Ansible

Systems configuration doesn't *have* to be complicated

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@jpmens

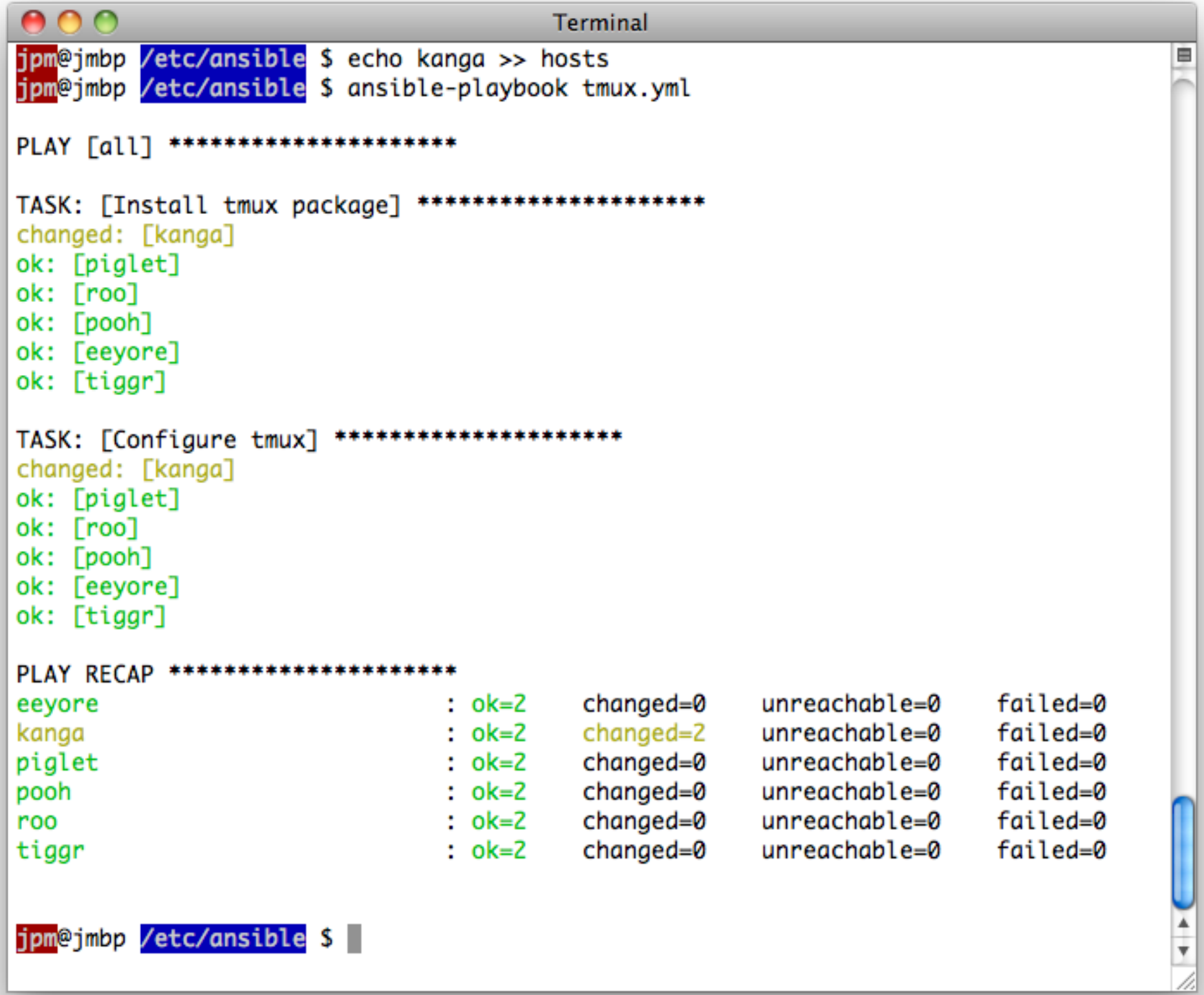
`@jpmens`: consultant,
author, architect, part-time
admin, small-scale fiddler,
loves LDAP, DNS,
plain text, and things
that **work**.

