Continuous Lifecycle 2016, Mannheim

Ansible für Devs – Konfigurationsmanagment nicht nur für Ops

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Zur meiner Person

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  - Software Craftmanship
  - Automatisierung von Entwicklungsprozessen
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Agenda

1. Ansible – Was ist das?
2. Warum ist es für Entwickler interessant?
3. Einführung in Ansible
4. Wie unterscheidet sich Ansible zur seiner Konkurrenz?
5. Weitere Einsatzszenarien aus Entwicklersicht

Ansible
Was ist das?

Ansible

- Software für
  - Konfigurationsmanagement,
  - Softwareverteilung und
  - Ad-hoc-Kommando-Ausführung

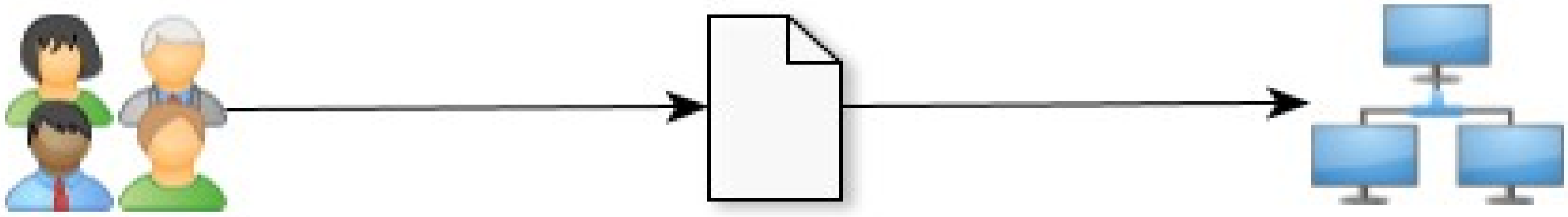
Konfigurationsmanagement (KM)

„Das KM umfasst alle technischen, organisatorischen und beschlussfassenden Maßnahmen und Strukturen, die sich mit der Konfiguration (Spezifikation) eines Produkts befassen.“
https://www.projektmagazin.de/glossarterm/konfigurationsmanagement

Konfigurationsmanagement (KM)

- Softwarekonfiguration
- Hardwarekonfiguration
- Dienstleistungskonfiguration
- Systemkonfiguration

Systemkonfiguration
- „Infrastructure As Code“



Systemkonfiguration
- „Infrastructure As Code“

SALTSTACK

CFEngine

CHEF™

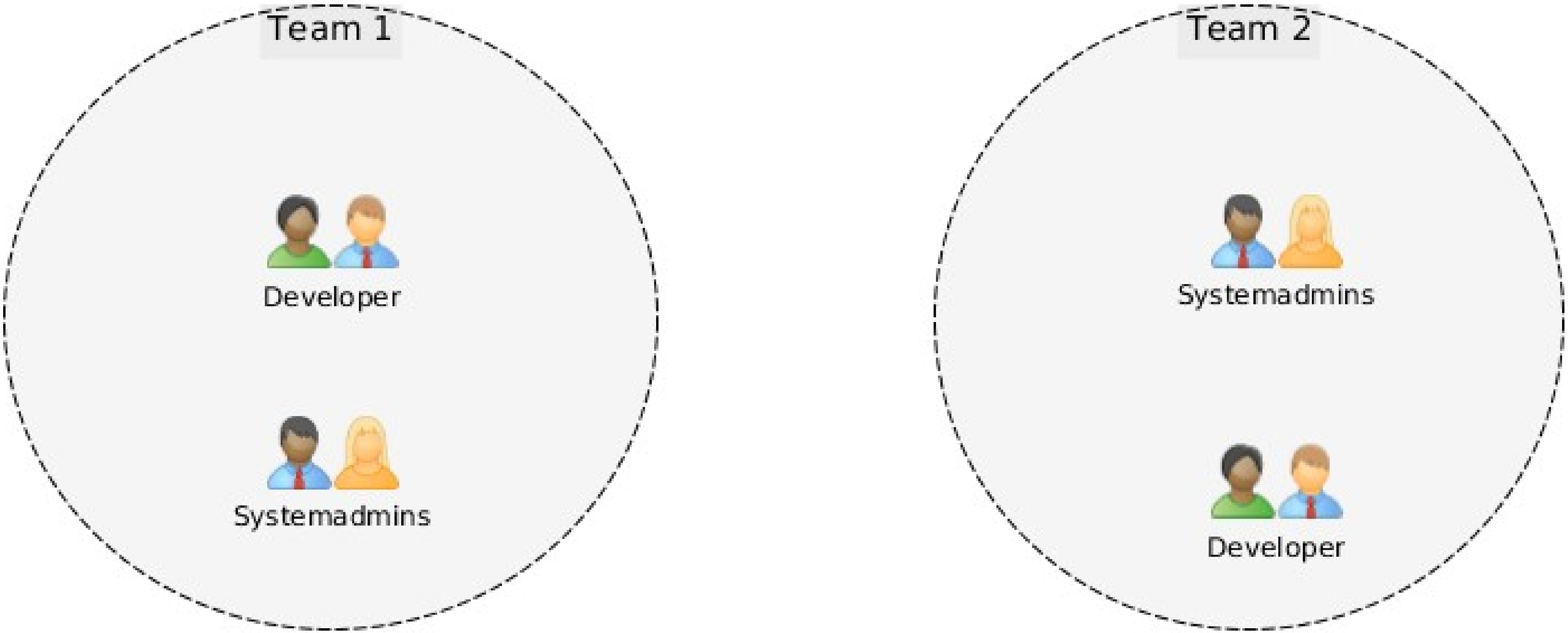
Puppet

Ansible

Warum ist es für Entwickler interessant?

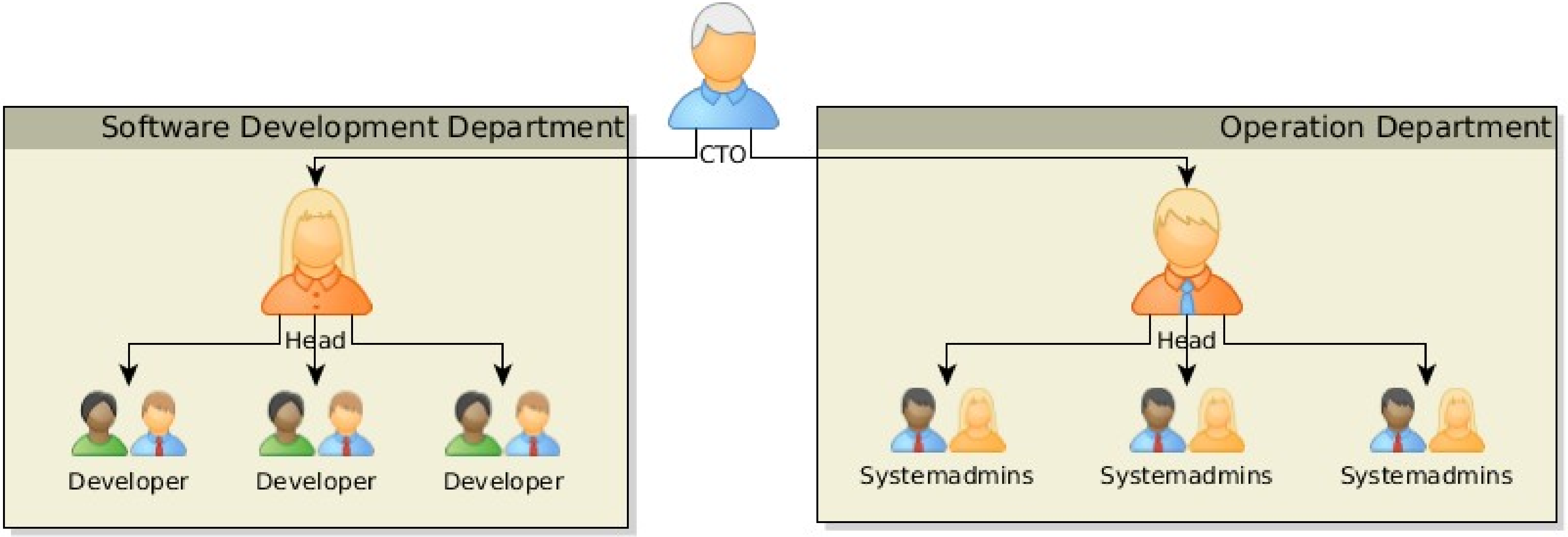
Systemkonfiguration für Entwickler

Organisatorische Ausgangslage
Wunsch



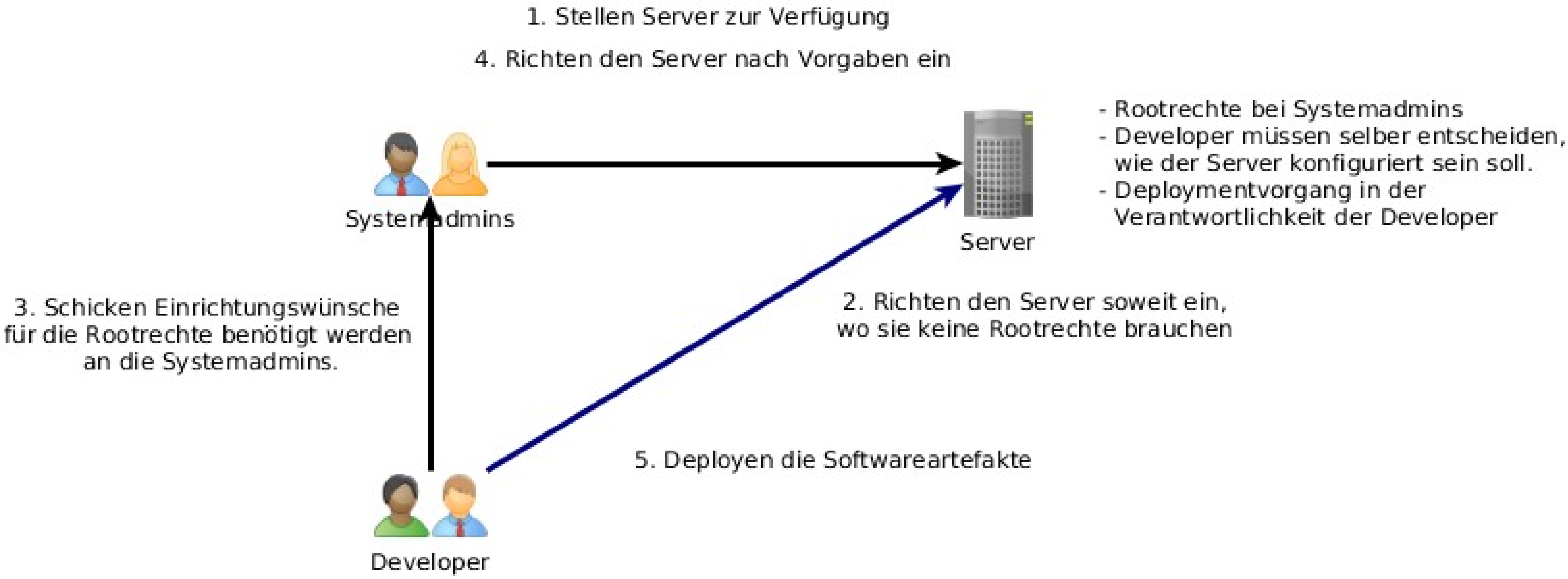
Systemkonfiguration für Entwickler

Organisatorische Ausgangslage
Realität



Systemkonfiguration für Entwickler

Prozess zwischen Development und Operation



1. Stellen Server zur Verfügung

4. Richten den Server nach Vorgaben ein

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

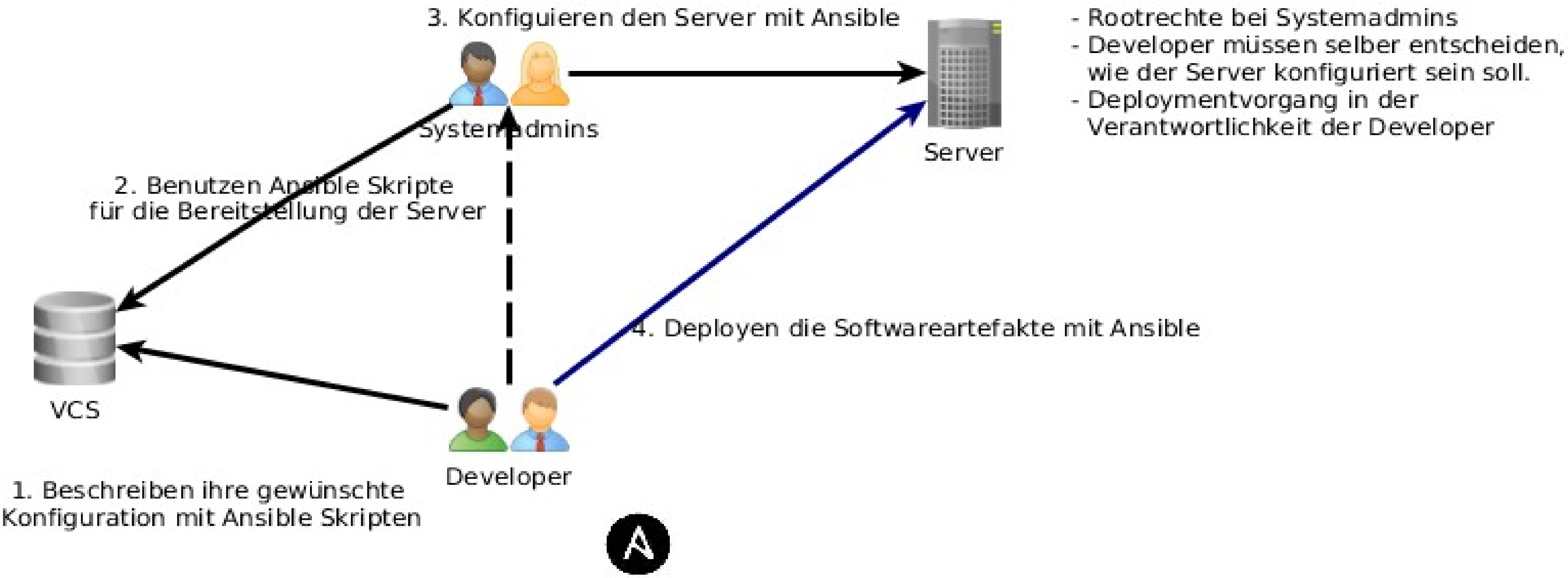
2. Richten den Server soweit ein, wo sie keine Rootrechte brauchen

3. Schicken Einrichtungswünsche für die Rootrechte benötigt werden an die Systemadmins.

5. Deployen die Softwareartefakte

Systemkonfiguration für Entwickler

Lösungidee mit Ansible



3. Konfiguieren den Server mit Ansible

Systemadmins

Server

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

2. Benutzen Ansible Skripte
für die Bereitstellung der Server

VCS

4. Deployen die Softwareartefakte mit Ansible

Developer

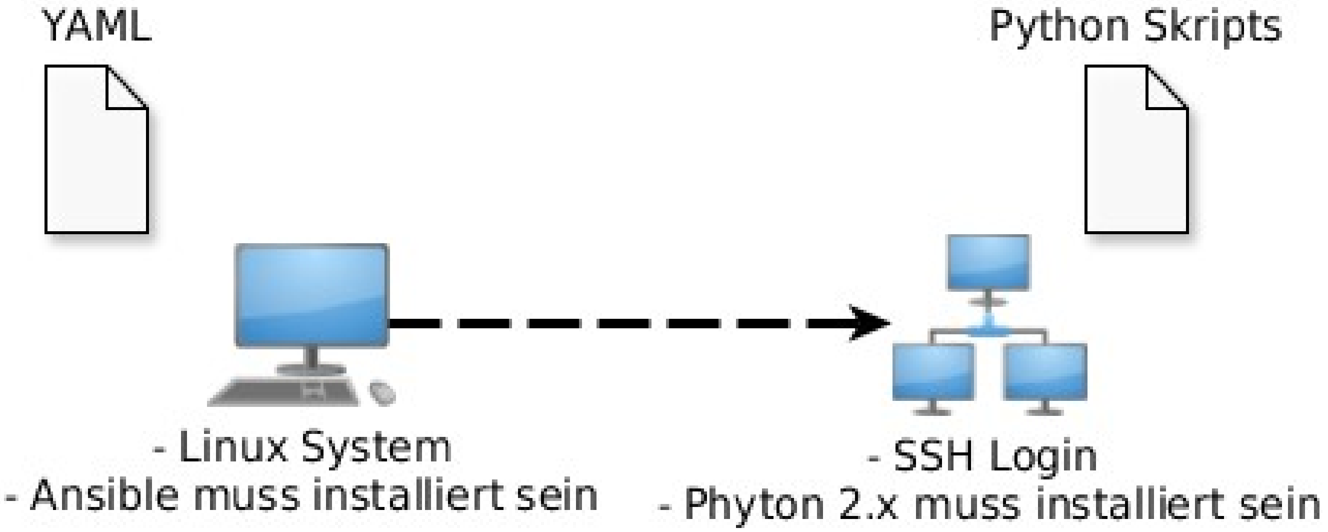
1. Beschreiben ihre gewünschte
Konfiguration mit Ansible Skripten

Einführung in Ansible

Ansible

- Software für
  - Konfigurationsmanagement,
  - Softwareverteilung und
  - Ad-hoc-Kommando-Ausführung
- Sprache: Python
- Ansible Skripte: YAML

