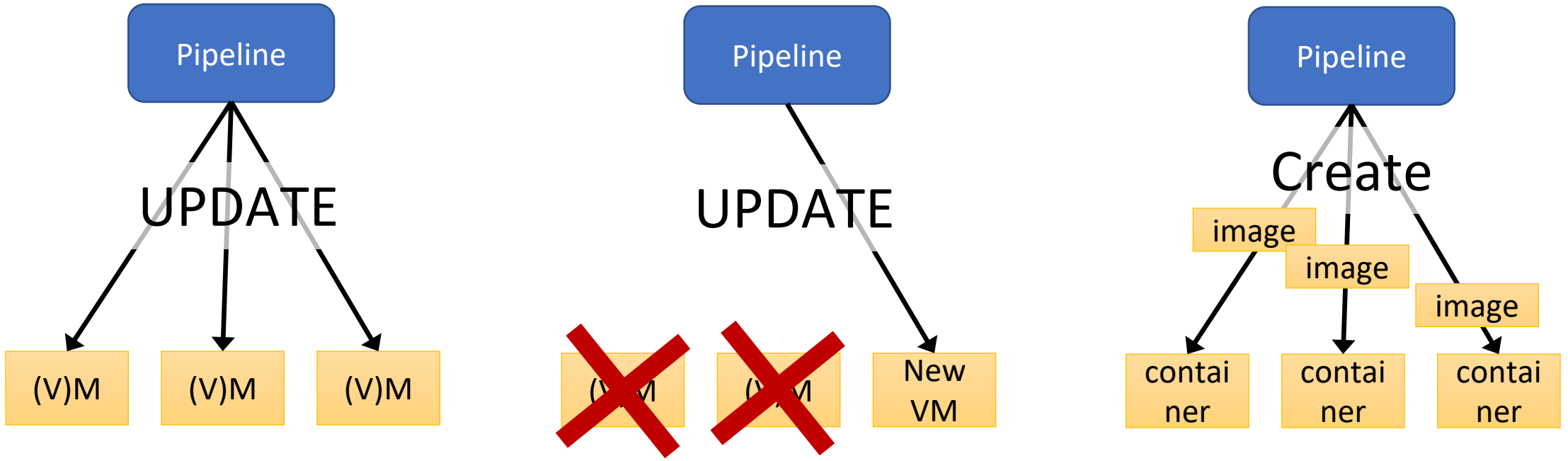
Intro to Ansible

Ansible exercise

Backgroud (slide from last week)



Alternative approaches for delivery

- Set-up everything when image is created
  - Very static
- Make the container to auto-update
  - You need to know in advance what might change
- ~~Put stuff to shared folder (use volume)~~
- Use configuration tools
  - Work also for full virtual machines and computers

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Ansible (https://www.ansible.com)

Automation engine for

- Provisioning
- Configuration Management
- App Deployment
- Continuous Delivery
- Security Automation
- Orchestration

uses YAML, in the form of Ansible Playbooks

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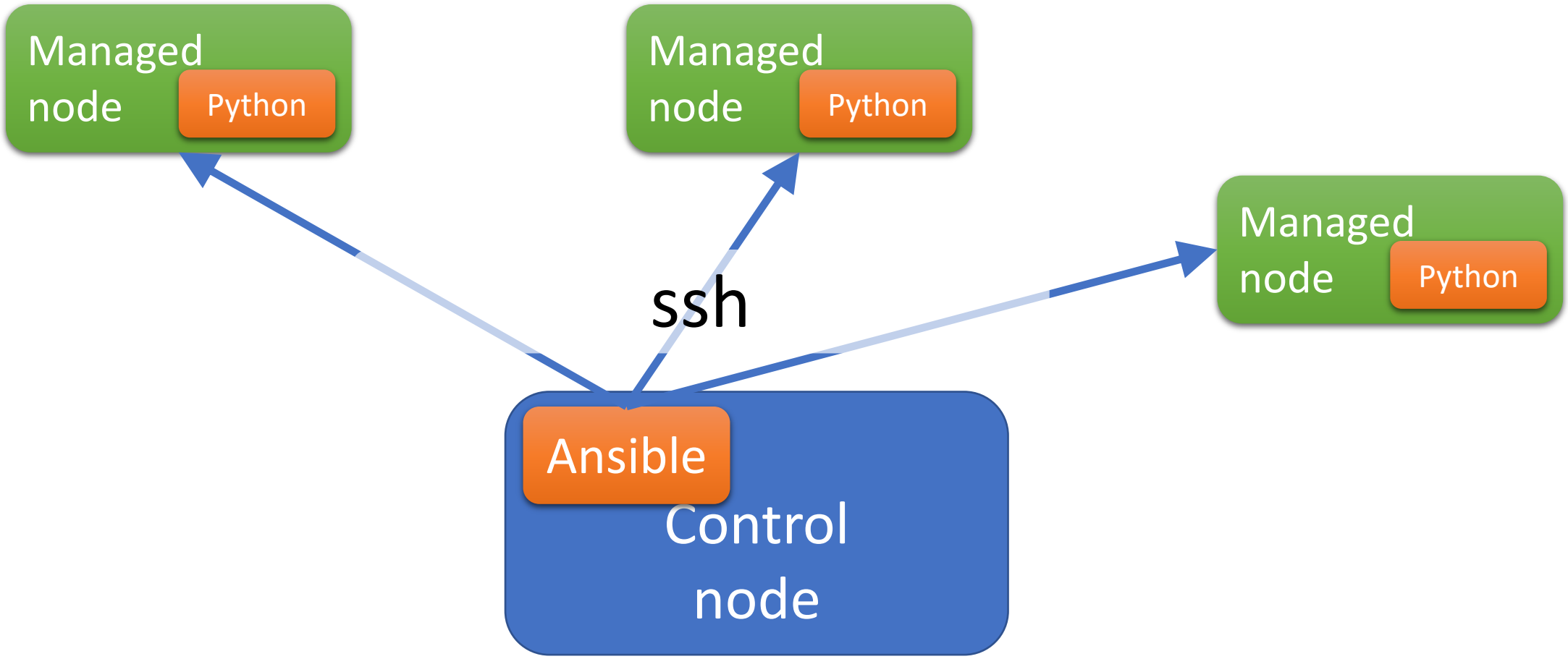
Ansible