once upon a **time**, we had **shell** scripts and SSH **loops**

then it got **complicated**

...

this is what we **want**:


Terminal
jpm@jmbp /etc/ansible $ echo kanga >> hosts
jpm@jmbp /etc/ansible $ ansible-playbook tmux.yml
PLAY [all] ********************
TASK: [Install tmux package] **********************
changed: [kanga]
ok: [piglet]
ok: [roo]
ok: [pooh]
ok: [eeyore]
ok: [tiggr]
TASK: [Configure tmux] **********************
changed: [kanga]
ok: [piglet]
ok: [roo]
ok: [pooh]
ok: [eeyore]
ok: [tiggr]
PLAY RECAP ********************
eeyore : ok=2 changed=0 unreachable=0 failed=0
kanga : ok=2 changed=2 unreachable=0 failed=0
piglet : ok=2 changed=0 unreachable=0 failed=0
pooh : ok=2 changed=0 unreachable=0 failed=0
roo : ok=2 changed=0 unreachable=0 failed=0
tiggr : ok=2 changed=0 unreachable=0 failed=0
jpm@jmbp /etc/ansible $

No more **daemons**

No more **agents**

Not yet another **PKI**

Not another **host**

No more open ports

No **databases**

Automation should **not** require programming experience; it **MUST** [RFC 2119] **be easy**

We all have other stuff to do, don't we?