Funktionsweise



YAML

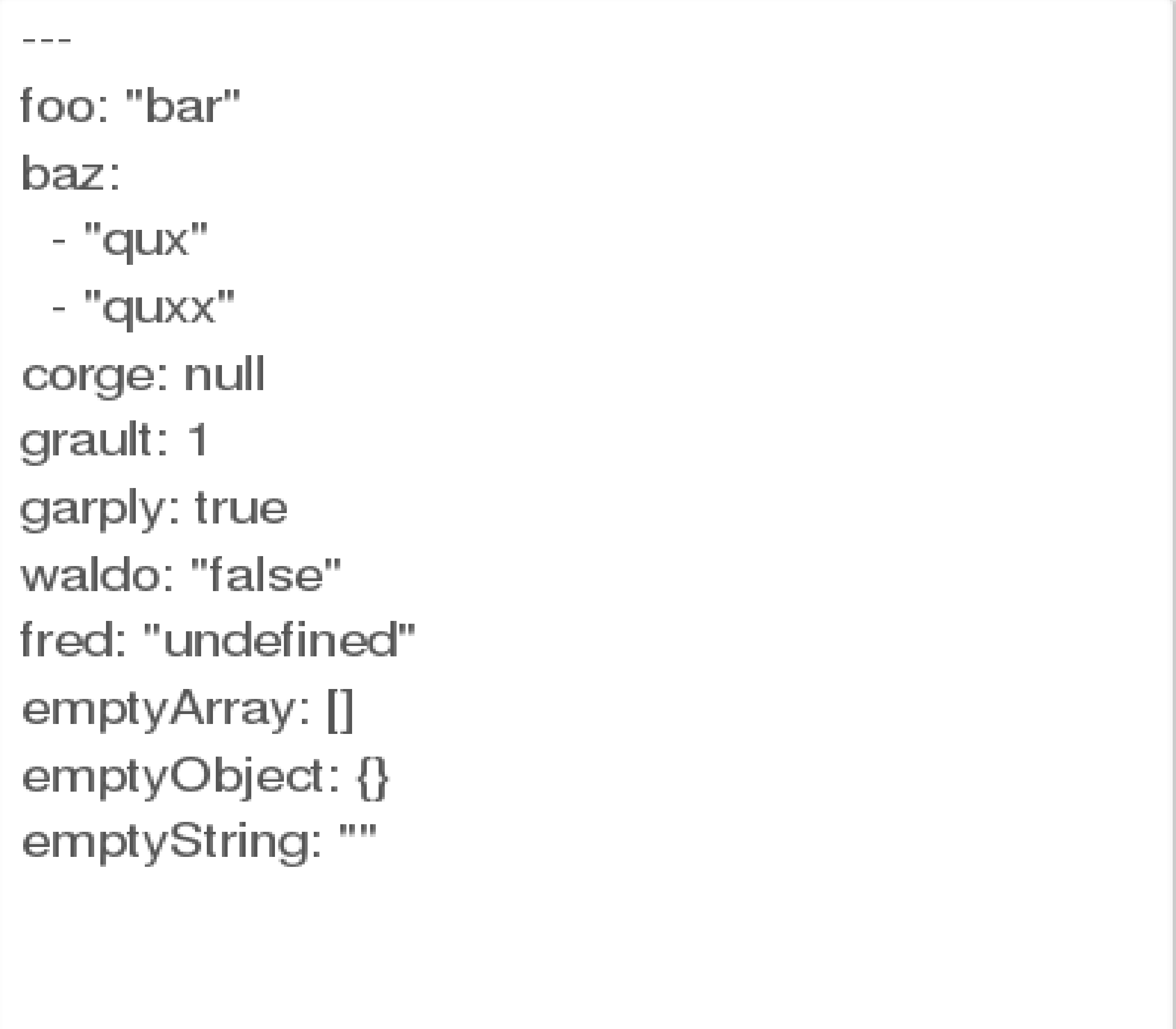
Python Skripts

- Linux System
- Ansible muss installiert sein

- SSH Login
- Phyton 2.x muss installiert sein

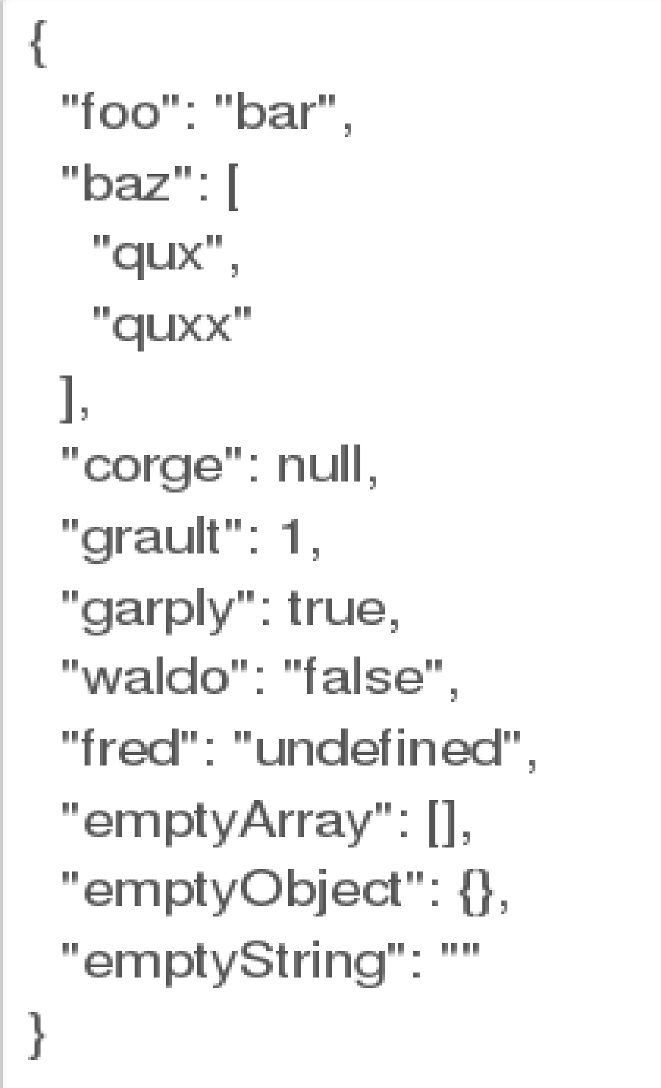
Exkurs: YAML

YAML



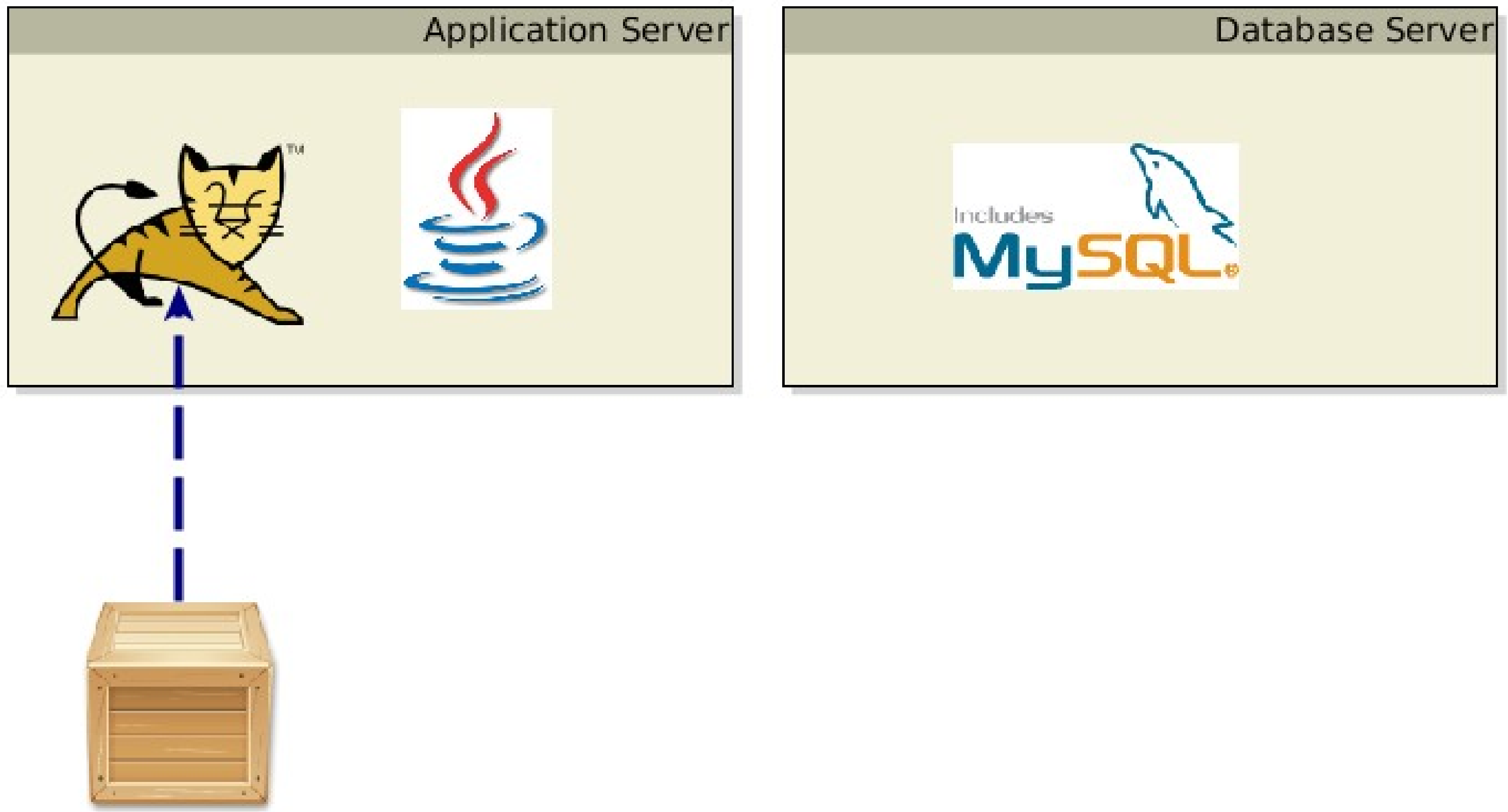
```yaml
---
foo: "bar"
baz:
  - "qux"
  - "quxx"
corge: null
grault: 1
garply: true
waldo: "false"
fred: "undefined"
emptyArray: []
emptyObject: {}
emptyString: ""
```

JSON

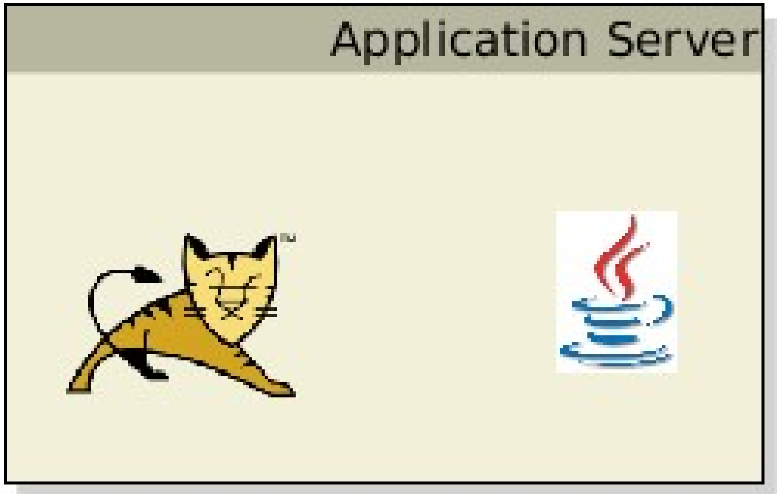


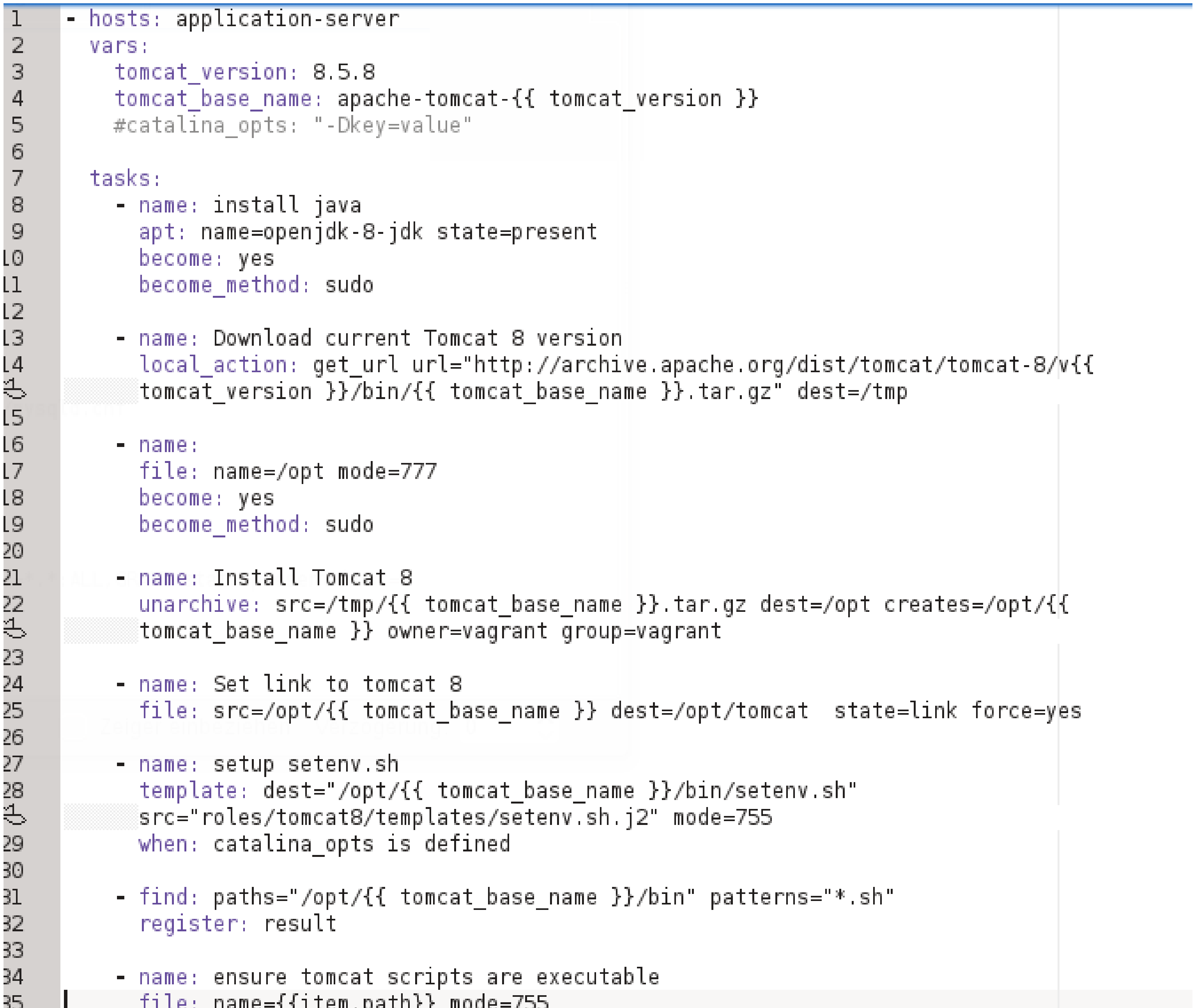
```json
{
  "foo": "bar",
  "baz": [
    "qux",
    "quxx"
  ],
  "corge": null,
  "grault": 1,
  "garply": true,
  "waldo": "false",
  "fred": "undefined",
  "emptyArray": [],
  "emptyObject": {},
  "emptyString": ""
}
```

Ansible Beispiel



Setup Application Server Playbook

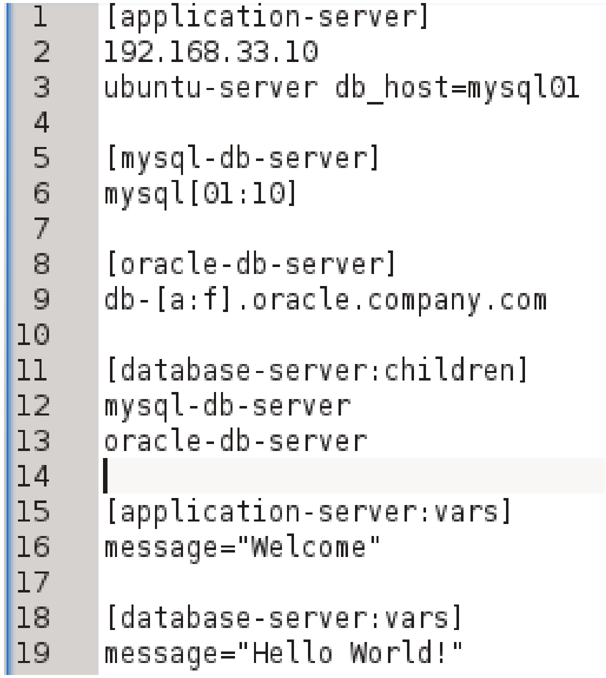




```
- hosts: application-server
  vars:
    tomcat_version: 8.5.8
    tomcat_base_name: apache-tomcat-{{ tomcat_version }}
    #catalina_opts: "-Dkey=value"

  tasks:
    - name: install java
      apt: name=openjdk-8-jdk state=present
      become: yes
      become_method: sudo

    - name: Download current Tomcat 8 version
      local_action: get_url url="http://archive.apache.org/dist/tomcat/tomcat-8/v{{ tomcat_version }}/bin/{{ tomcat_base_name }}.tar.gz" dest=/tmp

    - name:
      file: name=/opt mode=777
      become: yes
      become_method: sudo

    - name: Install Tomcat 8
      unarchive: src=/tmp/{{ tomcat_base_name }}.tar.gz dest=/opt creates=/opt/{{ tomcat_base_name }} owner=vagrant group=vagrant

    - name: Set link to tomcat 8
      file: src=/opt/{{ tomcat_base_name }} dest=/opt/tomcat  state=link force=yes

    - name: setup setenv.sh
      template: dest="/opt/{{ tomcat_base_name }}/bin/setenv.sh" src="roles/tomcat8/templates/setenv.sh.j2" mode=755
      when: catalina_opts is defined

    - find: paths="/opt/{{ tomcat_base_name }}/bin" patterns="*.sh"
      register: result

    - name: ensure tomcat scripts are executable
      file: name={{item.path}} mode=755
```

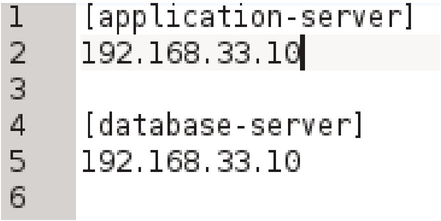
Inventories

Production



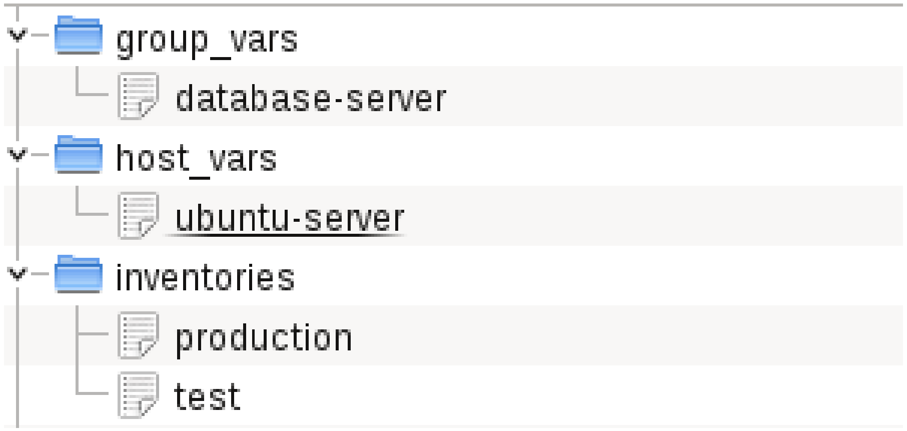
```
[application-server]
192.168.33.10
ubuntu-server db_host=mysql01

[mysql-db-server]
mysql[01:10]

[oracle-db-server]
db-[a:f].oracle.company.com

[database-server:children]
mysql-db-server
oracle-db-server

[application-server:vars]
message="Welcome"

[database-server:vars]
message="Hello World!"
```

Test

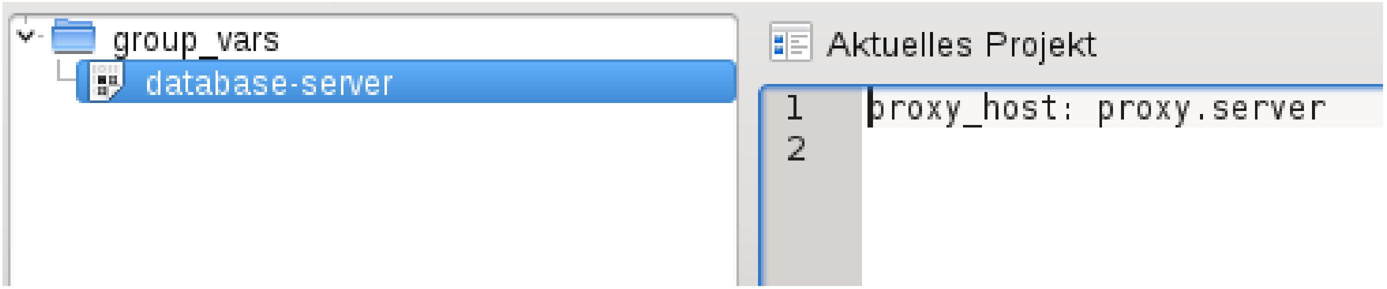


```
[application-server]
192.168.33.10

[database-server]
192.168.33.10

```

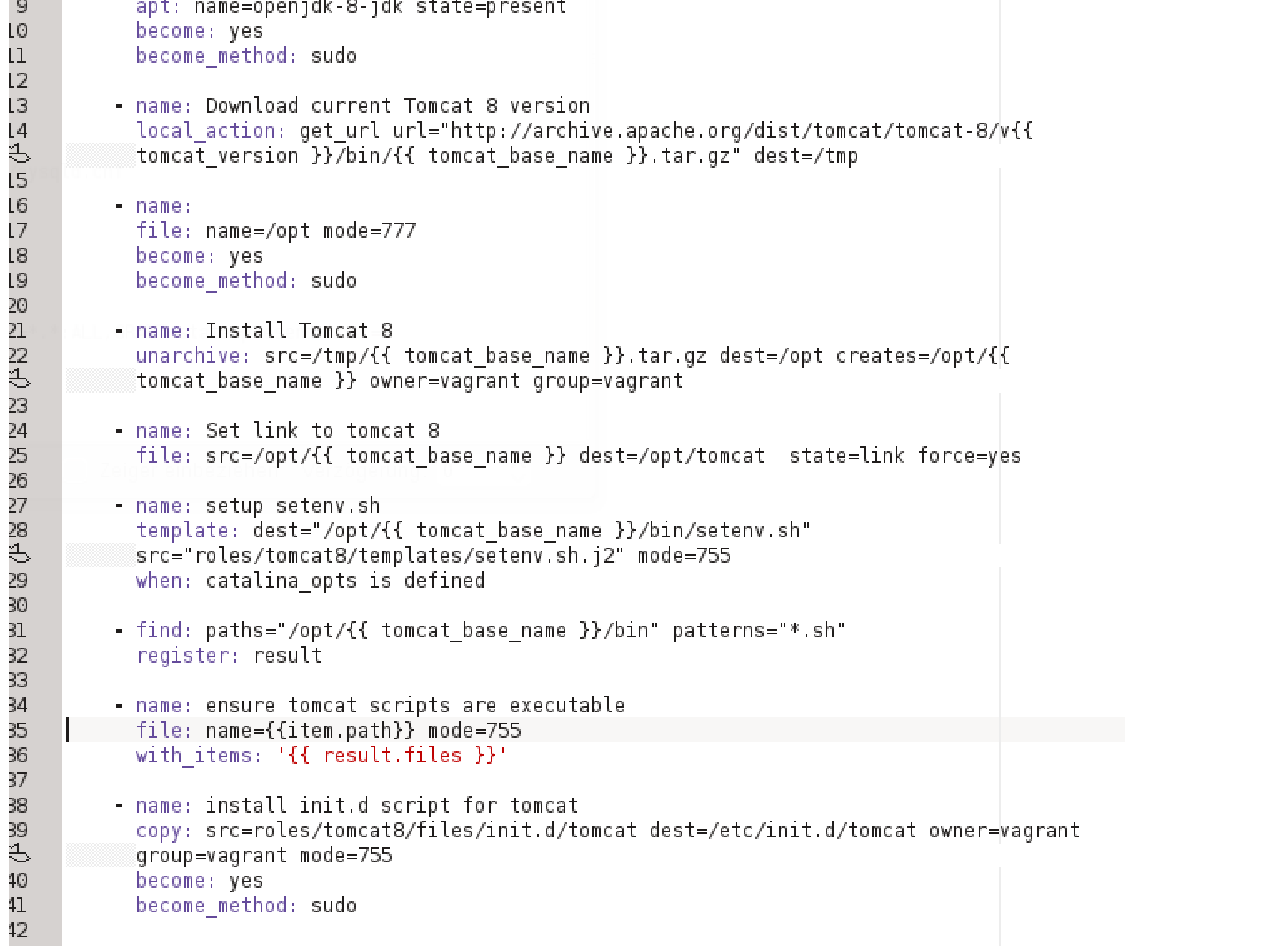
Inventories



```
group_vars
    database-server
host_vars
    ubuntu-server
inventories
    production
    test
```



