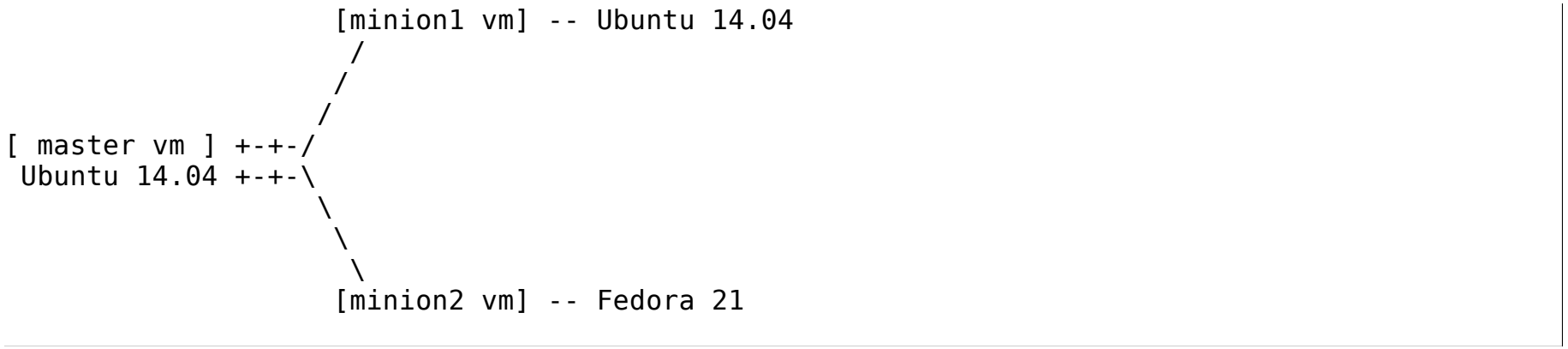
DISCLAIMER

- We will skip the installation, configuration of Puppet and SaltStack and some advanced (functions + implementations) and stick to getting a taste of what things are Puppet and SaltStack capable of doing.
- We will also skip some other things which I will skip mentioning until the end.
- I haven't worked on these technologies since an year and a half :)

MANAGING YOUR ~~SERVERS~~ *"ALL KIND OF MACHINES"* WITH PUPPET & SALTSTACK

By **Samarendra M Hedaoo**

DEMO SETUP


[minion1 vm] -- Ubuntu 14.04
[master vm] +-+-/
Ubuntu 14.04 +-+-\
[minion2 vm] -- Fedora 21

INTRODUCTION TO THE PROBLEM 1

Ensure that *n* number of machines have X* installed.

* no pun intended

POSSIBLE SOLUTIONS

- Copy whole hard disks/udpcast over PXE/Norton Ghost/disk cloning solutions
- SSH/PowerShell(?) in a loop
- Manually install on all machines
- Puppet ???
- SaltStack ???
- Any other solutions ???