compréhansible

push-based
pull possible

from **zero** to **prod** in **minutes**

Python

2.6 + PyYAML, Jinja2 on **manager**
2.4 + simplejson on **nodes**

Can run in *virtualenv* and from *git* checkout

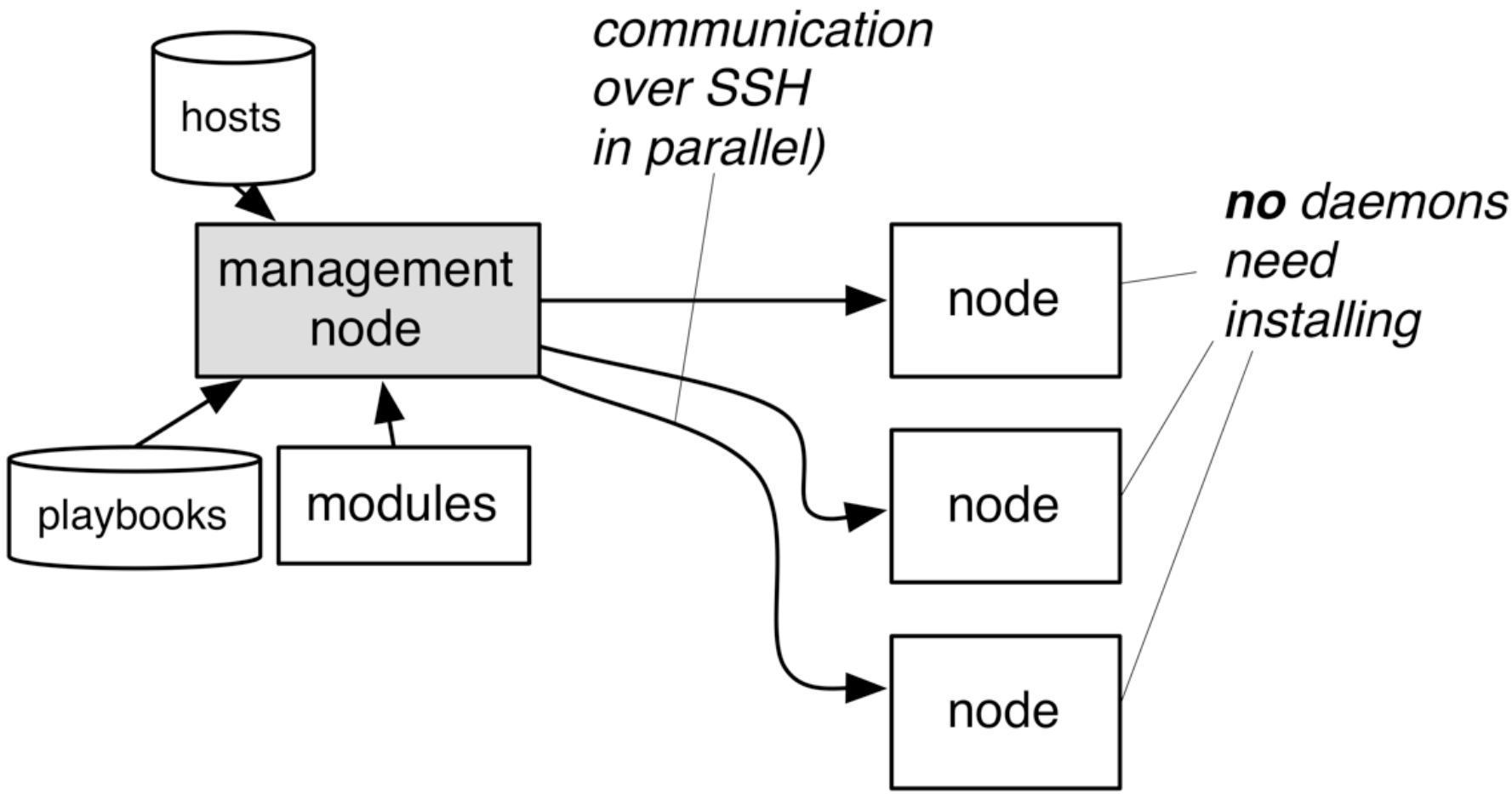
SSH

keys, Kerberos, passwords

doesn't need **root**

can **sudo**

Modus operandi



Do this **once, now**

ad-hoc

Orchestration

Minimal **config** language

no XML, no Ruby, no …, but YAML

Inventory

```
$ cat ${ANSIBLE_HOSTS:-/etc/ansible/hosts}

[local]
127.0.0.1

[webservers]
www.example.com ntp=ntp1.pool.ntp.org
web[10-23].example.com
sushi ansible_ssh_host=127.0.0.1 ansible_ssh_port=222

[devservers]
a1.ww.mens.de
```

executable **inventory**

- CMDB (LDAP, SQL, etc.)
- Cobbler
- EC2, OpenStack, etc.
- make your own: **JSON**

Target selection

```
webservers
all
ldap.example.com
webservers:!web20.example.com
*.example.com
192.168.6.*
```

ad-hoc **copy**

```
$ ansible devservers -m copy -a 'src=resolv.conf dest=/etc/resolv.conf'
a1.ww.mens.de | success >> {
    "changed": true,
    "dest": "/etc/resolv.conf",
    "group": "adm",
    "md5sum": "c6fce6e28c46be0512eaf3b7cfdb66d7",
    "mode": "0644",
    "owner": "jpm",
    "path": "resolv.conf",
    "src": "/home/jpm/.ansible/tmp/ansible-322091977449/resolv.conf",