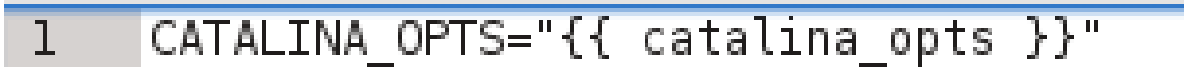
```
proxy_host: proxy.server
```



```yaml
      apt: name=openjdk-8-jdk state=present
      become: yes
      become_method: sudo

    - name: Download current Tomcat 8 version
      local_action: get_url url="http://archive.apache.org/dist/tomcat/tomcat-8/v{{ tomcat_version }}/bin/{{ tomcat_base_name }}.tar.gz" dest=/tmp

    - name:
      file: name=/opt mode=777
      become: yes
      become_method: sudo

    - name: Install Tomcat 8
      unarchive: src=/tmp/{{ tomcat_base_name }}.tar.gz dest=/opt creates=/opt/{{ tomcat_base_name }} owner=vagrant group=vagrant

    - name: Set link to tomcat 8
      file: src=/opt/{{ tomcat_base_name }} dest=/opt/tomcat  state=link force=yes

    - name: setup setenv.sh
      template: dest="/opt/{{ tomcat_base_name }}/bin/setenv.sh" src="roles/tomcat8/templates/setenv.sh.j2" mode=755
      when: catalina_opts is defined

    - find: paths="/opt/{{ tomcat_base_name }}/bin" patterns="*.sh"
      register: result

    - name: ensure tomcat scripts are executable
      file: name={{item.path}} mode=755
      with_items: '{{ result.files }}'

    - name: install init.d script for tomcat
      copy: src=roles/tomcat8/files/init.d/tomcat dest=/etc/init.d/tomcat owner=vagrant group=vagrant mode=755
      become: yes
      become_method: sudo

```

Templates

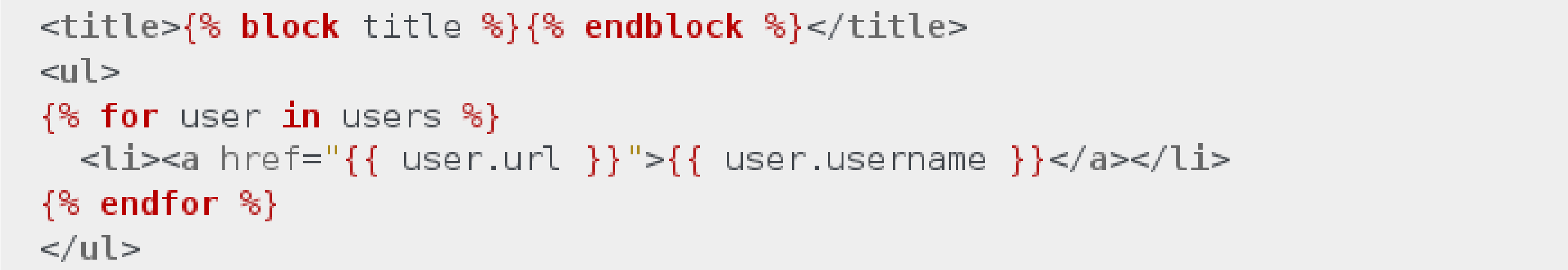
- setenv.sh.j2



```
CATALINA_OPTS="{{ catalina_opts }}"
```

Templates - Jinja2

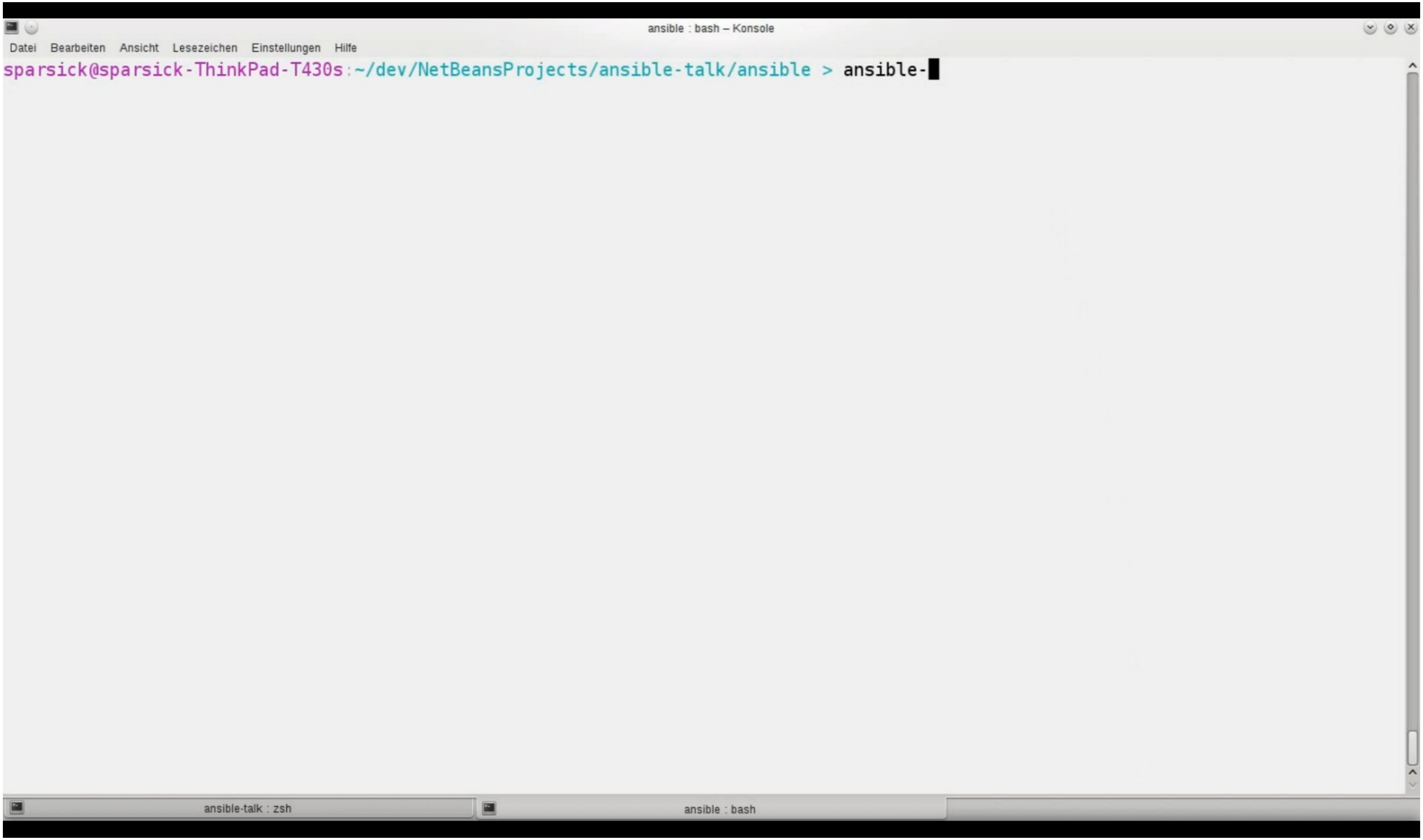
- Templating engine für Python



```
<title>{% block title %}{% endblock %}</title>
<ul>
{% for user in users %}
  <li><a href="{{ user.url }}">{{ user.username }}</a></li>
{% endfor %}
</ul>
```

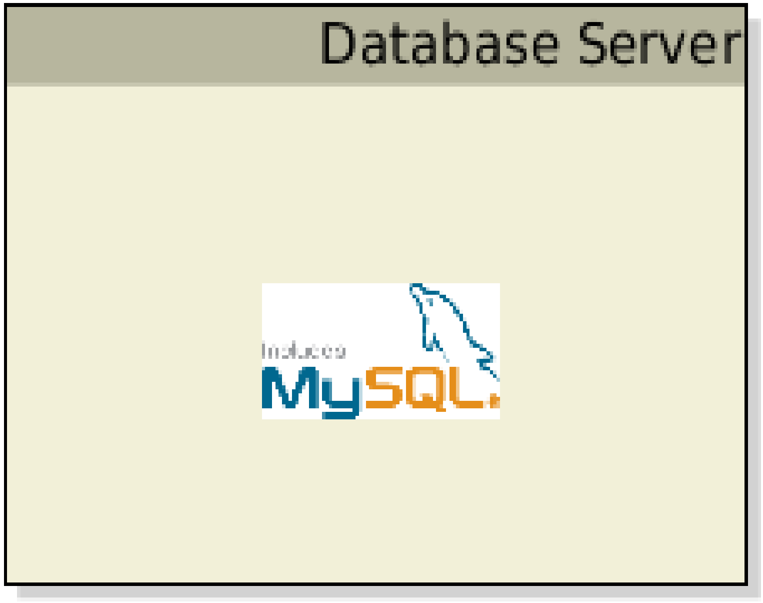
- Mehr Information unter http://jinja.pocoo.org/docs/dev/

Setup Application Server Playbook

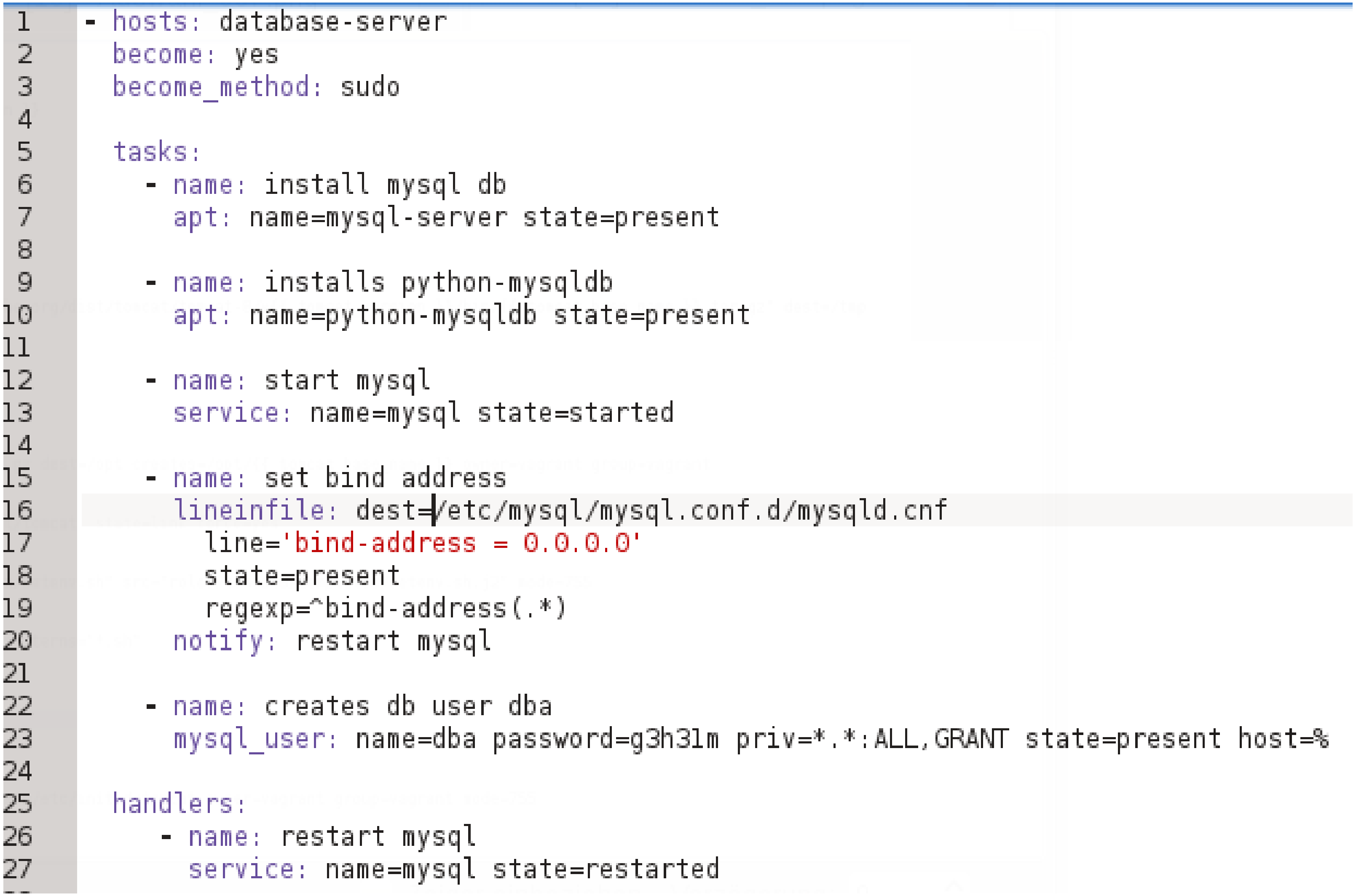


```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible > ansible-
```

Setup Database Server Playbook

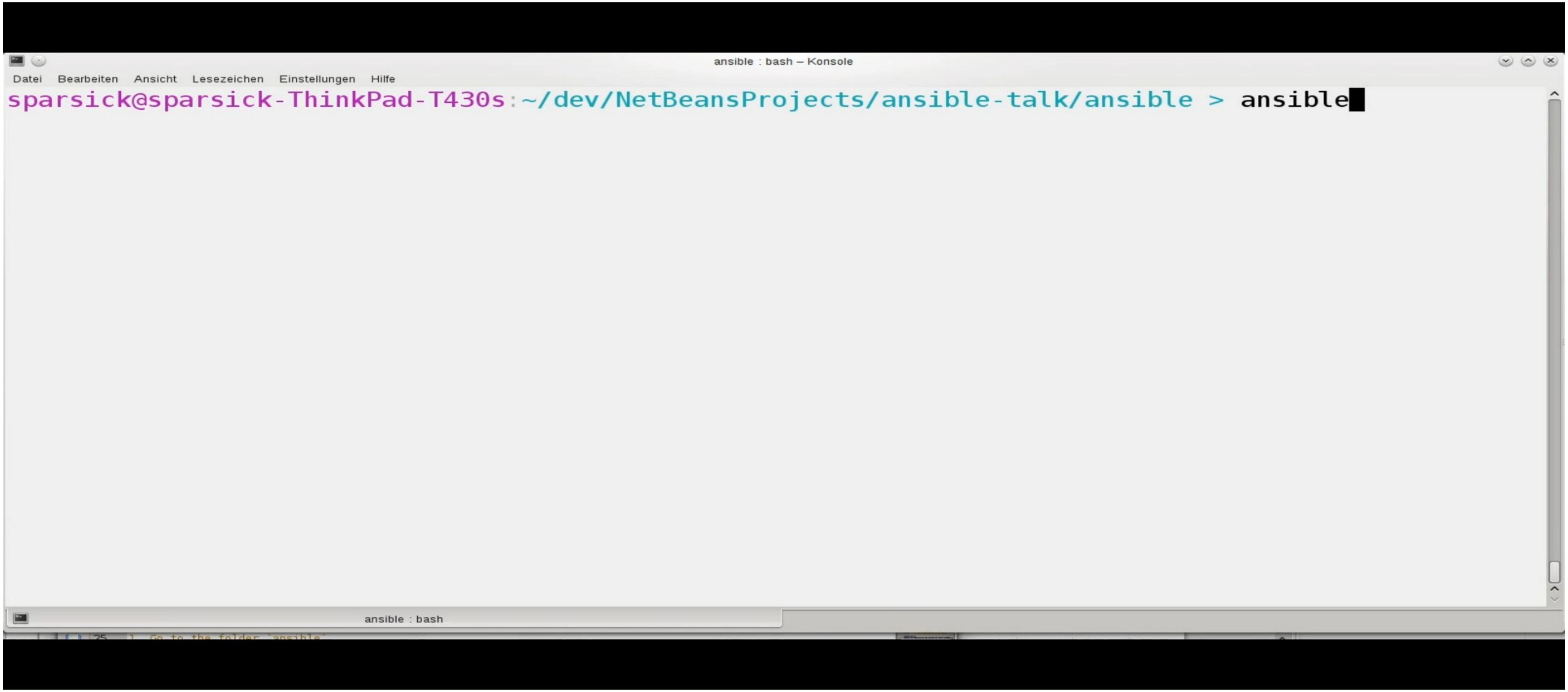


Database Server



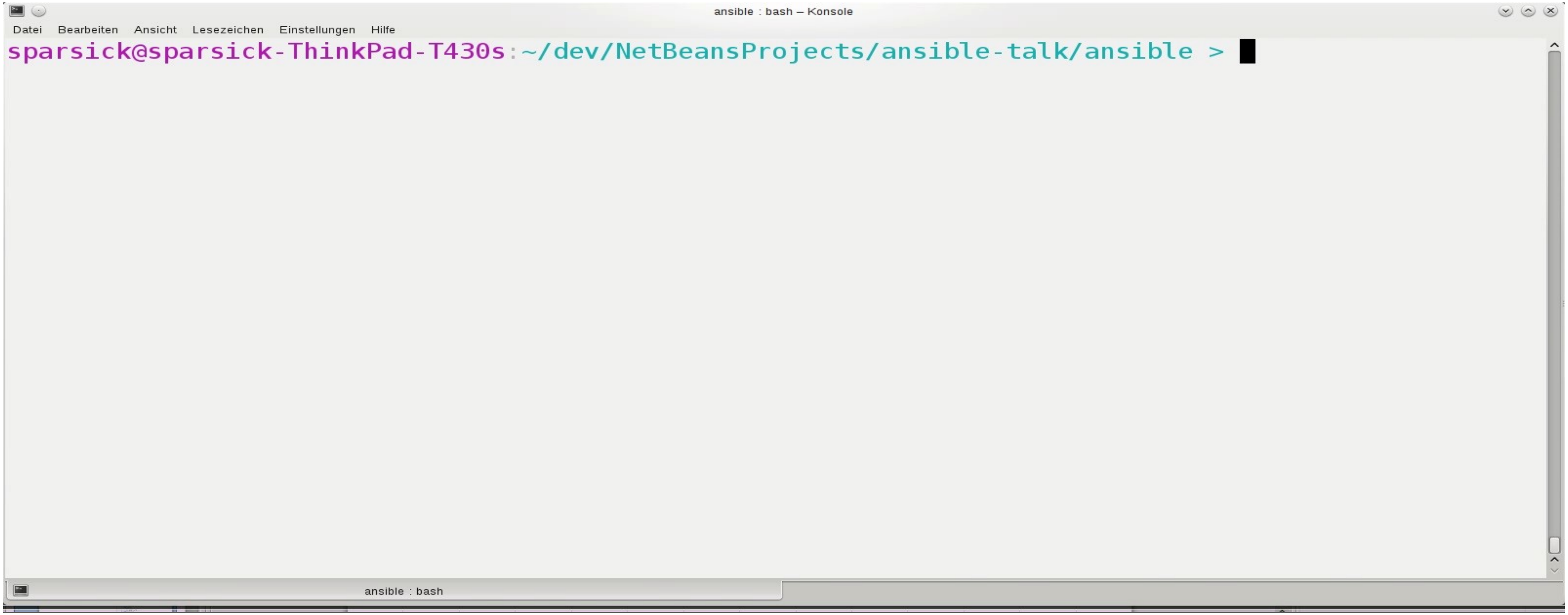
```
- hosts: database-server
  become: yes
  become_method: sudo

  tasks:
    - name: install mysql db
      apt: name=mysql-server state=present

    - name: installs python-mysqldb
      apt: name=python-mysqldb state=present

    - name: start mysql
      service: name=mysql state=started

    - name: set bind address
      lineinfile: dest=/etc/mysql/mysql.conf.d/mysqld.cnf
        line='bind-address = 0.0.0.0'
        state=present
        regexp=^bind-address(.*)
      notify: restart mysql

    - name: creates db user dba
      mysql_user: name=dba password=g3h31m priv=*.*:ALL,GRANT state=present host=%

  handlers:
     - name: restart mysql
       service: name=mysql state=restarted
```