- Ansible works by connecting to your nodes and pushing out small programs, called "Ansible modules" to them.
- These programs are written to be resource models of the desired state of the system.
- Ansible then executes these modules (over SSH by default), and removes them when finished.
- Your library of modules can reside on any machine, and there are no servers, daemons, or databases required.
- Typically, you'll work with your favourite terminal program, a text editor, and probably a version control system to keep track of changes to your content.
- A short video:
  - https://www.ansible.com/resources/videos/quick-start-video

Architecture



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Docker containers as targets

- Since we do not enough virtual machines, lets use Docker images
- Complicates the exercise,
- but allows you to learn more about Docker

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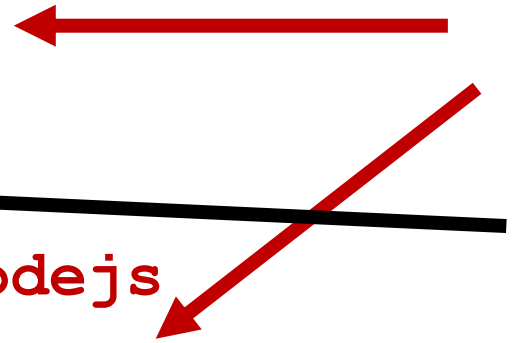
Creating the docker image 1/2

```
FROM debian
USER root
# Copy application itself:
COPY . /home
WORKDIR /home
RUN apt-get update
RUN apt-get install -y nodejs
ENTRYPOINT node server.js
```



Debugging aid

Time consuming init

Docker build –t utest

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Creating the docker image 2/2

```
1       FROM  utest


2       RUN apt-get install -y openssh-server
3       RUN sed -i 's/PermitRootLogin prohibit-password/PermitRootLogin yes/'
        /etc/ssh/sshd_config
4       RUN apt-get install -y net-tools
5       RUN useradd -m -s /bin/bash -G sudo -p $(openssl passwd -1 eee) ssluser


6       RUN apt-get install -y python3
7       RUN apt-get install -y sudo


8       ENV PORT=8894
9       EXPOSE 22


10      ENTRYPOINT service ssh start && node server.js
```

SSH support two alternative ways for authentication

Password

- Used in the previous slide
- Not very secure
- You can use, but gives at most 80% of the maximum points

Public/private keypair

- Public key of your computer is installed to the host
- More secure
- If you want 100% of maximum points, you should use this (building of the image need to be changed)

Info

- Short:https://unix.stackexchange.com/questions/210228/add-a-user-without-password-but-with-ssh-and-public-key
- Long: https://www.ssh.com/academy/ssh/key

Example ansible playbook

```
---
- hosts: webservers
  vars:
     http_port: 80
     max_clients: 200
  remote_user: root
  tasks:
  - name: ensure apache is at the
          latest version
    yum:
      name: httpd
      state: latest
  - name: write the apache config
          file.
    template:
      src: /srv/httpd.j2
      dest:/etc/httpd.conf
    notify:
      - restart apache
  - name: ensure apache is
          running
    service:
      name: httpd
      state: started

handlers:
    - name: restart apache
      service:
        name: httpd
        state: restarted
```