    "state": "file"
}
```

facts


```
"ansible_architecture": "x86_64",
 "ansible_default_ipv4": {
     "address": "192.168.1.194",
     "gateway": "192.168.1.1",
     "interface": "eth0",
     "macaddress": "22:54:00:02:8e:0f",
 },
 "ansible_distribution": "CentOS",
 "ansible_distribution_version": "6.2",
 "ansible_fqdn": "a1.ww.mens.de",
 "ansible_hostname": "a1",
 "ansible_processor_count": 1,
 "ansible_product_name": "KVM",
 "ansible_swapfree_mb": 989,
```


Plus **ohai** and **facter** if installed on node

modules

add_host **apt** apt_key apt_repository **assemble** async_status authorized_key bzr cloudformation **command copy cron** debug django_manage easy_install **ec2** ec2_facts ec2_vol facter **fail fetch** file fireball gem **get_url** git group group_by hg homebrew ini_file lineinfile lvg lvol macports **mail** mongodb_user mount mysql_db mysql_user **nagios** netscaler ohai openbsd_pkg opkg pacman pause **ping** pip pkgin postgresql_db postgresql_user rabbitmq_parameter rabbitmq_plugin rabbitmq_user rabbitmq_vhost raw s3 **script** seboolean selinux service setup **shell** slurp subversion supervisorctl svr4pkg sysctl **template uri user** vagrant virt wait_for **yum** zfs

Plus many more: **provisioning**, contrib, etc.