Setup Database Server Playbook

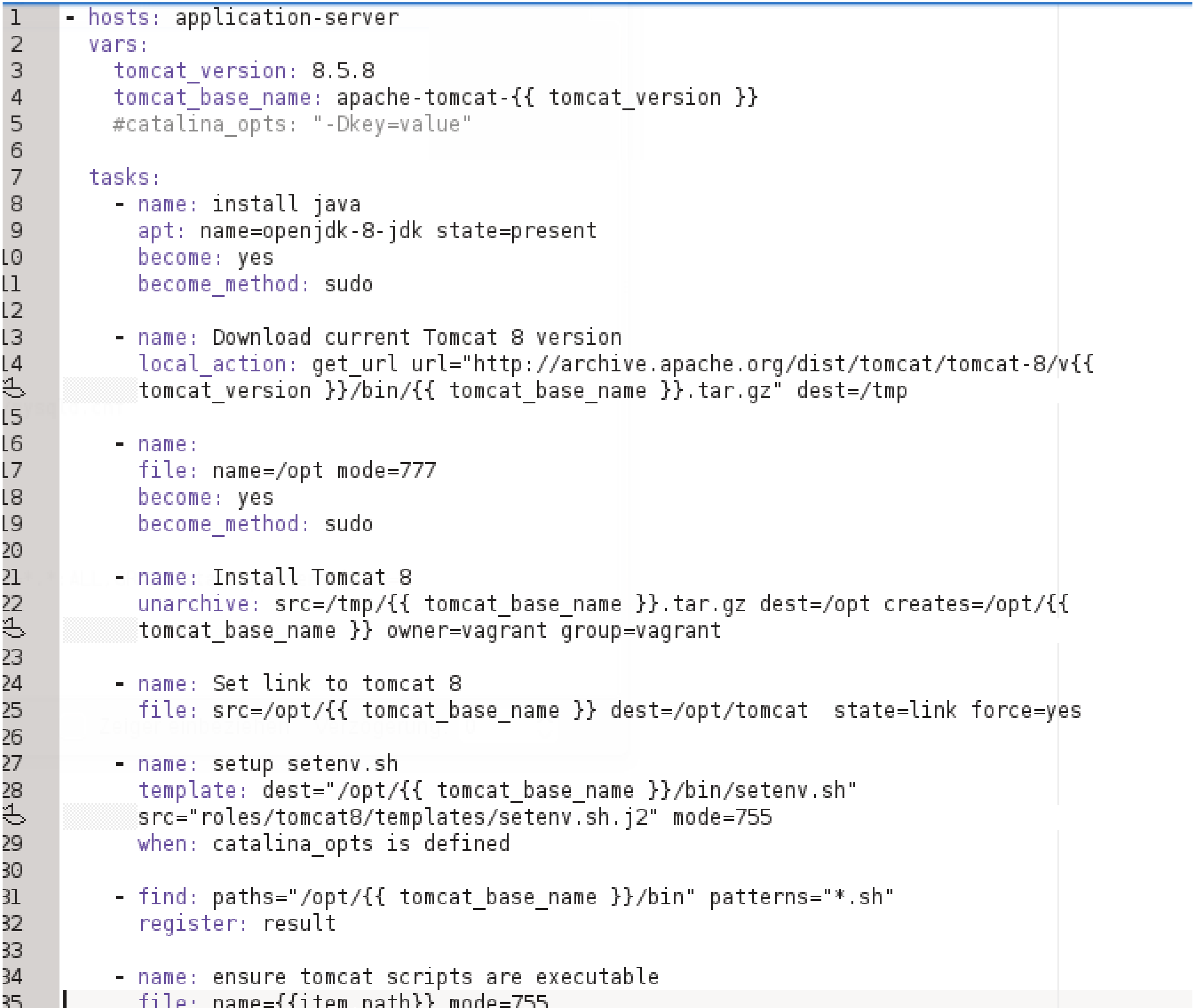


```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible > ansible
```

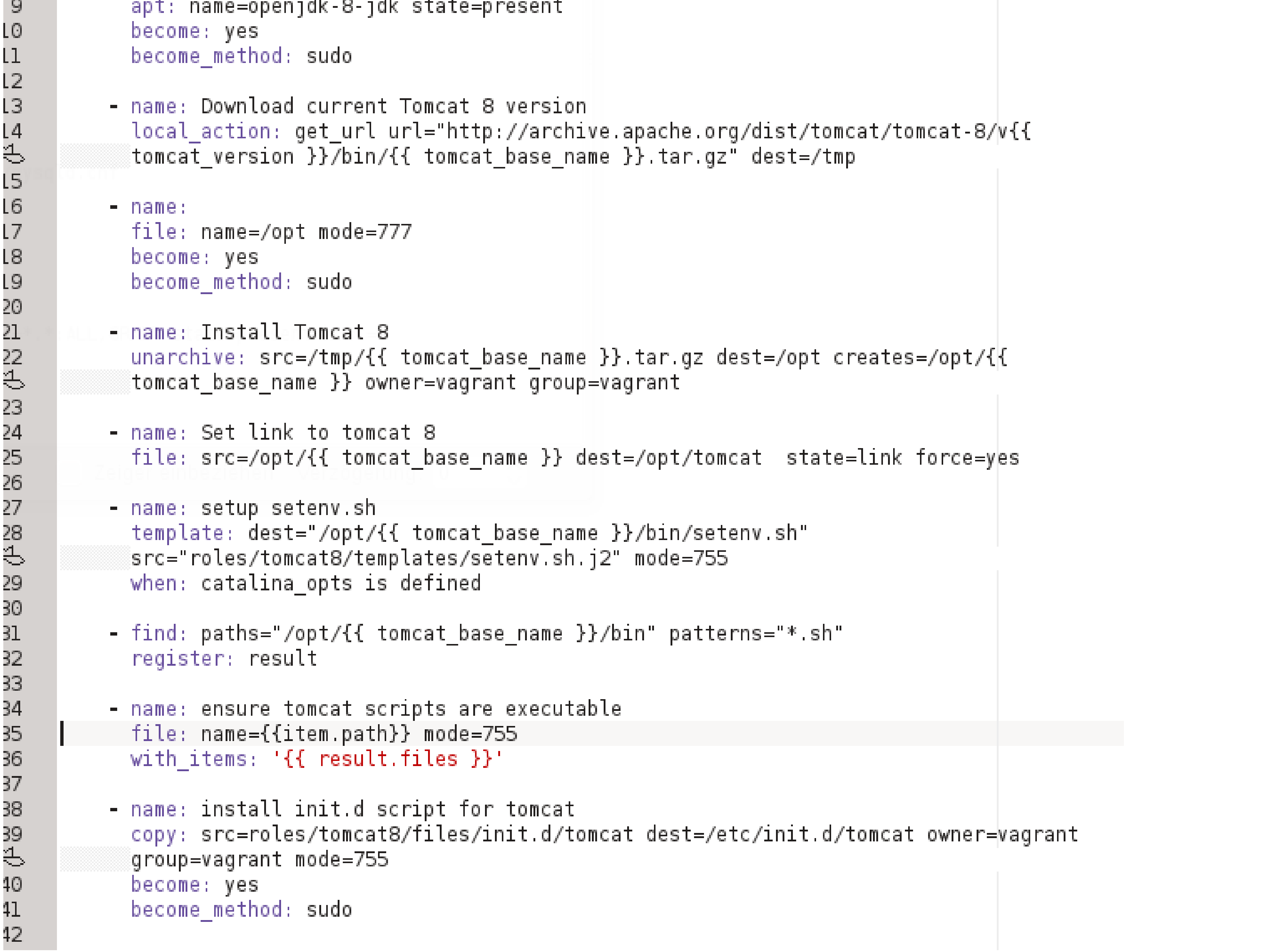
Setup Database Server Playbook



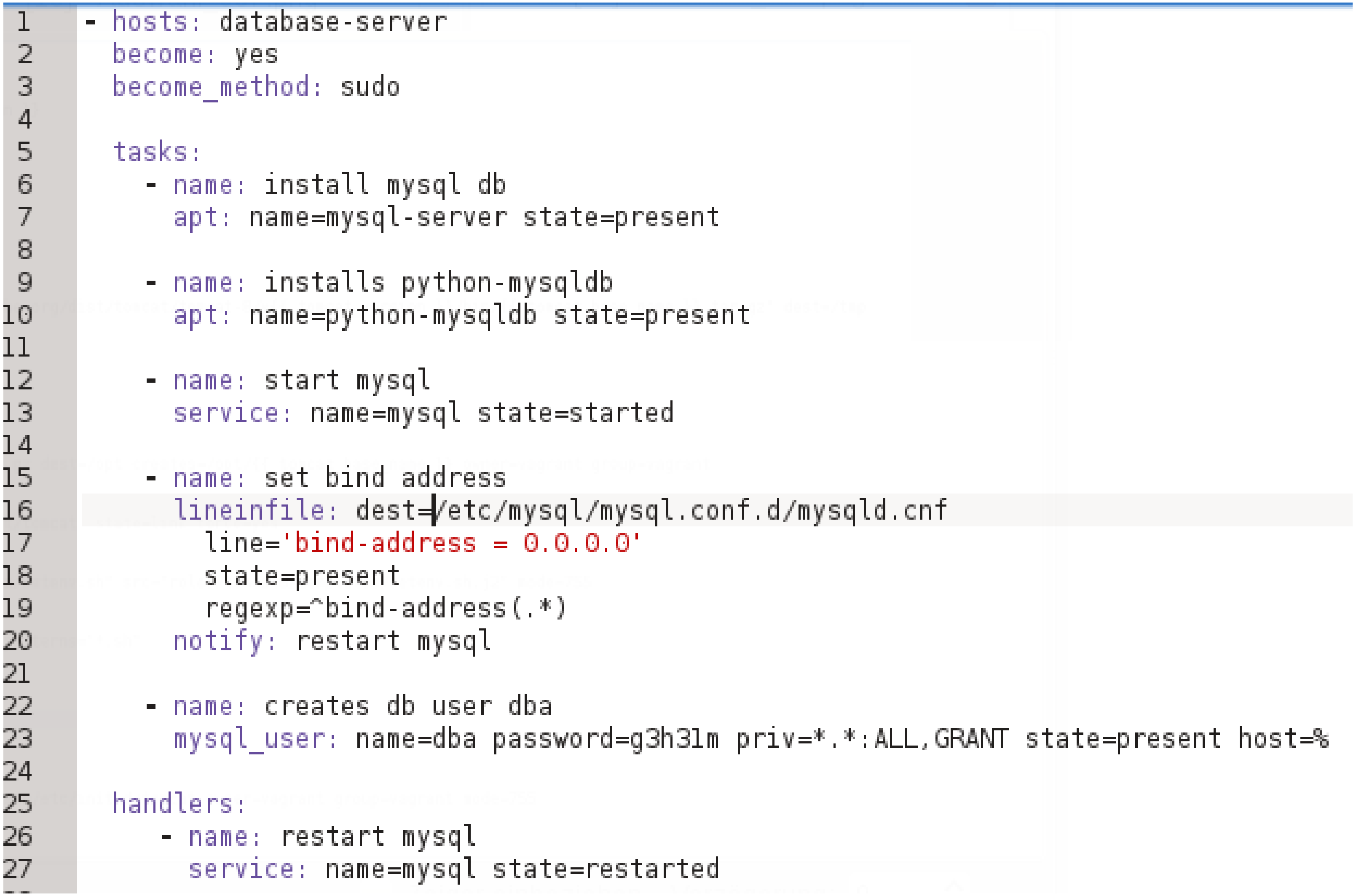
```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible >
```



```
- hosts: application-server
  vars:
    tomcat_version: 8.5.8
    tomcat_base_name: apache-tomcat-{{ tomcat_version }}
    #catalina_opts: "-Dkey=value"

  tasks:
    - name: install java
      apt: name=openjdk-8-jdk state=present
      become: yes
      become_method: sudo

    - name: Download current Tomcat 8 version
      local_action: get_url url="http://archive.apache.org/dist/tomcat/tomcat-8/v{{ tomcat_version }}/bin/{{ tomcat_base_name }}.tar.gz" dest=/tmp

    - name:
      file: name=/opt mode=777
      become: yes
      become_method: sudo

    - name: Install Tomcat 8
      unarchive: src=/tmp/{{ tomcat_base_name }}.tar.gz dest=/opt creates=/opt/{{ tomcat_base_name }} owner=vagrant group=vagrant

    - name: Set link to tomcat 8
      file: src=/opt/{{ tomcat_base_name }} dest=/opt/tomcat  state=link force=yes

    - name: setup setenv.sh
      template: dest="/opt/{{ tomcat_base_name }}/bin/setenv.sh" src="roles/tomcat8/templates/setenv.sh.j2" mode=755
      when: catalina_opts is defined

    - find: paths="/opt/{{ tomcat_base_name }}/bin" patterns="*.sh"
      register: result

    - name: ensure tomcat scripts are executable
      file: name={{item.path}} mode=755
```



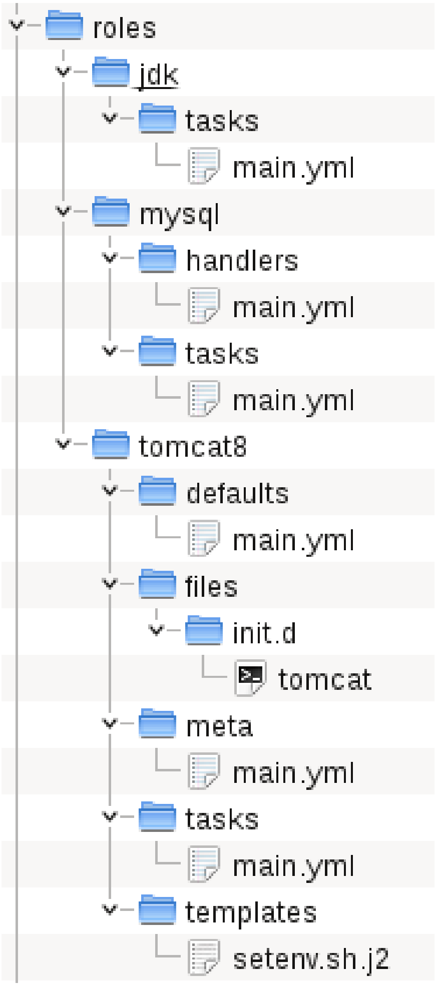
```
      apt: name=openjdk-8-jdk state=present
      become: yes
      become_method: sudo

    - name: Download current Tomcat 8 version
      local_action: get_url url="http://archive.apache.org/dist/tomcat/tomcat-8/v{{ tomcat_version }}/bin/{{ tomcat_base_name }}.tar.gz" dest=/tmp

    - name:
      file: name=/opt mode=777
      become: yes
      become_method: sudo

    - name: Install Tomcat 8
      unarchive: src=/tmp/{{ tomcat_base_name }}.tar.gz dest=/opt creates=/opt/{{ tomcat_base_name }} owner=vagrant group=vagrant

    - name: Set link to tomcat 8
      file: src=/opt/{{ tomcat_base_name }} dest=/opt/tomcat  state=link force=yes

    - name: setup setenv.sh
      template: dest="/opt/{{ tomcat_base_name }}/bin/setenv.sh" src="roles/tomcat8/templates/setenv.sh.j2" mode=755
      when: catalina_opts is defined

    - find: paths="/opt/{{ tomcat_base_name }}/bin" patterns="*.sh"
      register: result

    - name: ensure tomcat scripts are executable
      file: name={{item.path}} mode=755
      with_items: '{{ result.files }}'

    - name: install init.d script for tomcat
      copy: src=roles/tomcat8/files/init.d/tomcat dest=/etc/init.d/tomcat owner=vagrant group=vagrant mode=755
      become: yes
      become_method: sudo
```



```yaml
- hosts: database-server
  become: yes
  become_method: sudo

  tasks:
    - name: install mysql db
      apt: name=mysql-server state=present

    - name: installs python-mysqldb
      apt: name=python-mysqldb state=present

    - name: start mysql
      service: name=mysql state=started

    - name: set bind address
      lineinfile: dest=/etc/mysql/mysql.conf.d/mysqld.cnf
        line='bind-address = 0.0.0.0'
        state=present
        regexp=^bind-address(.*)
      notify: restart mysql

    - name: creates db user dba
      mysql_user: name=dba password=g3h31m priv=*.*:ALL,GRANT state=present host=%

  handlers:
     - name: restart mysql
       service: name=mysql state=restarted
```

Roles

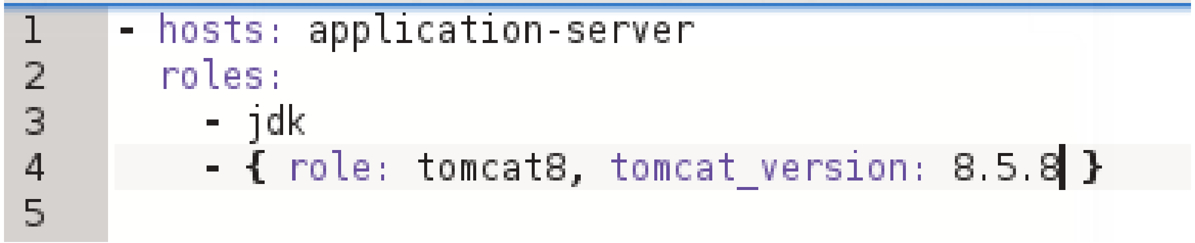
```
roles/
   common/
     files/
     templates/
     tasks/
     handlers/
     vars/
     defaults/
     meta/
```



```
roles
  jdk
    tasks
      main.yml
  mysql
    handlers
      main.yml
    tasks
      main.yml
  tomcat8
    defaults
      main.yml
    files
      init.d
        tomcat
    meta
      main.yml
    tasks
      main.yml
    templates
      setenv.sh.j2
```

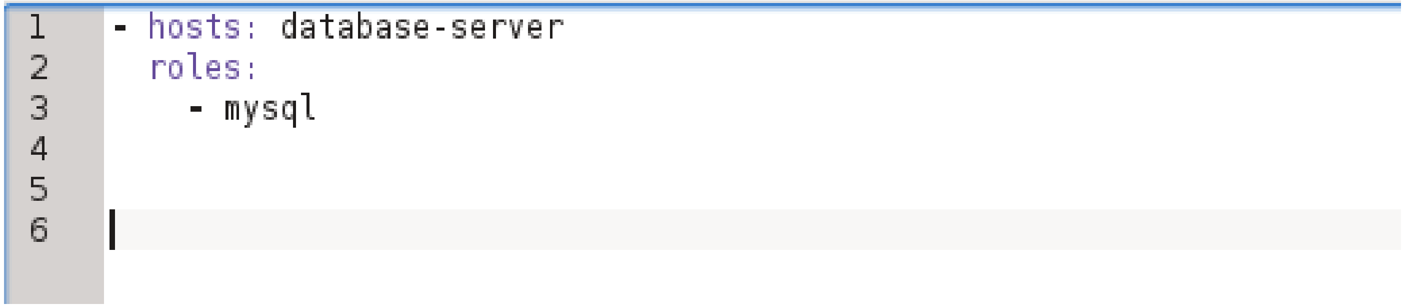
Setup Playbooks mit Roles

- Setup Application Server



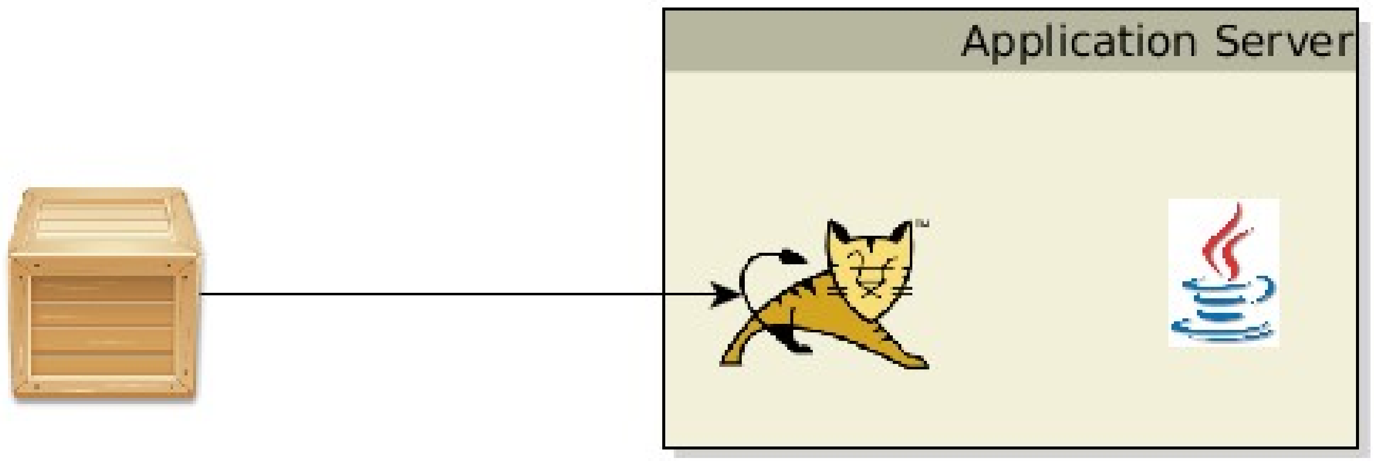
```yaml
- hosts: application-server
  roles:
    - jdk
    - { role: tomcat8, tomcat_version: 8.5.8 }
```

- Setup Database Server

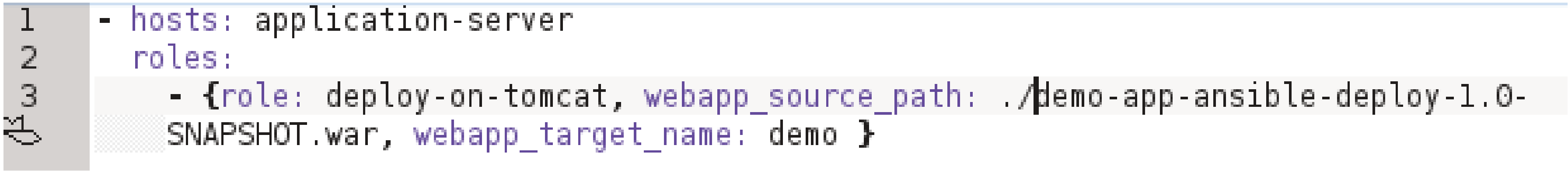


```yaml
- hosts: database-server
  roles:
    - mysql
```

