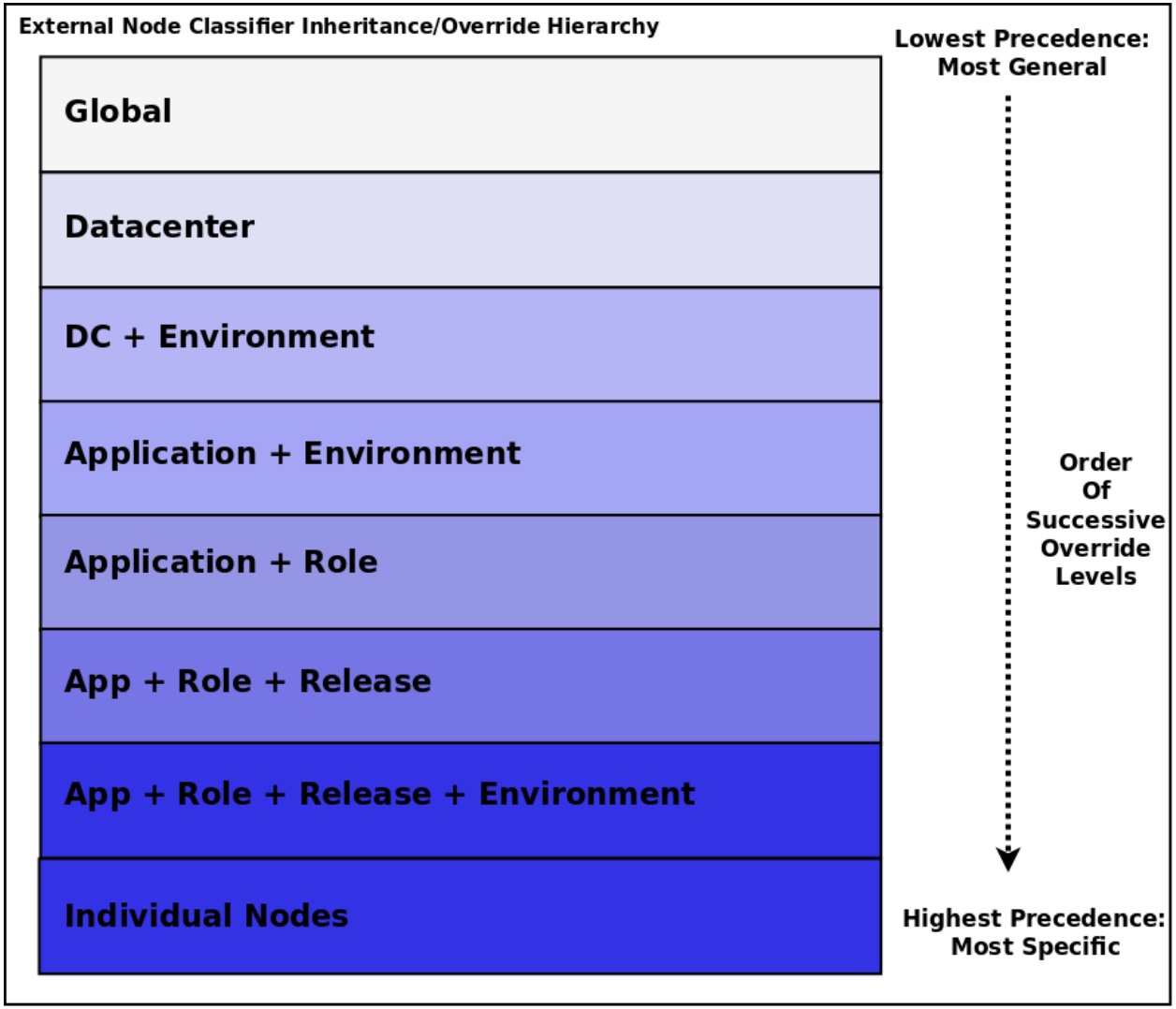

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Our ENC

```
vars:
  puppet_version: 2.6.7
  ntp_servers:
    - 192.0.2.1
    - 192.0.2.2
    - 192.0.2.3
  repo_server: repo.ny.example.com
  accounts:
    - bofh
    - peon
  myapp_version: 3.0.0

classes:
  platform:
    puppet_version: ${puppet_version}
    ntp_servers: ${ntp_servers}
    repo_server: ${repo_server}
    accounts: ${accounts}
  myapp:
    version: ${myapp_version}
```

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Future

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Future

- Deployment strategy not entirely worked out
- Developer workflows still could be improved (some promising work in this area, e.g. cloudsmith/geppetto (IDE integration))

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Thank You!

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ohookins@gmail.com
http://paperairoplane.net/

P.S. We're Hiring!

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