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Apt vs yum

Operating System	Format	Tool(s)
Debian	.deb	apt, apt-cache, apt-get, dpkg
Ubuntu	.deb	apt, apt-cache, apt-get, dpkg
CentOS	.rpm	yum
Fedora	.rpm	dnf
FreeBSD	Ports, .txz	make, pkg

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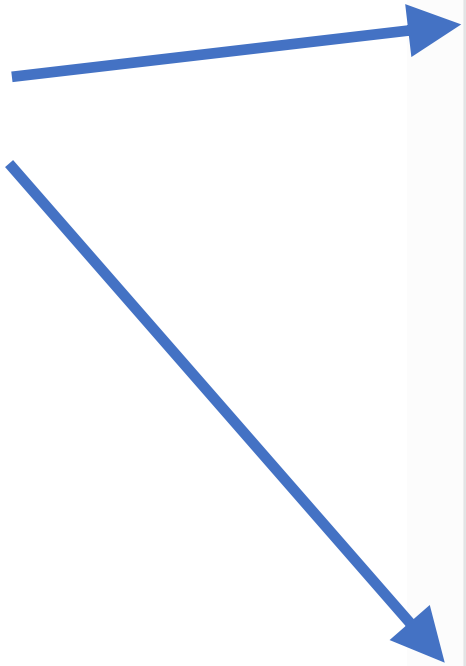
Sidenode apt vs yum examples

Task	apt (deb)	yum (rpm)	zypper (rpm)
Install from repository	apt-get install pkg-name	yum install pkg-name	zypper install pkg-name
Update package	apt-get install pkg-name	yum update pkg-name	zypper update -t package pkg-name
Remove package	apt-get remove pkg-name	yum erase pkg-name	zypper remove pkg-name
Install from package file	dpkg -i pkg-name	yum localinstall pkg-name	zypper install pkg-name

There can be multiple plays



```yaml
---
- hosts: webservers
  remote_user: root

  tasks:
  - name: ensure apache is at the latest version
    yum:
      name: httpd
      state: latest
  - name: write the apache config file
    template:
      src: /srv/httpd.j2
      dest: /etc/httpd.conf

- hosts: databases
  remote_user: root

  tasks:
  - name: ensure postgresql is at the latest version
    yum:
      name: postgresql
      state: latest
  - name: ensure that postgresql is started
    service:
      name: postgresql
      state: started
```

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The exercise in short

- Read Ansible tutorial to understand how it works. A good starting point is: https://docs.ansible.com/ansible/latest/user_guide/intro_getting_started.html
- Prepare a docker image that can be used as a target. See details in below.
- Install Ansible in your computer.
- Make simple playbook
  - Check that the image has the latest version of git version management system
  - Queries the uptime (Linux command uptime) of target host
- Return result to Plus

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Testing your Ansible

1. Start one container from the image, get its IP-address.
   (in case of password-based authentication you need a manual login after start)
2. Ensure that the IP address is in /etc/ansible/hosts
3. Run the playbook
4. Copy the output (O1)
5. Run the playbook again
6. Copy that output, too (O2)
7. Start a second contained from the image, get its IP-address.
8. Ensure that this IP address is in /etc/ansible/hosts, too.
9. Run the playbook
10. Copy the output (O3)
11. Run the playbook again
12. Copy that output, too (O4)

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Submission

- Git link of the code (teacher may want do git clone). Use different folder or subrepo from earlier exercises.
- The report should have a “report.pdf” with the following contents.
  - All the copied output (O1,O2,O3,O4)
  - Comments on what was easy and what was difficult.

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Main principles (https://continuousdelivery.com/principles/)

- Build quality in
- Work in small batches
- Computers perform repetitive tasks, people solve problems
- Relentlessly pursue continuous improvement
- Everyone is responsible

Sound familiar from somewhere?

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CI – essential practices
(according to Humbley and Farley)

- Don’t check in on a broken code
- Always run all commits tests locally before committing, or get your CI server to do it for you
- Wait for commit tests to pass before moving on
- Never go home on a broken build
- Always be prepared to revert to the previous revisions
- Time-box fixing before reverting
- Don’t comment out failing tests
- Take responsible for all breakages that result from your changes
- Test-driven development

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Deployment essential pract.
(according to Humbley and Farley)

- Only build your binaries once
- Deploy the same way to every environment
- Smoke-test your deployments
- Deploy to copy of production
- Each change should propagate through the pipeline instantly
- If any part of pipeline fails, stop the line