Java Webapplikation Deployment

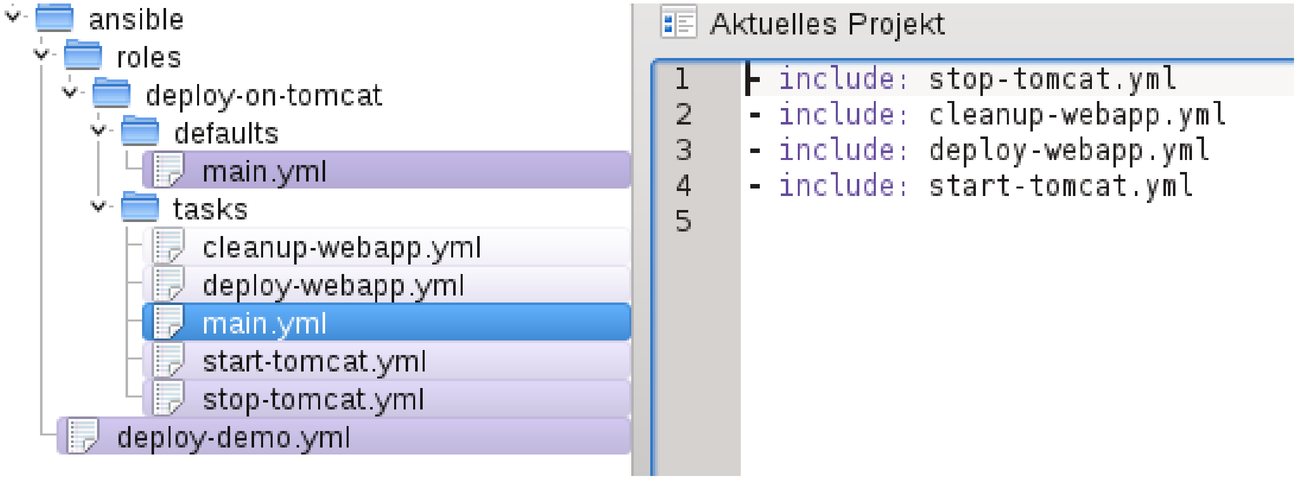


Deploy Application Playbook



```
- hosts: application-server
  roles:
    - {role: deploy-on-tomcat, webapp_source_path: ./demo-app-ansible-deploy-1.0-SNAPSHOT.war, webapp_target_name: demo }
```

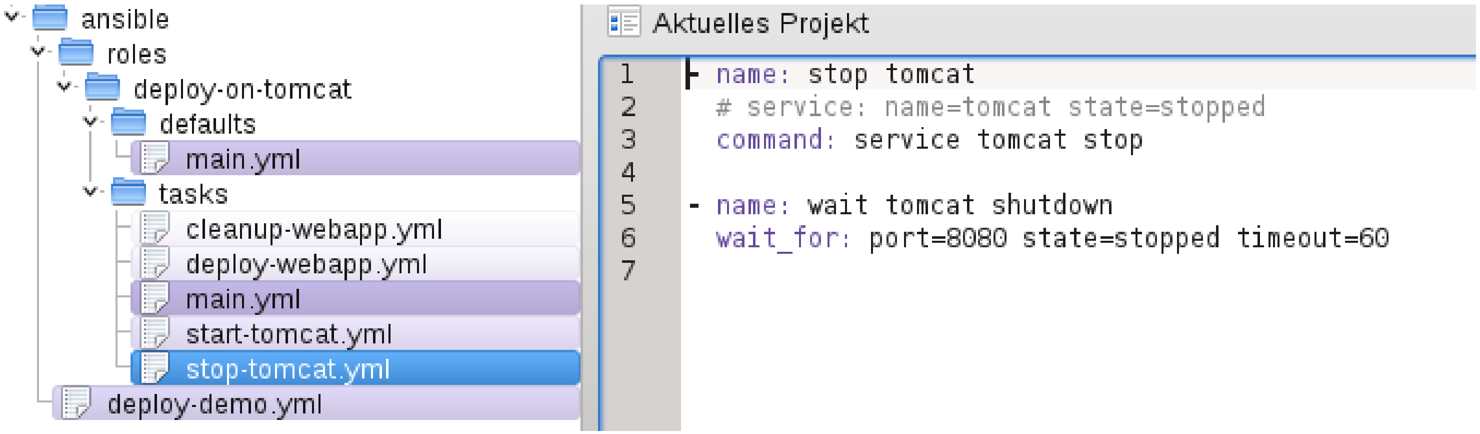
deploy-on-tomcat Role



```
ansible
  roles
    deploy-on-tomcat
      defaults
        main.yml
      tasks
        cleanup-webapp.yml
        deploy-webapp.yml
        main.yml
        start-tomcat.yml
        stop-tomcat.yml
  deploy-demo.yml
```

```
- include: stop-tomcat.yml
- include: cleanup-webapp.yml
- include: deploy-webapp.yml
- include: start-tomcat.yml

```

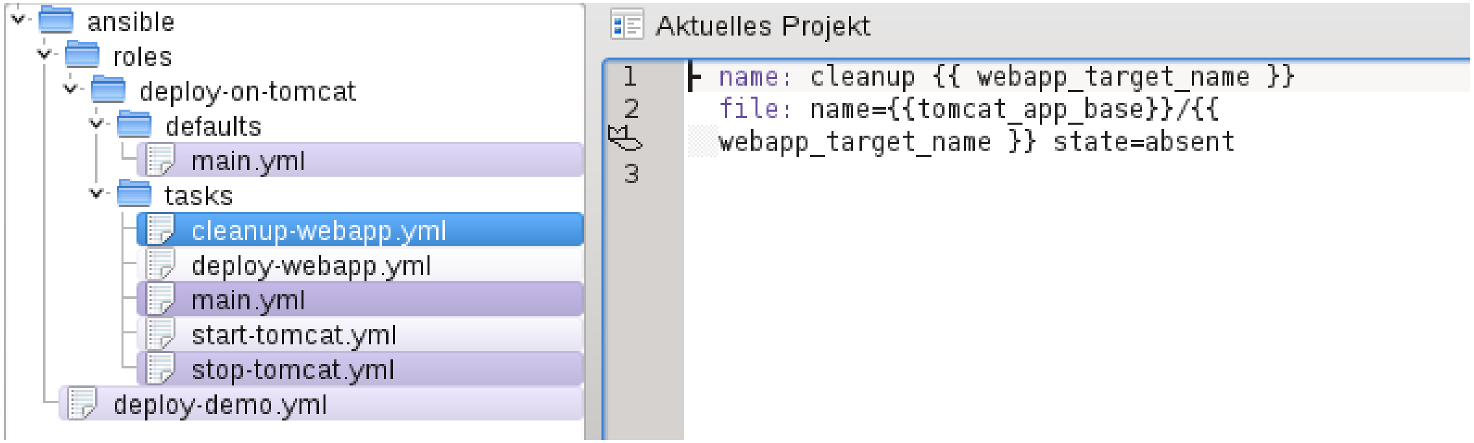
deploy-on-tomcat Role



```
ansible
  roles
    deploy-on-tomcat
      defaults
        main.yml
      tasks
        cleanup-webapp.yml
        deploy-webapp.yml
        main.yml
        start-tomcat.yml
        stop-tomcat.yml
  deploy-demo.yml
```

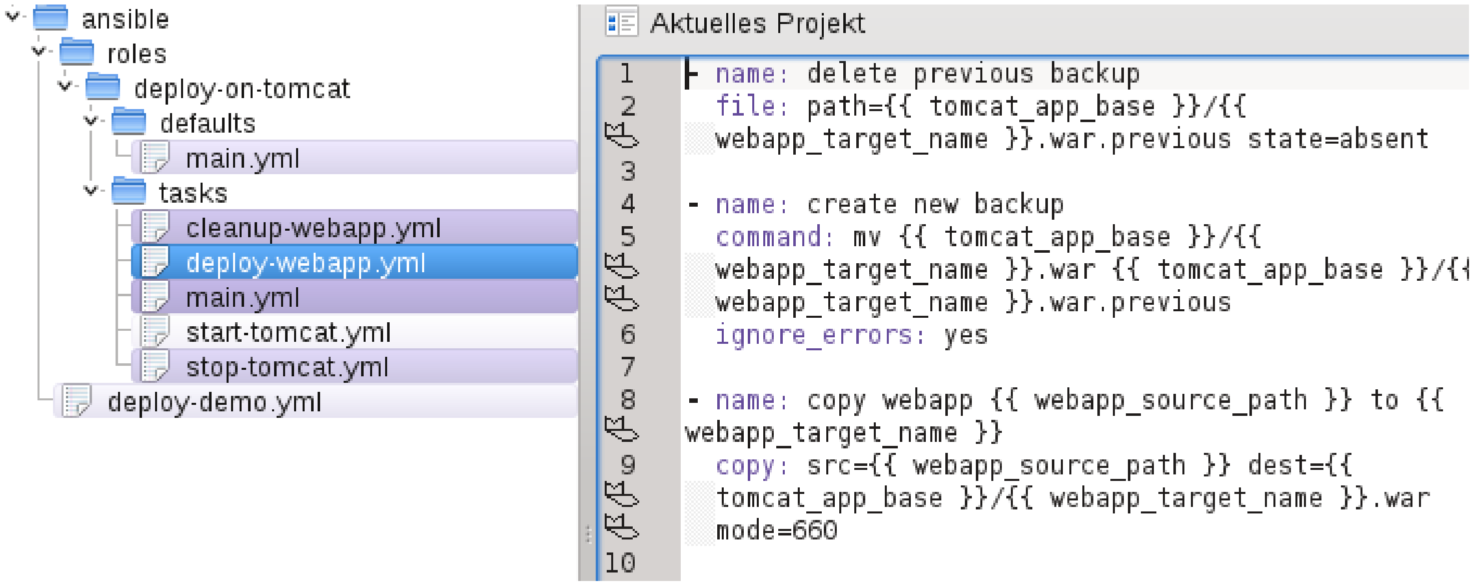
```yaml
- name: stop tomcat
  # service: name=tomcat state=stopped
  command: service tomcat stop

- name: wait tomcat shutdown
  wait_for: port=8080 state=stopped timeout=60
```

deploy-on-tomcat Role



```yaml
- name: cleanup {{ webapp_target_name }}
  file: name={{tomcat_app_base}}/{{
webapp_target_name }} state=absent
```

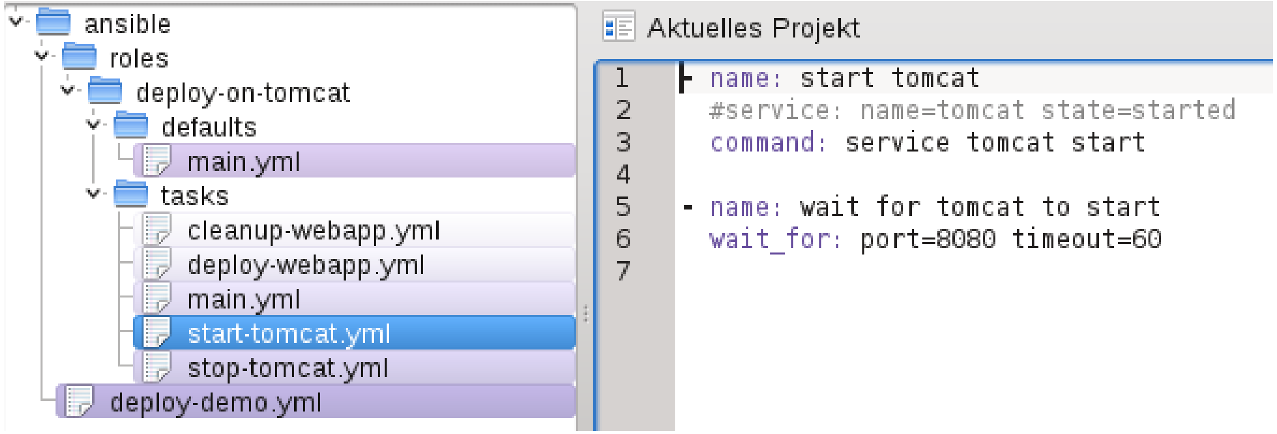
deploy-on-tomcat Role



```
ansible
  roles
    deploy-on-tomcat
      defaults
        main.yml
      tasks
        cleanup-webapp.yml
        deploy-webapp.yml
        main.yml
        start-tomcat.yml
        stop-tomcat.yml
  deploy-demo.yml
```

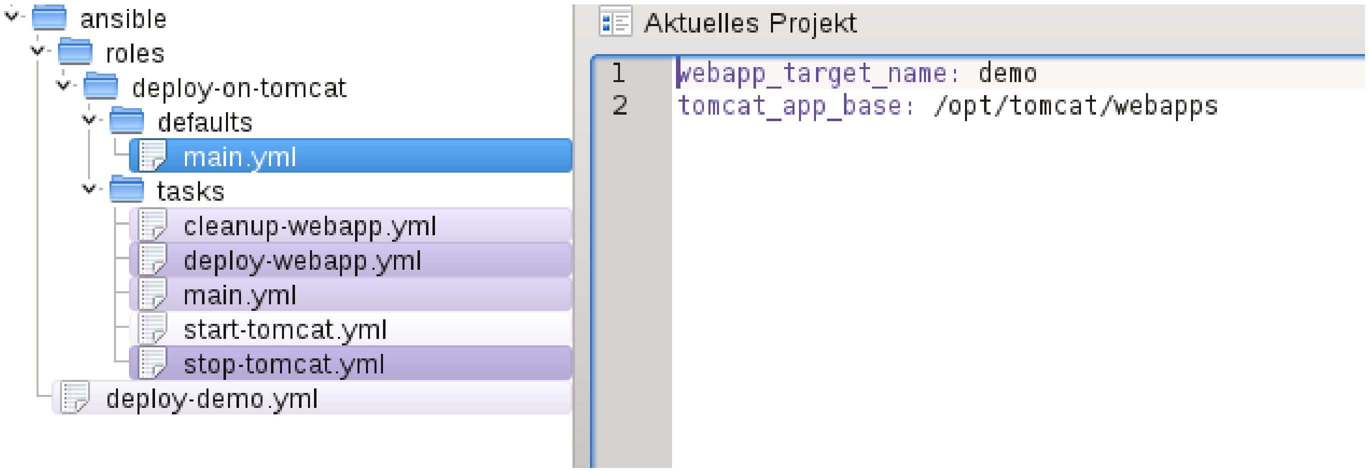
```
- name: delete previous backup
  file: path={{ tomcat_app_base }}/{{ webapp_target_name }}.war.previous state=absent

- name: create new backup
  command: mv {{ tomcat_app_base }}/{{ webapp_target_name }}.war {{ tomcat_app_base }}/{{ webapp_target_name }}.war.previous
  ignore_errors: yes

- name: copy webapp {{ webapp_source_path }} to {{ webapp_target_name }}
  copy: src={{ webapp_source_path }} dest={{ tomcat_app_base }}/{{ webapp_target_name }}.war mode=660
```

deploy-on-tomcat Role



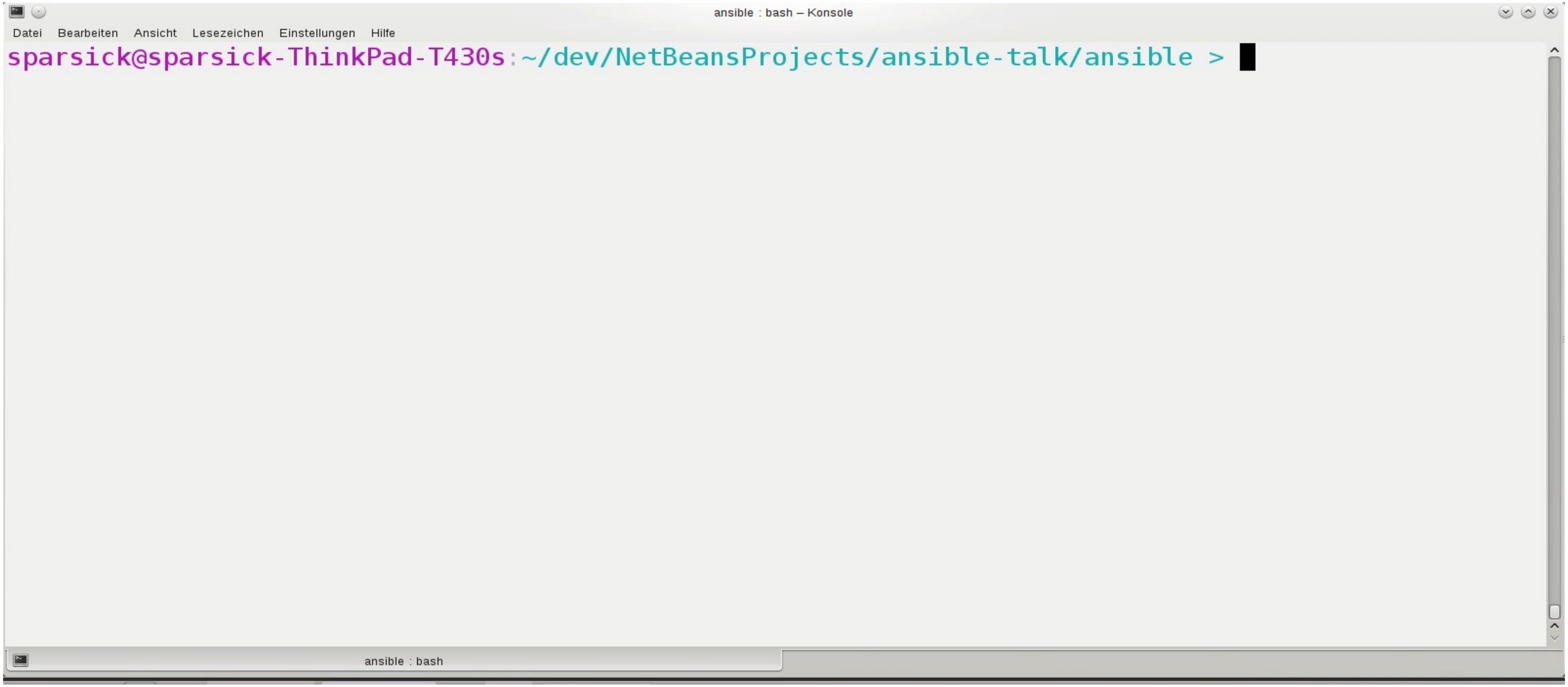
```
- name: start tomcat
  #service: name=tomcat state=started
  command: service tomcat start

- name: wait for tomcat to start
  wait_for: port=8080 timeout=60
```

deploy-on-tomcat Role



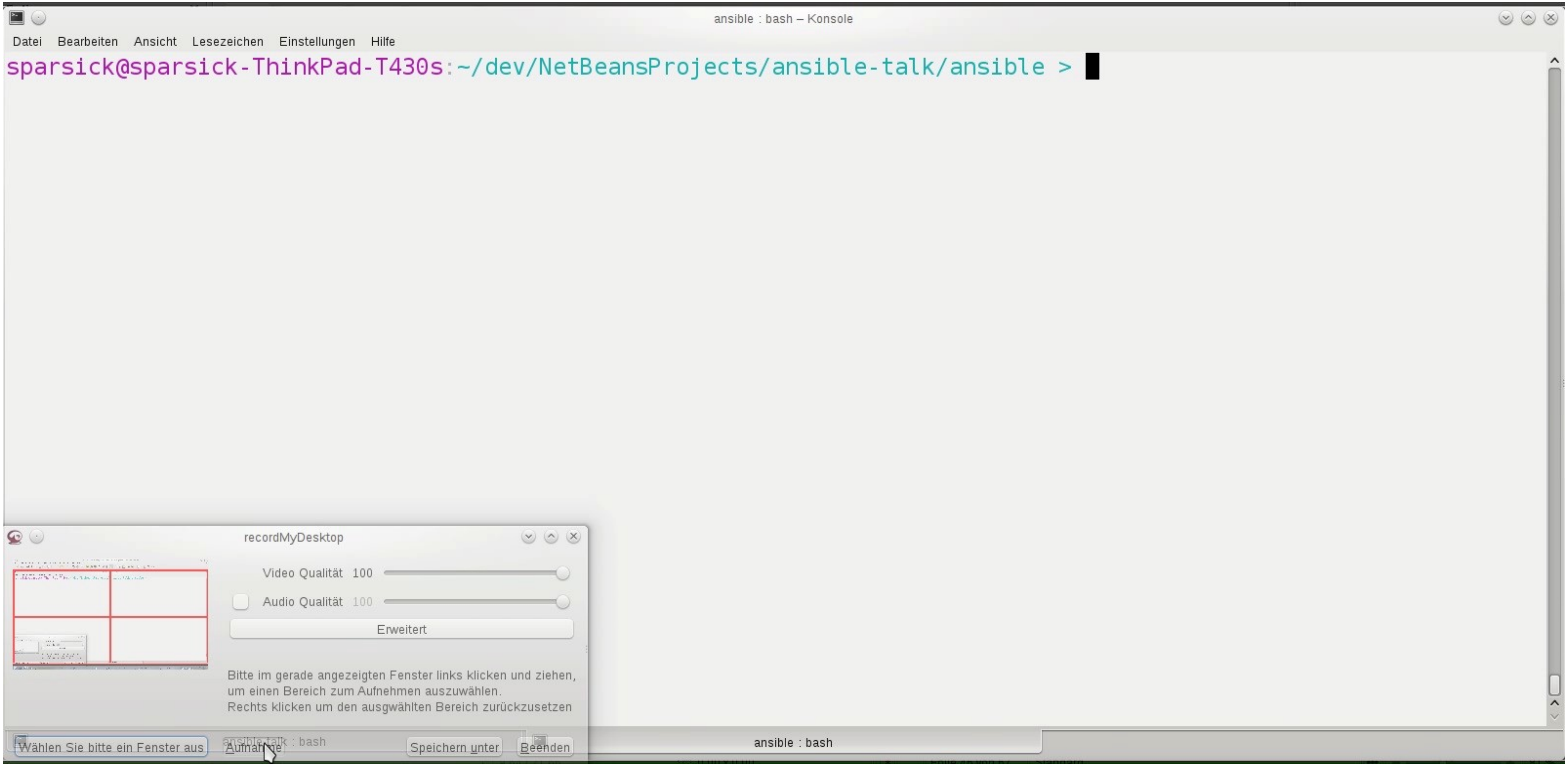
```
webapp_target_name: demo
tomcat_app_base: /opt/tomcat/webapps
```