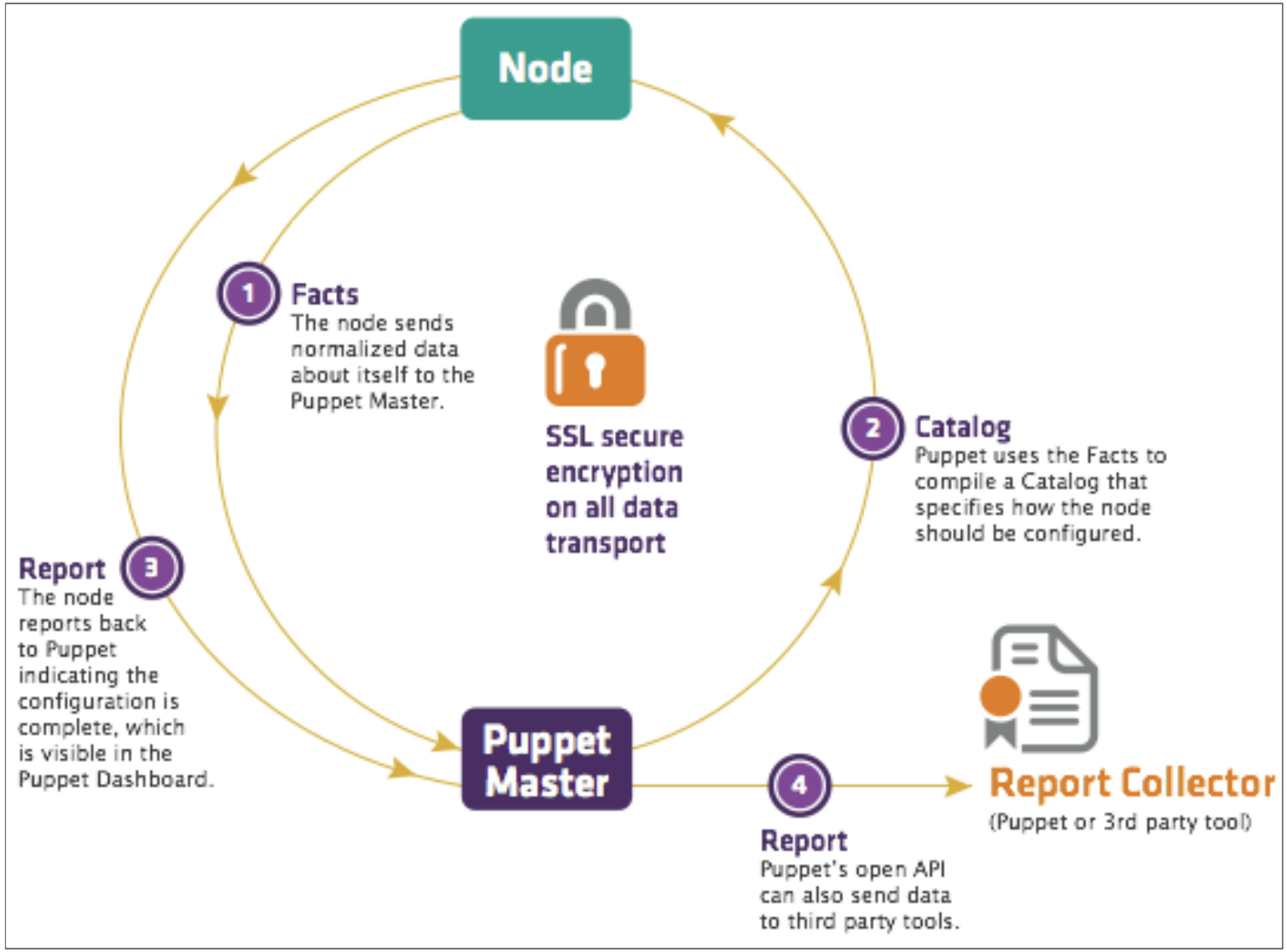
SSH IN A LOOP

```
for machine in $(cat machine_list)
do
    echo "Installing X on $machine..."
    ssh $machine the_great_package_manager install X
    echo "Done installing X on $machine"
    echo "Now moving to next!"
done
```

SCALING SSH-IN-A-LOOP

- Handle and log errors while installing
- Add support for yum, apt-get, MSI and so on...
- Handle non-SSH-supporting OS
- Manage ssh-keys, non-standard ports and all your "security" workarounds
- Add support for different tasks as they are realized by your manager/client

PUPPET AND HOW IT WORKS



From *The Architecture of Open Source Applications* book

HOW TO USE PUPPET ?

- Write resource definitions in Puppet's Domain-Specific-Language
- Put your resources into node-specific manifests
- Validate the manifests
- Let Puppet worry about how to get things done.

```
#inside your modules
class hamareResources {

    resource_type_x { $title :
            attribute => $value
    }

    resource_type_y { $title :
            attribute => $value
    }
    .
    .
    .
}

#and then in the node manifest
node "machine.example.net" {
        include hamareResources

    }
```

MANAGING SOFTWARE RESOURCES

```
package { "software_name" :
            ensure => present,
        }
```

A software is managed in the form of a package. Using the 'package' resource, we can manage a software's state -- *present*, *absent*, *specific version*, *latest*

WHAT IF THE SOFTWARE ISN'T IN .RPM OR .DEB?

PACKAGE IT!

MANAGING SERVICE RESOURCES

A service is any software managed by the systemctl, SysV or other such utility which has interfaces available for start/stop/reload/restart functionalities.

```
service { "service_name" :
            ensure  => running,
            enabled => true,
        }
```

MANAGING SERVICE RESOURCES

Service name may differ based on OS version/flavour.