Playbooks

- YAML
- OS **configuration**
- APP **deployment**
- collections of **actions** using **modules**
- each group of actions is a **play**
- notification **handlers**

Install, configure **tmux**

```
---
- hosts: devservers
  user: f2
  sudo: True
  vars:
     editmode: vi
  tasks:
  - name: Install tmux package
    action: yum name=tmux state=installed
  - name: Configure tmux
    action: template src=tmux.conf.j2 dest=/etc/tmux.conf
  - name: Tell master
    action: shell echo "{{ansible_fqdn}} done" >> /tmp/list
    delegate_to: k4.ww.mens.de
```

variables

- From **inventory**
- In **plays**
- From **host_vars/** files
- From **group_vars/** files
- From **register**

```
---
editmode: emacs
admin: Jane Jolie
location: Bldg Z8/211
```

{{ templates }}

templates in Jinja2

```
# {{ ansible_managed }}

{# editmode is either "vi" or "emacs" #}
set -g prefix C-a
set -g status-utf8 on
setw -g mode-keys {{ editmode }}
```

```
# Ansible managed: tmux.conf.j2 modified on 2012-10-14 09:47:11 by jpm on hippo

set -g prefix C-a
set -g status-utf8 on
setw -g mode-keys vi
```

generate /etc/hosts

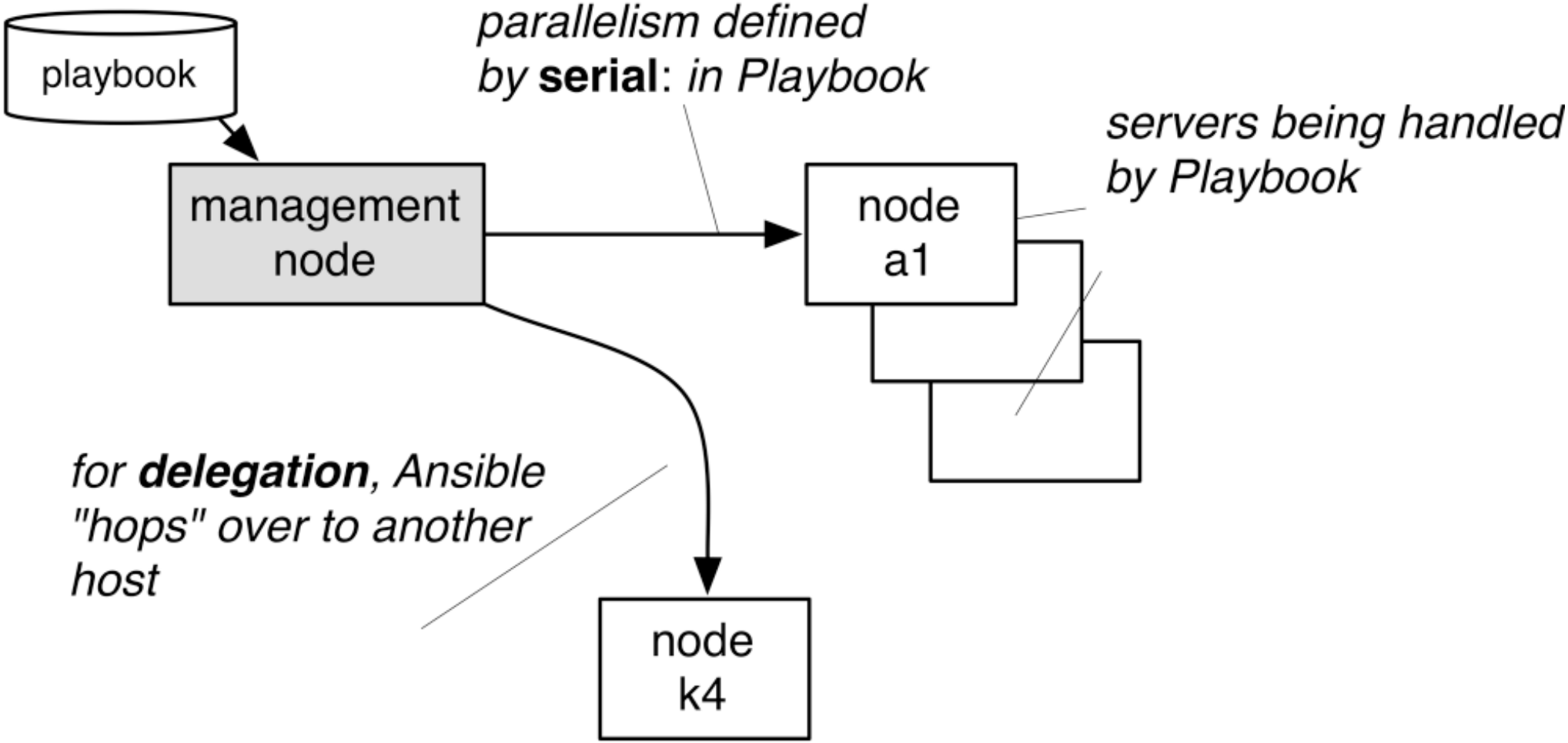
```
{% for k,v in hostvars.iteritems() -%}
   {{ v['ansible_eth0']['ipv4']['address']}} {{ k }} \
                                              {{ v['ansible_hostname'] }}
{% endfor %}
```

```
192.168.1.218 k4.ww.mens.de k4
192.168.1.194 a1.ww.mens.de a1
...
```