Deploy Application Playbook



```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible >
```

Ad-hoc-Kommando



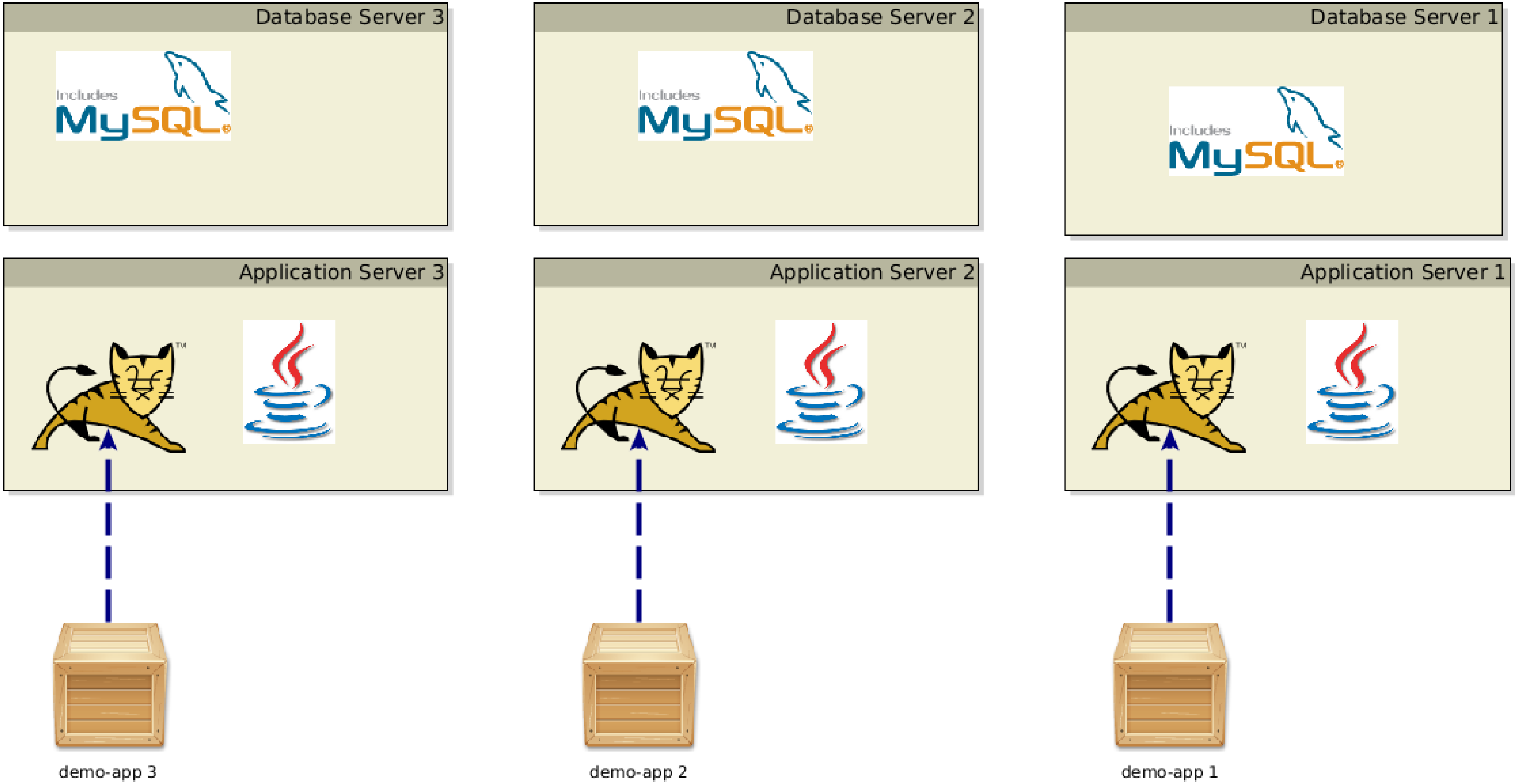
```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible >
```

Video Qualität 100

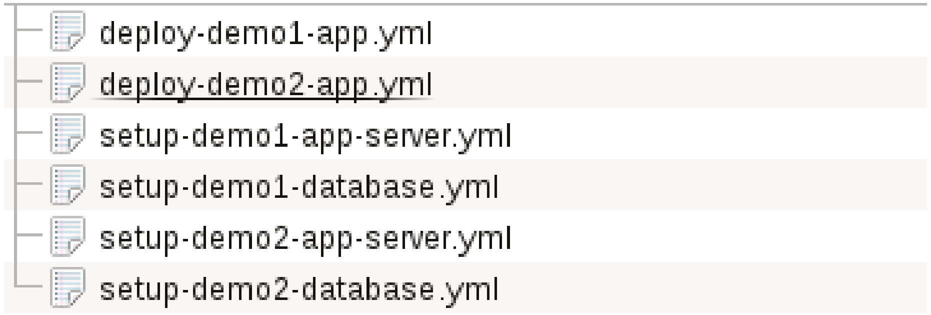
□ Audio Qualität 100

Bitte im gerade angezeigten Fenster links klicken und ziehen, um einen Bereich zum Aufnehmen auszuwählen.
Rechts klicken um den ausgwählten Bereich zurückzusetzen

Warum Roles?

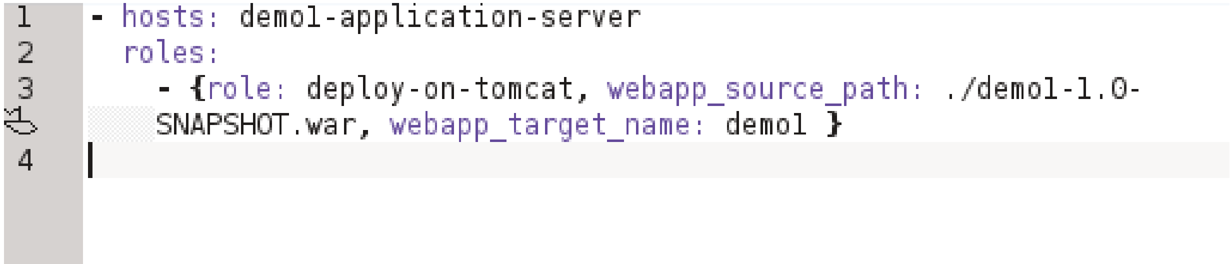

Database Server 3
Database Server 2
Database Server 1
Includes MySQL
Includes MySQL
Includes MySQL
Application Server 3
Application Server 2
Application Server 1
demo-app 3
demo-app 2
demo-app 1

Warum Roles?

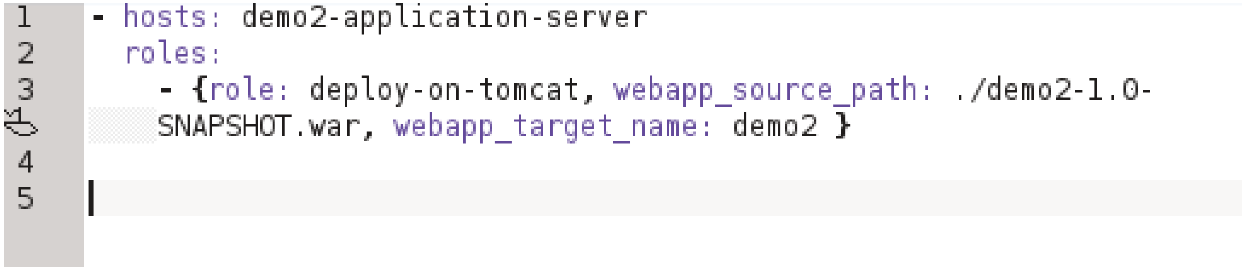


```
├─ deploy-demo1-app.yml
├─ deploy-demo2-app.yml
├─ setup-demo1-app-server.yml
├─ setup-demo1-database.yml
├─ setup-demo2-app-server.yml
└─ setup-demo2-database.yml
```

Warum Roles?

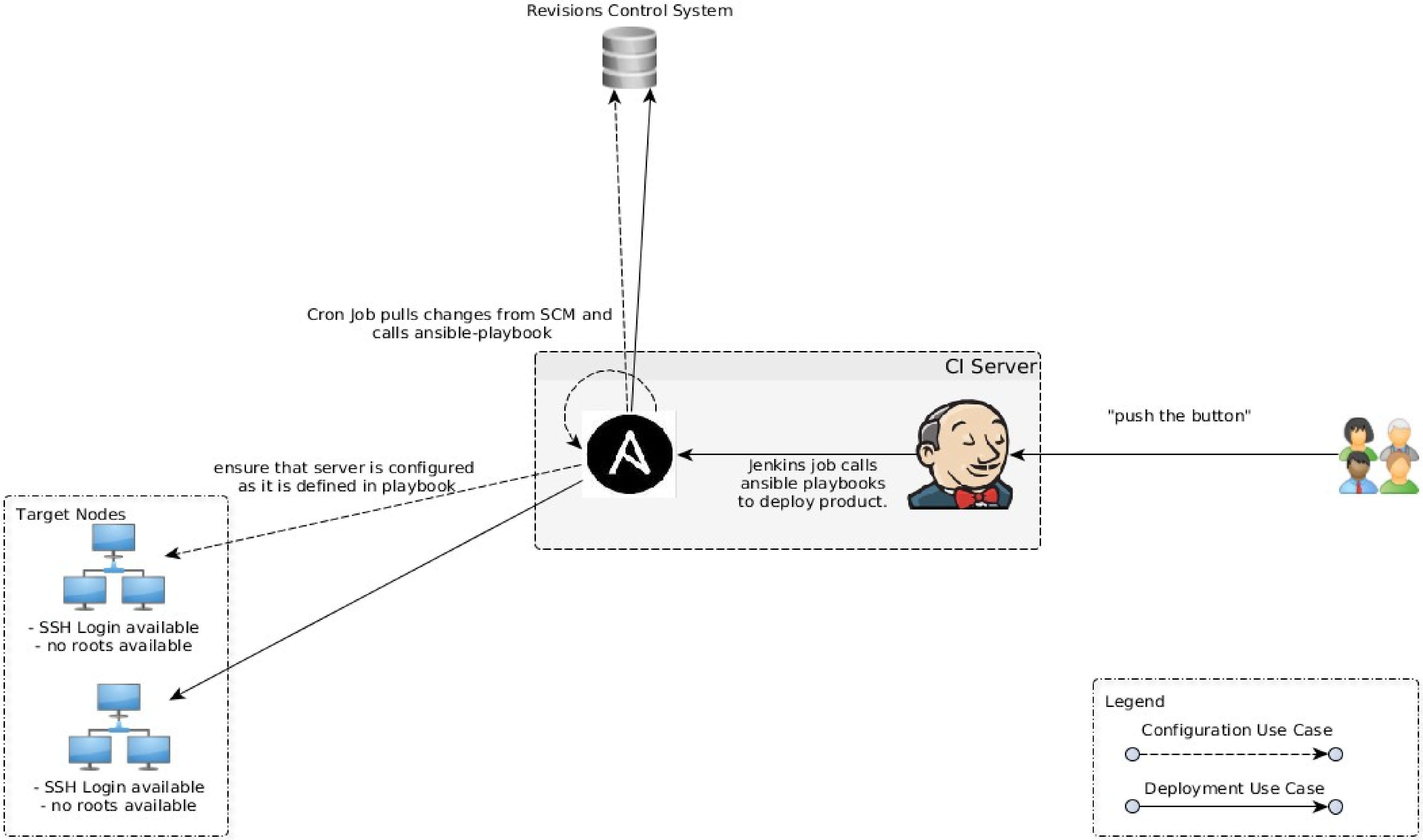


```
- hosts: demo1-application-server
  roles:
    - {role: deploy-on-tomcat, webapp_source_path: ./demo1-1.0-SNAPSHOT.war, webapp_target_name: demo1 }

```

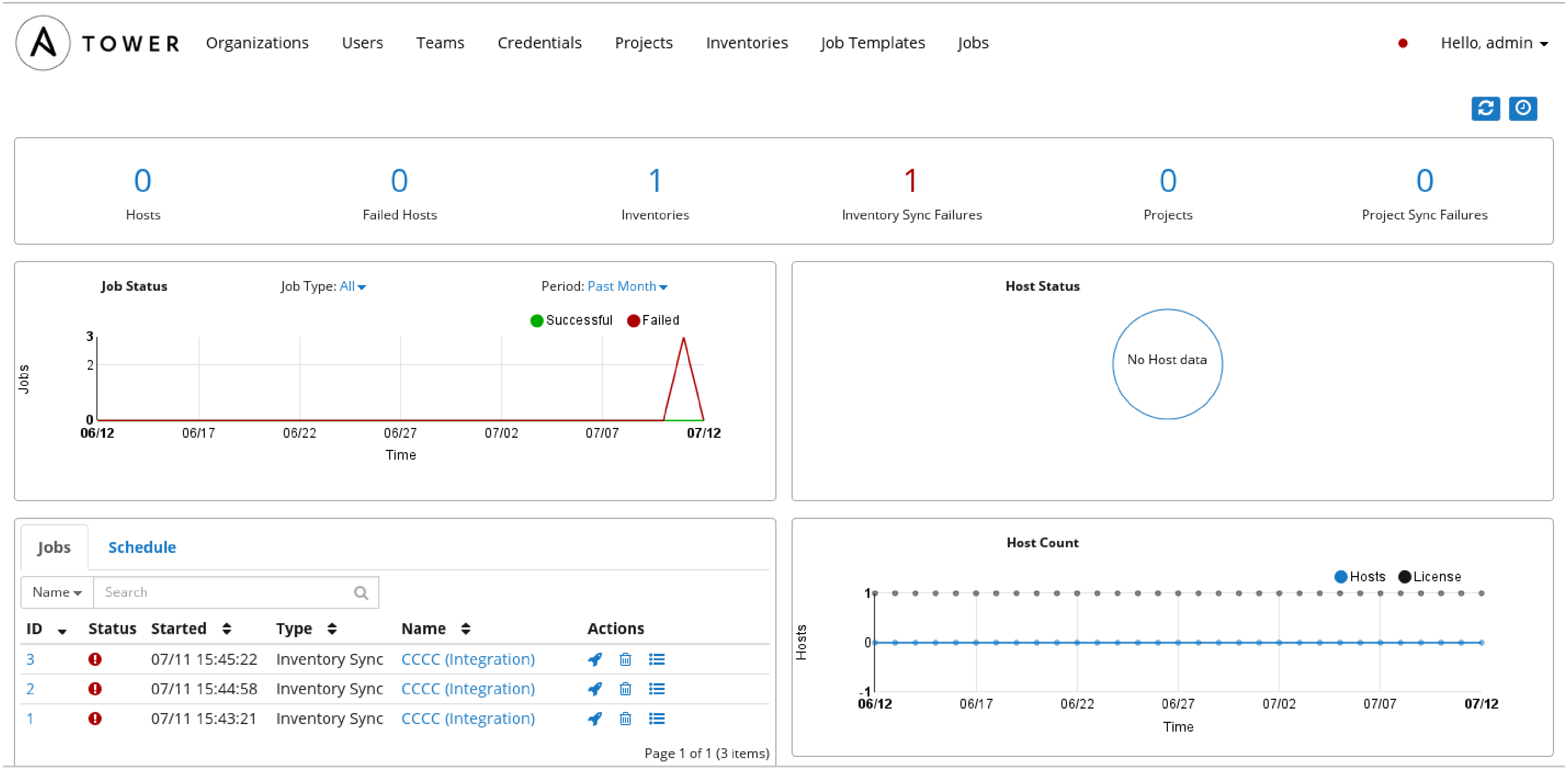


```
- hosts: demo2-application-server
  roles:
    - {role: deploy-on-tomcat, webapp_source_path: ./demo2-1.0-SNAPSHOT.war, webapp_target_name: demo2 }


```

Ansible Infrastruktur



Ansible Tower



0	0	1	1	0	0
Hosts	Failed Hosts	Inventories	Inventory Sync Failures	Projects	Project Sync Failures

ID	Status	Started	Type	Name	Actions
3	!	07/11 15:45:22	Inventory Sync	CCCC (Integration)	
2	!	07/11 15:44:58	Inventory Sync	CCCC (Integration)	
1	!	07/11 15:43:21	Inventory Sync	CCCC (Integration)	

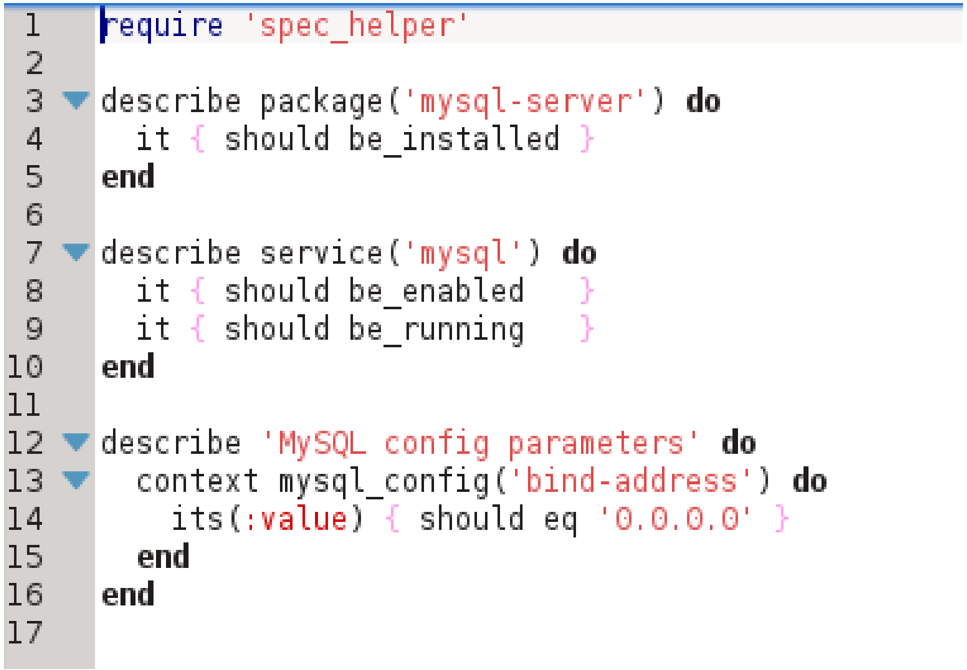
Page 1 of 1 (3 items)

Wie werden Ansible Skripte getestet?