So you can use:

```
service {
                "cron" :
                     ensure  => running ;
                "crond" :
                     ensure  => running,
     }
```

OR

```
case $operatingsystem {
        ubuntu { $service_name = 'cron' }
        fedora { $service_name = 'crond' }
    }

    service { $service_name :
                ensure => running;
            }
```

MANAGING FILE RESOURCES

A file is a file is a file.

```
file { "/absolute/path/to/file_on_the_machine" :
        ensure  => present, #directory/file/absent/present/link
        mode    => '0700',  #permissions in numeric mode
        owner   => user,    #owner name
        group   => group,   #group name
        content => "INLINE STRING CONTENT" or template(),
        source  => "puppet://link/to/file/relative/to/the/module" #This file should exist in
    }
```

You can read **more about template function.**

You can choose to make a backup of the file if it is being replaced using the *backup* attribute. The backup can be either on the agent OR on the Puppet Master in a *filebucket*

MANAGING FILE RESOURCES

A directory is also a file!

```
file { "/absolute/path/to/dir_on_the_machine" :
        ensure  => present, #directory/file/absent/present/link
        mode    => '0700',  #permissions in numeric mode
        owner   => user,    #owner name
        group   => group,   #group name
        recurse => true,
        source  => "puppet://link/to/dir/relative/to/the/module" #This file should exist ins
    }
```

You can choose to manage a directory *recurs*ively (*sub-directories + inside files wi be also managed*) and you can choose what happens to files which are on the machir but not present on the Puppet Master using the *purge* attribute.

RUNNING A COMMAND ON YOUR MACHINES

```
exec { 'binary --with --args'
        path => [ "/paths",
                  "/to",
                  "/search",
                  "/the",
                  "/binary",
                ]
     }
```

MANAGING MORE THINGS WITH PUPPET

- cron jobs
- users
- groups
- ssh keys
- **more**
- ...and many more things thanks to the **Puppet Forge!**
- ...and also Windows machines!

MANAGING THINGS WITH PUPPET -- IN A BETTER WAY

- Use if-else, switch-case, unless, selectors and custom variables
- Combine group of related resources in classes
- Combine related classes in modules
- Use facts from facter
- Use **subscribe and notify relationships** between resources
- Use *before* and *after* ordering between resources (if you absolutely have to)

INTRODUCTION TO THE PROBLEM 2

Check the date and time on all machines

POSSIBLE SOLUTIONS

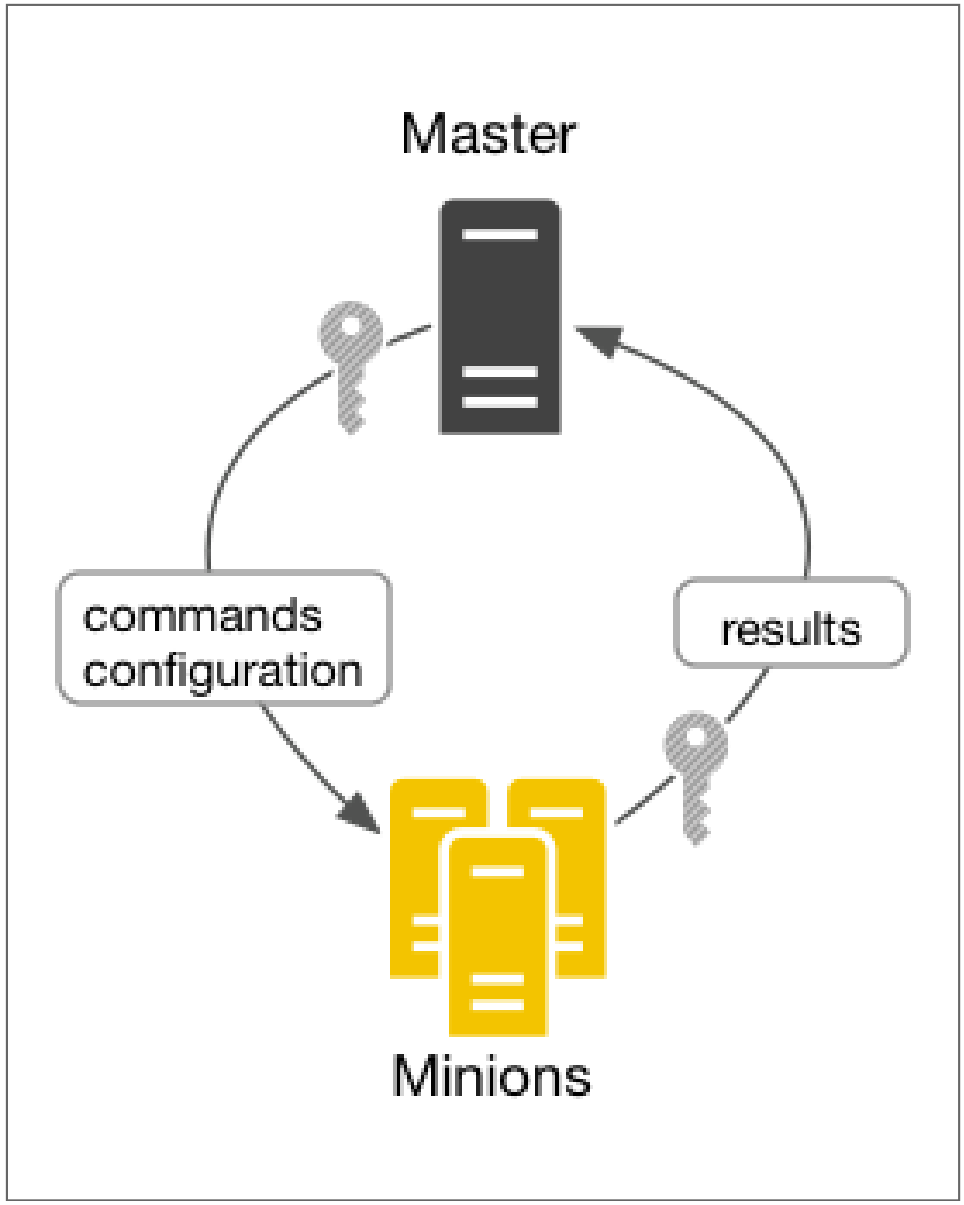
- SSH/PowerShell(?) in a loop
- Puppet ???
- SaltStack ???