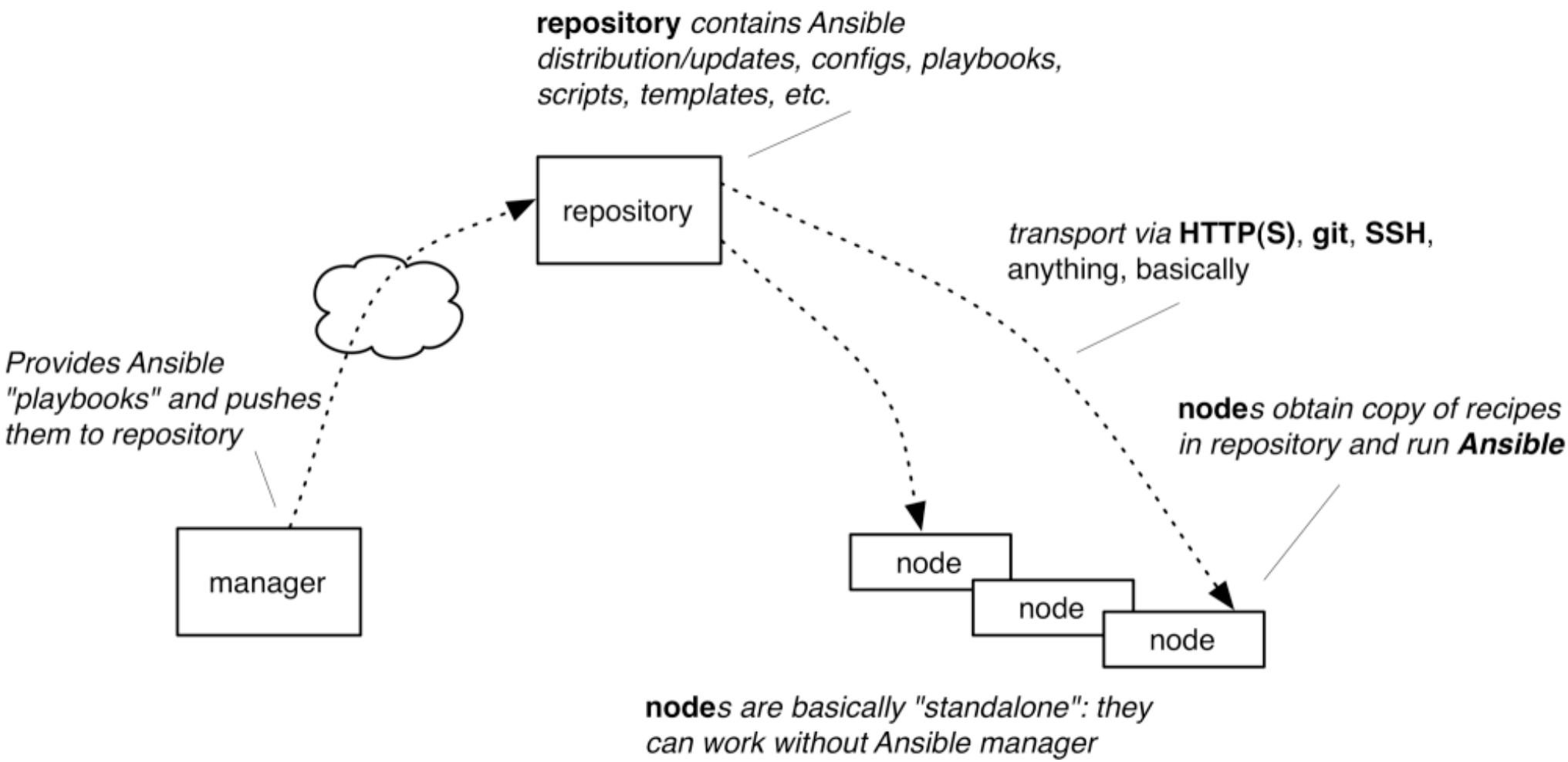
$LOOKUP

- files, CSV
- pipe
- Redis
- DNS TXT
- dig
- ...

delegation


playbook
parallelism defined
by **serial**: *in Playbook*
servers being handled
by Playbook
management
node
node
a1
for ***delegation***, Ansible
"hops" over to another
host
node
k4

pull mode


repository *contains Ansible distribution/updates, configs, playbooks, scripts, templates, etc.*
repository
transport via **HTTP(S)**, **git**, **SSH**, anything, basically
Provides Ansible "playbooks" and pushes them to repository
node*s obtain copy of recipes in repository and run* ***Ansible***
manager
node
node
node
node*s are basically "standalone": they can work without Ansible manager*

roles

```
roles/
  nginx/
    files/
    handlers/main.yml
    meta/main.yml
    tasks/main.yml
    templates/
    vars/main.yml
```

```yaml
---
- hosts: all
  roles:
    - nginx
    - mysql
    - { role: app, dir: '/etc/app', ntp: 'n1.example.org' }
    - { role: special, when: "ansible_os_family == 'RedHat'" }
  tasks:
  - ...
```

vault

```
$ ansible-vault create yy.yml
Vault password:
Confirm Vault password:

$ cat yy.yml
$ANSIBLE_VAULT;1.1;AES256
13064343538613362376132363832663335626463656265333132613932363833
[...]
3539

$ ansible-playbook yy.yml
ERROR: A vault password must be specified to decrypt data

$ ansible-playbook --ask-vault-pass yy.yml
Vault password:
```

API: task execution

```
#!/usr/bin/env python

import ansible.runner
import sys

res = ansible.runner.Runner(
    pattern='a1*',
    module_name='command',
    module_args='/usr/bin/uptime'
).run()
print res
```

```
{'dark': {}, 'contacted': {'a1.ww.mens.de': {u'changed': True, u'end': u'2012-10-22
09:07:18.327568', u'stdout': u'09:07:18 up 100 days,  2:13,  3 users,  load average:
0.00, 0.00, 0.00', u'cmd': [u'/usr/bin/uptime'], u'rc': 0, u'start': u'2012-10-22
09:07:18.323645', u'stderr': u'', u'delta': u'0:00:00.003923', 'invocation':
{'module_name': u'command', 'module_args': u'/usr/bin/uptime'}}}}
```

Extansible

- Callbacks (Python)
- Action plugins (Python)
- Data sources (Python)
- Inventory sources (any language)

ansible **galaxy**

- reusable roles
- New command: `ansible-galaxy`

More **time** for **stuff** that **matters**

ansible.com

@ansible

Join the **party**!