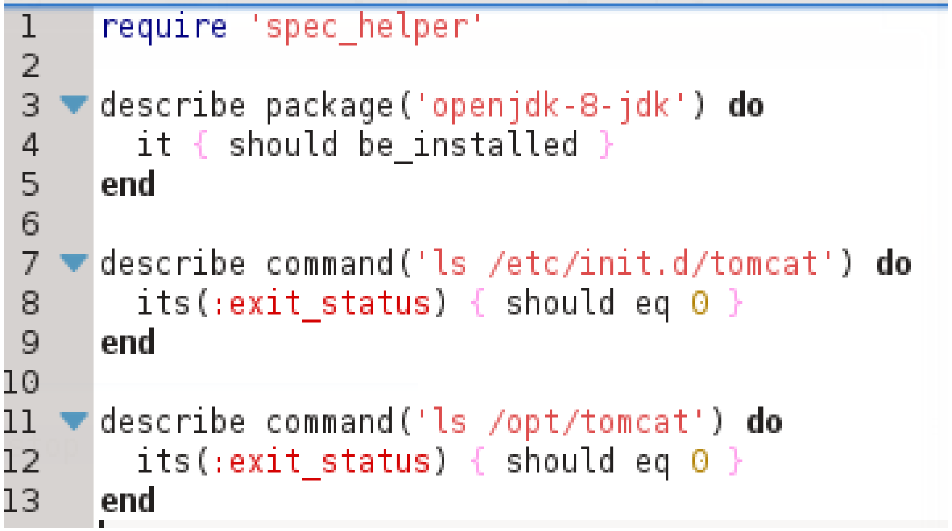
- `ansible-playbook --check`
- `ansible-playbook --syntax-check`
- Jenkins + Vagrant
- Rspec tests

SERVERSPEC

ServerSpec Tests

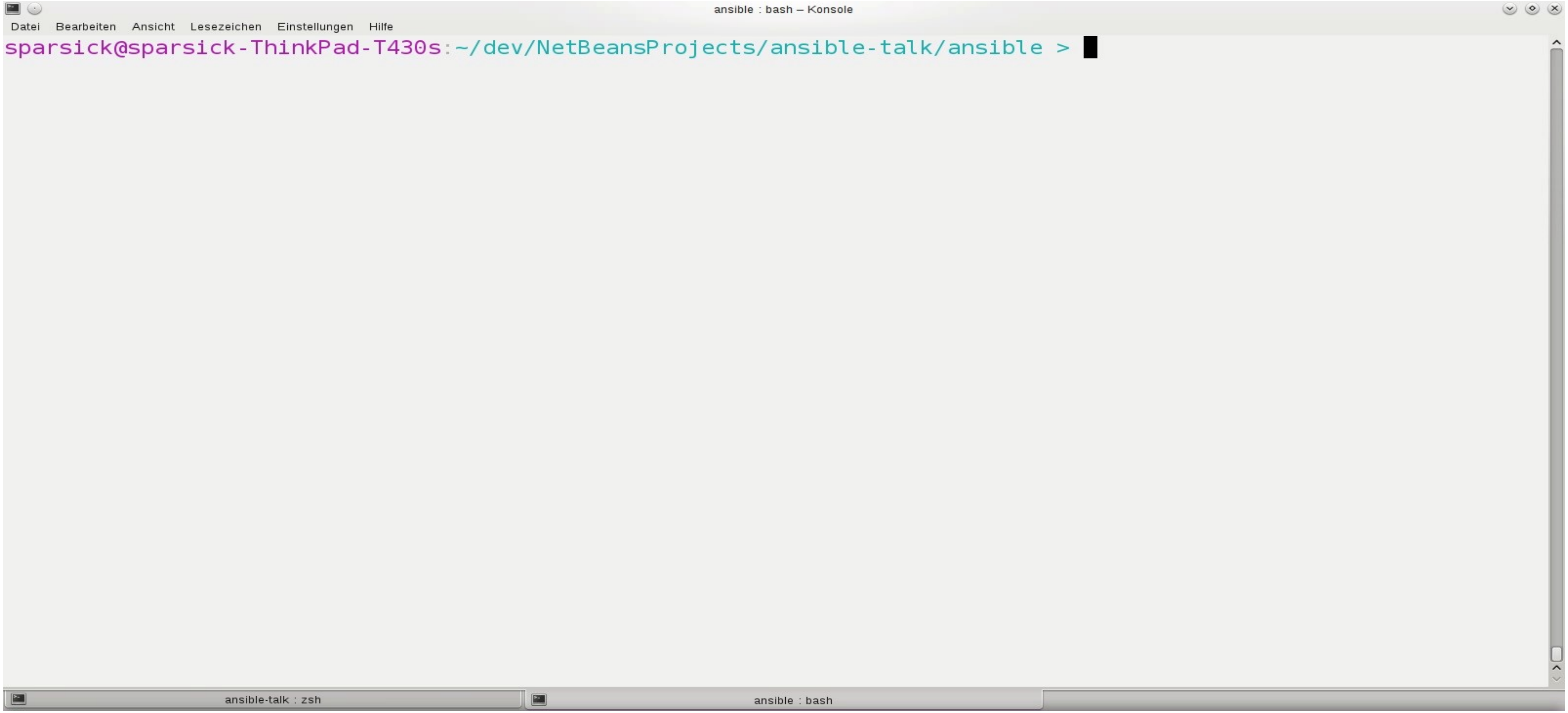


```ruby
require 'spec_helper'

describe package('mysql-server') do
  it { should be_installed }
end

describe service('mysql') do
  it { should be_enabled   }
  it { should be_running   }
end

describe 'MySQL config parameters' do
  context mysql_config('bind-address') do
    its(:value) { should eq '0.0.0.0' }
  end
end

```



```ruby
require 'spec_helper'

describe package('openjdk-8-jdk') do
  it { should be_installed }
end

describe command('ls /etc/init.d/tomcat') do
  its(:exit_status) { should eq 0 }
end

describe command('ls /opt/tomcat') do
  its(:exit_status) { should eq 0 }
end
```

ServerSpec Tests



```
sparsick@sparsick-ThinkPad-T430s:~/dev/NetBeansProjects/ansible-talk/ansible >
```

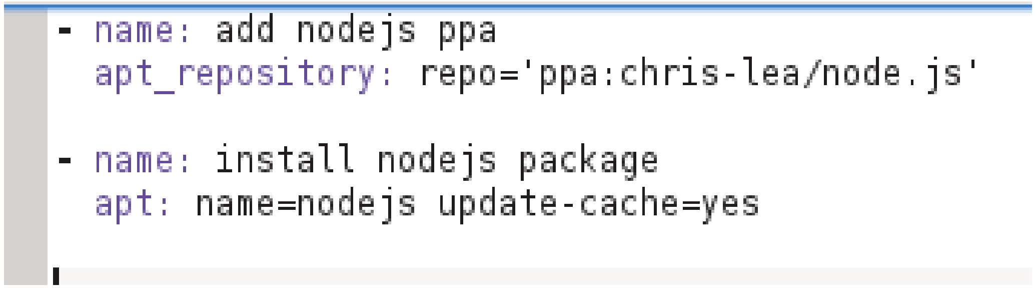
Wie unterscheidet sich Ansible zu seiner Konkurrenz?

Vergleich

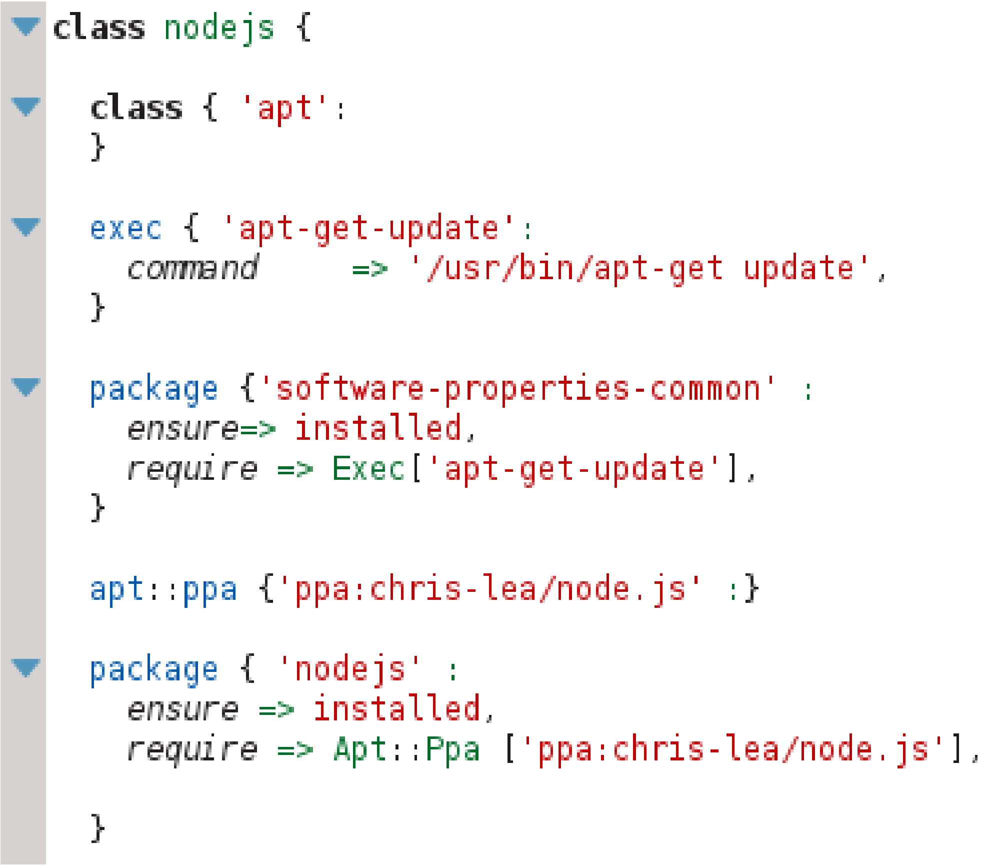
- Orchestrierung über SSH
- Benötigt keine Rootrechte auf Zielsystem
- Konfigurationsmgmt + Applikationsdeployment
- Monitoringtool nur in der Enterprise Variante
- Skripte mehr imperativ
- Windows-Support rudimentär
- Skripte OS- bzw. Distributions-spezifisch

- Client-Server Architektur
- Für komfortables Arbeiten benötigt es Rootrechte
- Konfigurationsmgmt
- Monitoringtools Open Source
- Skripte mehr deklarativ
- Windows-Support
- Skripte können OS-unspezifisch sein

Vergleich



```
- name: add nodejs ppa
  apt_repository: repo='ppa:chris-lea/node.js'

- name: install nodejs package
  apt: name=nodejs update-cache=yes
```

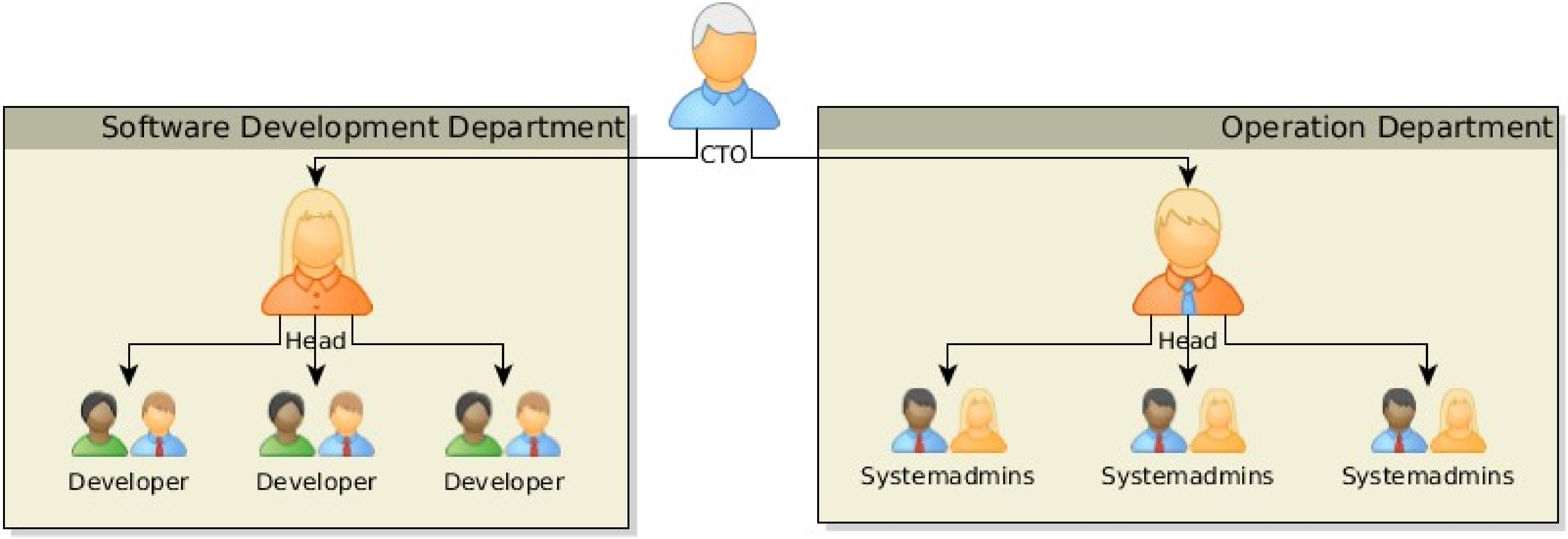


```
class nodejs {

  class { 'apt':
  }

  exec { 'apt-get-update':
    command      => '/usr/bin/apt-get update',
  }

  package {'software-properties-common' :
    ensure=> installed,
    require => Exec['apt-get-update'],
  }

  apt::ppa {'ppa:chris-lea/node.js' :}

  package { 'nodejs' :
    ensure => installed,
    require => Apt::Ppa ['ppa:chris-lea/node.js'],

  }
```

Weitere Einsatzszenarien aus Entwicklersicht

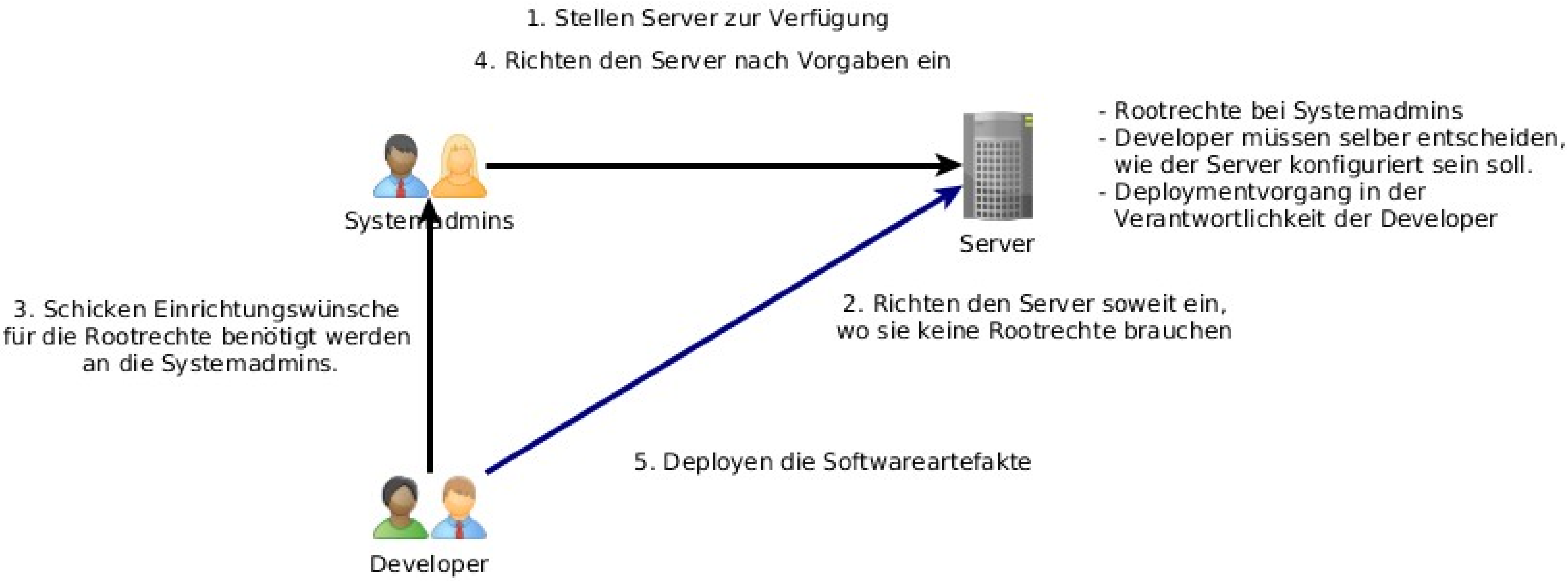
Systemkonfiguration für Entwickler

Organisatorische Ausgangslage
Realität



Systemkonfiguration für Entwickler

Prozess zwischen Development und Operation



1. Stellen Server zur Verfügung

4. Richten den Server nach Vorgaben ein

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

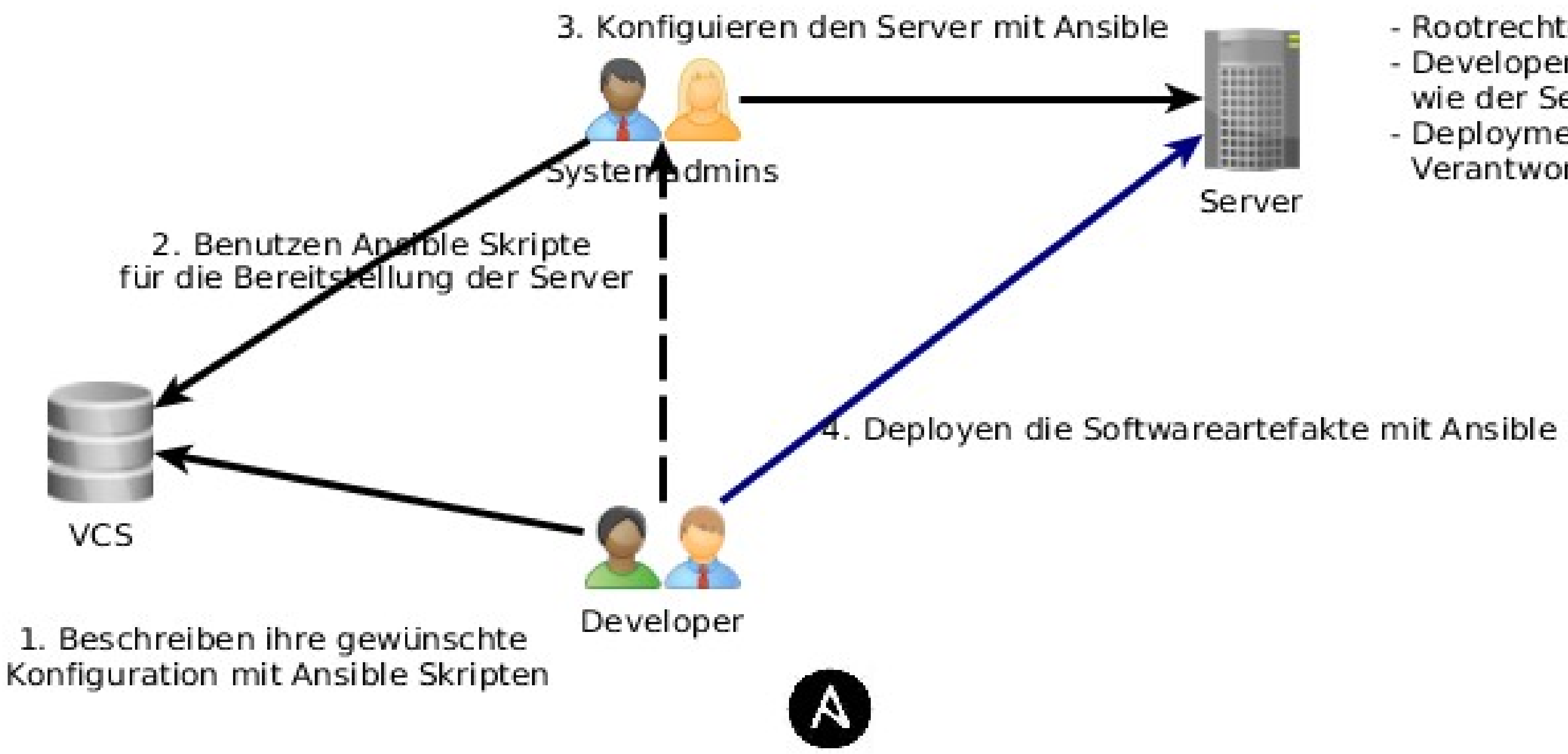
2. Richten den Server soweit ein, wo sie keine Rootrechte brauchen

3. Schicken Einrichtungswünsche für die Rootrechte benötigt werden an die Systemadmins.

5. Deployen die Softwareartefakte

Systemkonfiguration für Entwickler

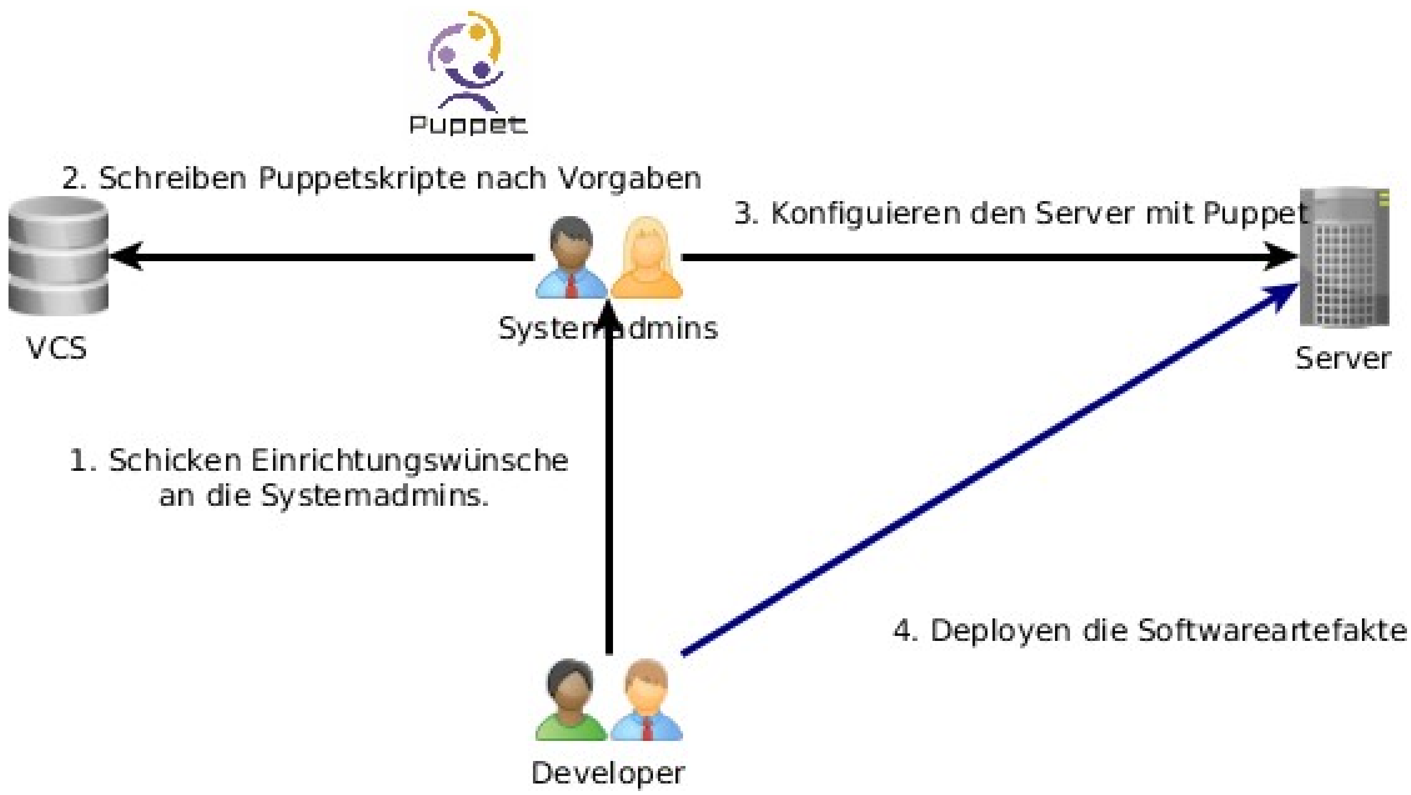
Lösungidee mit Ansible


3. Konfiguieren den Server mit Ansible
Systemadmins
Server
2. Benutzen Ansible Skripte
für die Bereitstellung der Server
VCS
4. Deployen die Softwareartefakte mit Ansible
Developer
1. Beschreiben ihre gewünschte
Konfiguration mit Ansible Skripten