USING PUPPET TO SOLVE PROBLEM2

```
exec { 'date' :
        path => ['/usr/bin',
                 '/bin',
                ]
     }
```

- Will repeat again, and again and again until you remove it from the manifest.
- Not easy to figure out whether the command has run on a machine or not.
- Not easy to store and parse the output

SALTSTACK AND HOW IT WORKS



From *SaltStack docs*

HOW TO USE SALTSTACK?

- Setup Salt Master and SaltStack minions on your machines that you wish to contrc
- Introduce them to each other
- Run commands from the Salt Master!

CHECKING DATE AND TIME ON ALL MACHINES

Very simple task but difficult to do when you have numerous machines with heterogeneous configuration

```
salt {target_machines} cmd.run "date"
```

CHECKING WHETHER A STRING EXISTS IN A FILE ON MACHINES

```
salt {target_machines} file.contains {filename} "string"
```

LIST NETWORK INTERFACES

```
salt {target_machines} network.interfaces
```

PULL A SPECIFIC FILE FROM ALL MACHINES TO A CENTRAL LOCATION

```
salt {target_machines} cp.push {absolute_path_to_file}
```

Will copy files to the *cache_dir* on your master.

DOING MORE THINGS WITH SALTSTACK

- Use **globs** and **grains** on the commandline
- Use pillars
- Use the **reactor system**
- Use the Python API
- Use the REST/WebSockets/XMPP api using the salt-api daemon

THE SKIPPED THINGS YOU SHOULD KNOW

- mcollective in Puppet.
- salt for configuration management.
- Language! Ruby and Python differ wildly not only in syntax but also in philosophies -- and so do Puppet and SaltStack!

USE CASES

- Install emacs on all machines. -- *Both Puppet and Salt can do it.*
- Make sure that *.ssh* directory exists for each user. -- *Puppet is the best*
- Restart X server on all machines. -- *Salt is the best.*
- Reload X server on all machines after putting a change in the configuration file. -- *Puppet is the best*
- Add a new virtualhost to Apache configuration. -- *Puppet is the best. Checkout* ***Apache module by PuppetLabs***

USE CASES - 2

- Check if fail2ban is installed. -- *Salt will check. Puppet will check and install (ENSURE)*
- Copy a file to all machines. -- *Puppet will copy and ensure it remains so. Salt wil just copy and forget.*
- Check the contents of a file and on the basis of it perform P or Q action. -- *can be done using facter and if-else blocks in Puppet or simply Salt.*

ABOUT ME

Just another Linux user who:

- ...currently works at the **GPU Centre of Excellence, IIT Bombay**
- ...did a startup with Sachin here with mixed results.
- ...picked up Puppet and SaltStack while working as a DevOps in **SocialTwist** and **Intellecap**
- ...and attempted to create a fork of vim koans called **Puppet koans**
- ...has his website at **fortyplustwo.net**

This presentation was made using **reveal.js**