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

Systemkonfiguration für Entwickler

Variante - Prozess zwischen Development und Operation

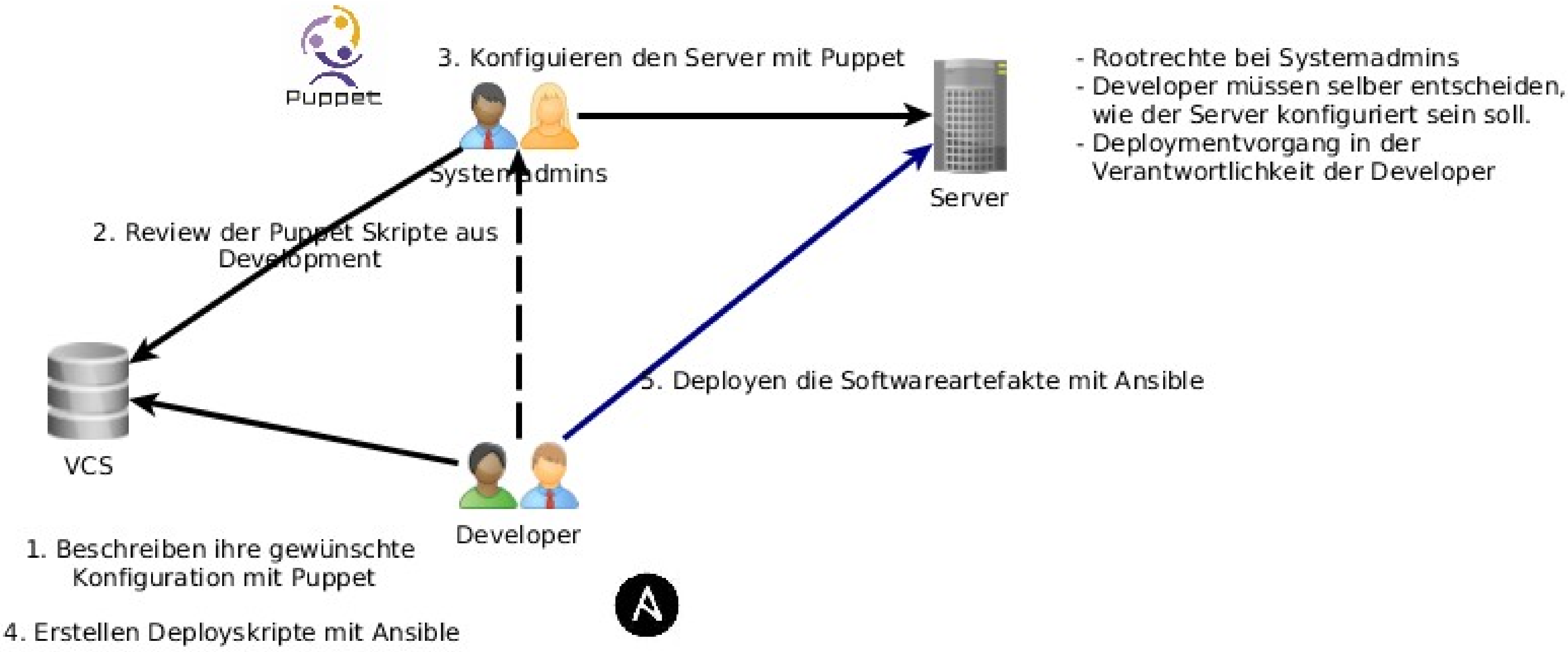


Puppet
2. Schreiben Puppetskripte nach Vorgaben
3. Konfiguieren den Server mit Puppet
VCS
Systemadmins
Server
1. Schicken Einrichtungswünsche an die Systemadmins.
4. Deployen die Softwareartefakte
Developer

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

Systemkonfiguration für Entwickler

Lösungsvariante



1. Beschreiben ihre gewünschte Konfiguration mit Puppet

2. Review der Puppet Skripte aus Development

3. Konfiguieren den Server mit Puppet

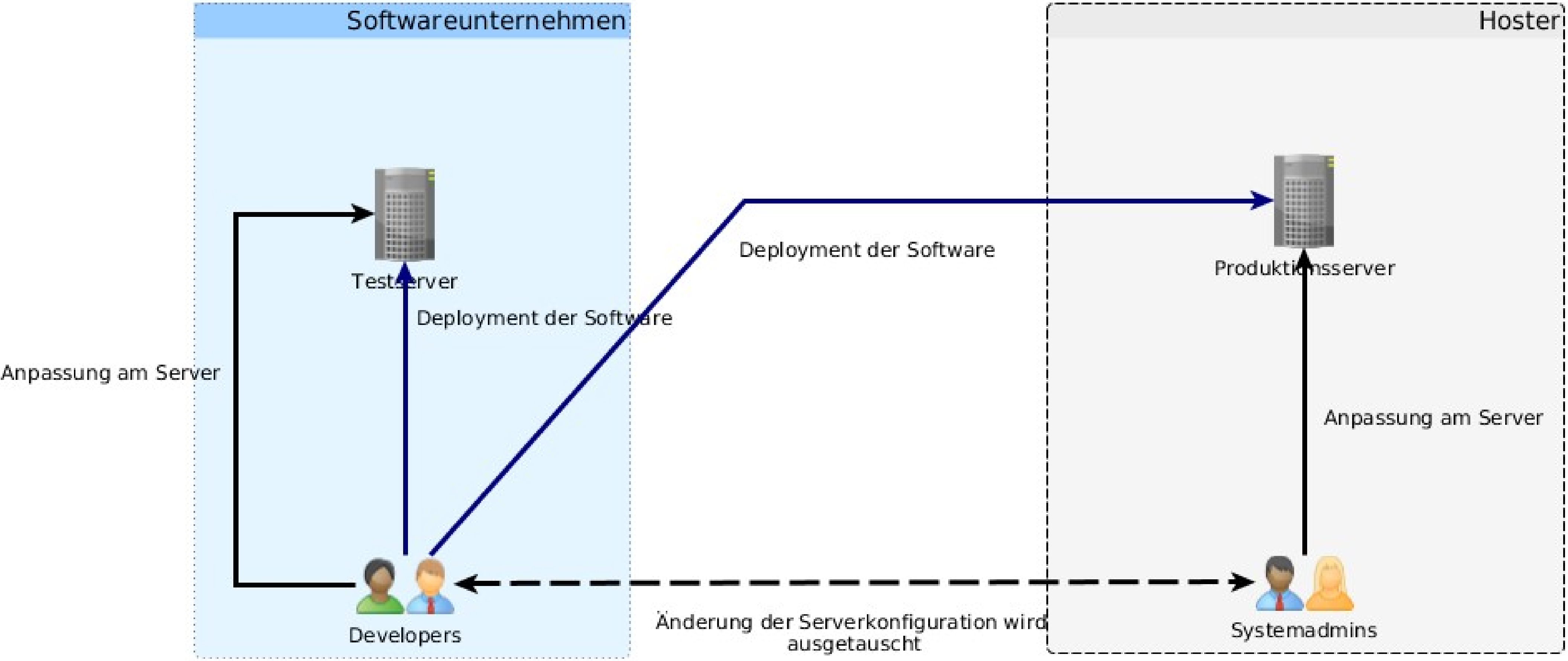
4. Erstellen Deployskripte mit Ansible

5. Deployen die Softwareartefakte mit Ansible

- Rootrechte bei Systemadmins
- Developer müssen selber entscheiden, wie der Server konfiguriert sein soll.
- Deploymentvorgang in der Verantwortlichkeit der Developer

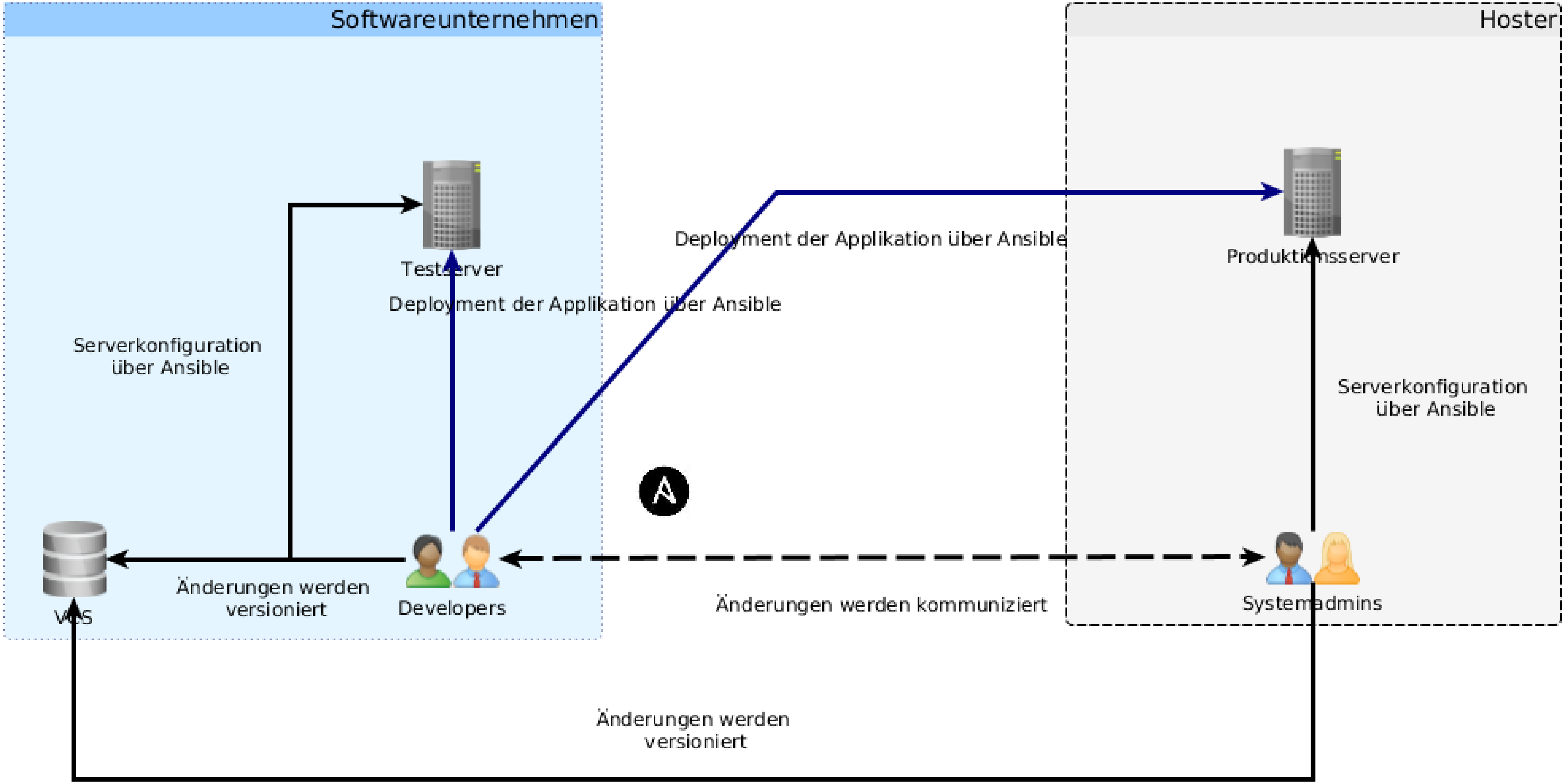
Systemkonfiguration für Entwickler

Produktionsserver sind beim externen Hoster



Systemkonfiguration für Entwickler

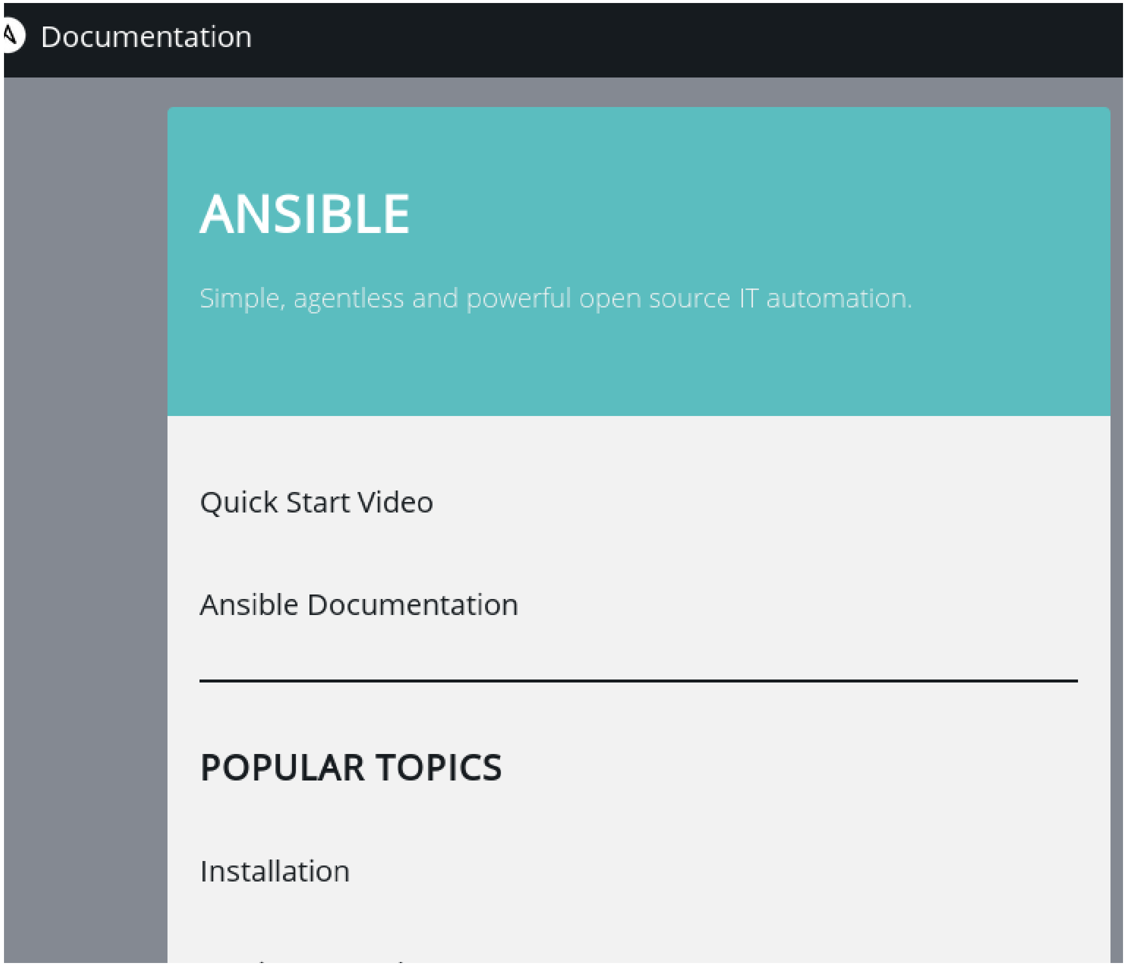
Lösungsidee



Softwareunternehmen
Hoster
Testserver
Produktionsserver
Deployment der Applikation über Ansible
Deployment der Applikation über Ansible
Serverkonfiguration über Ansible
Serverkonfiguration über Ansible
VCS
Änderungen werden versioniert
Developers
Änderungen werden kommuniziert
Systemadmins
Änderungen werden versioniert

- Hoster verantwortlich für die Systemkonfiguration
- Softwareunternehmen verantwortlich für das Deployment
- Synchronisation zwischen Testserver und Produktionsserver wird vereinfacht

Weitere Informationen



Documentation

ANSIBLE

Simple, agentless and powerful open source IT automation.

Quick Start Video

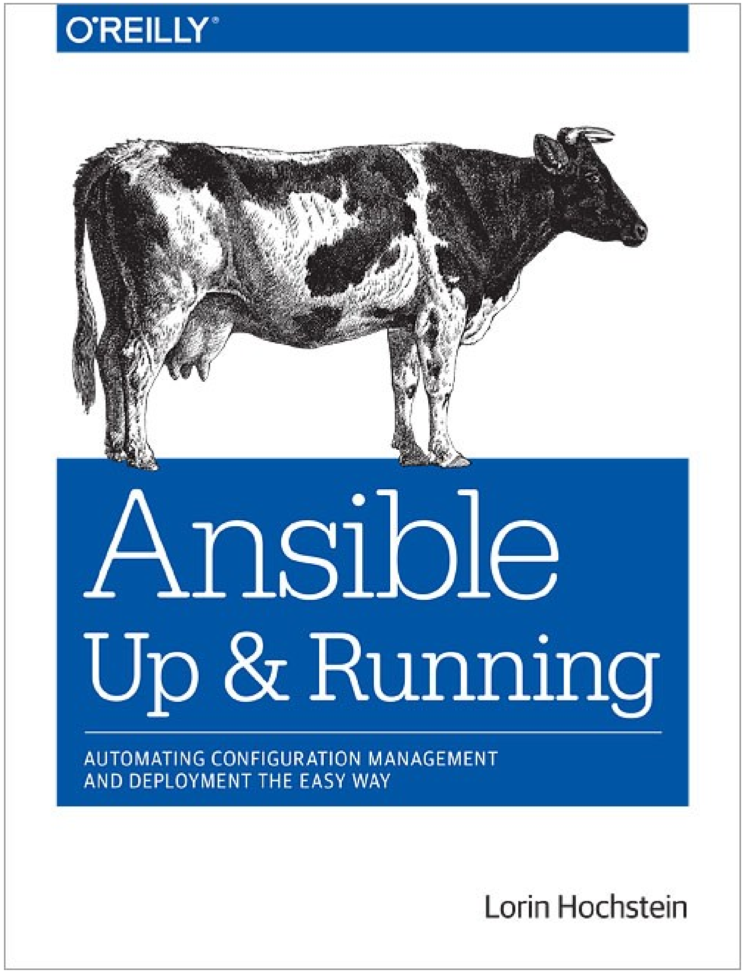
Ansible Documentation

POPULAR TOPICS

Installation

http://docs.ansible.com/

Weitere Informationen

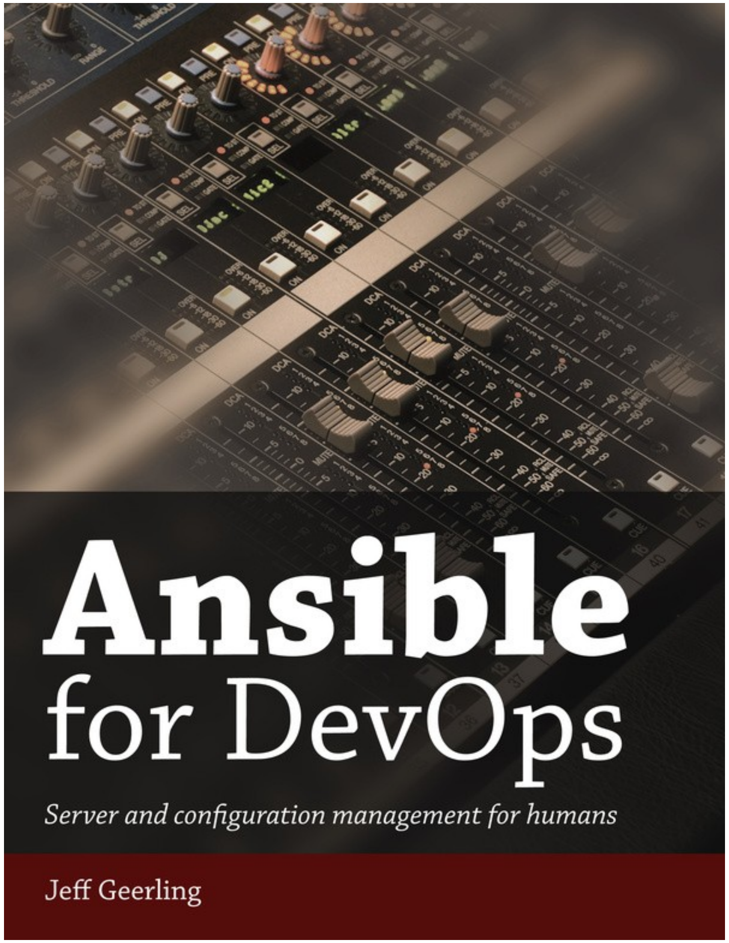


O'REILLY

Ansible
Up & Running

AUTOMATING CONFIGURATION MANAGEMENT
AND DEPLOYMENT THE EASY WAY

Lorin Hochstein



Ansible
for DevOps

Server and configuration management for humans

Jeff Geerling

Weitere Informationen

04-2016 | Winter | www. ijug.eu

Javaaktuell

Praxis. Wissen. Networking. Das Magazin für Entwickler
Aus der Community – für die Community

Java ist vie

Software organisieren

Ansible – warum Konfigurationsmanagement auch für Entwickler interessant sein kann

Sandra Parsick

D: 4,90 EUR A: 5,60 EUR CH: 9,80 CHF Benelux: 5,80 EUR ISSN 2191-6977

JUnit 5
Das nächste große Release steht vor der Tür

Ansible
Konfigurationsmanagement auch für Entwickler

Spring Boot Starter
Komfortable Modularisierung und Konfiguration

iJUG Verbund

http://bit.ly/2cZ0IrZ

Fragen?

@SandraParsick
mail@sandra-parsick.de
https://github.com/sparsick/ansible-talk.git