

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

useGalaxy.eu

Helena Rasche

2018-04-11

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

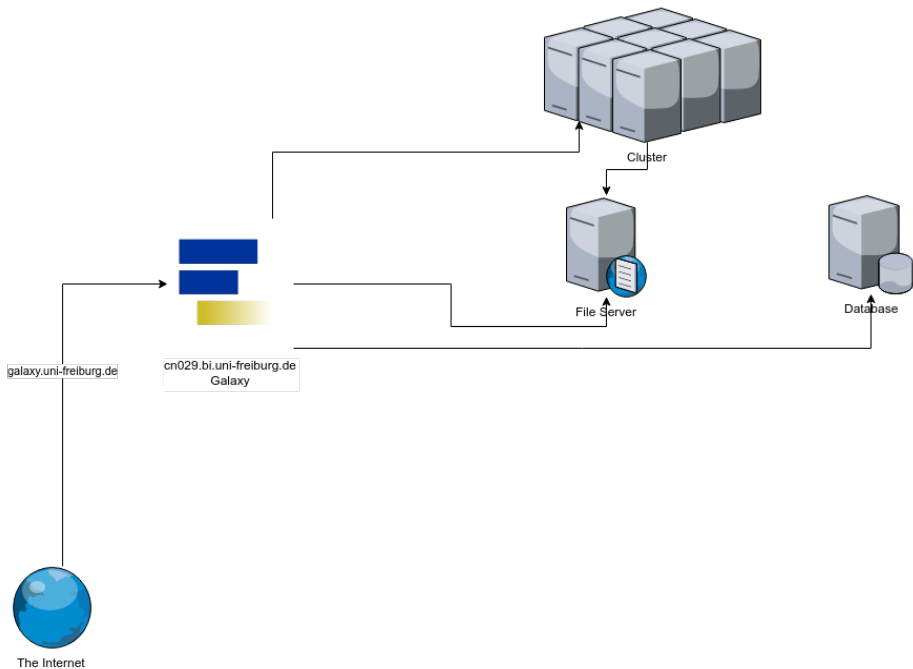
End

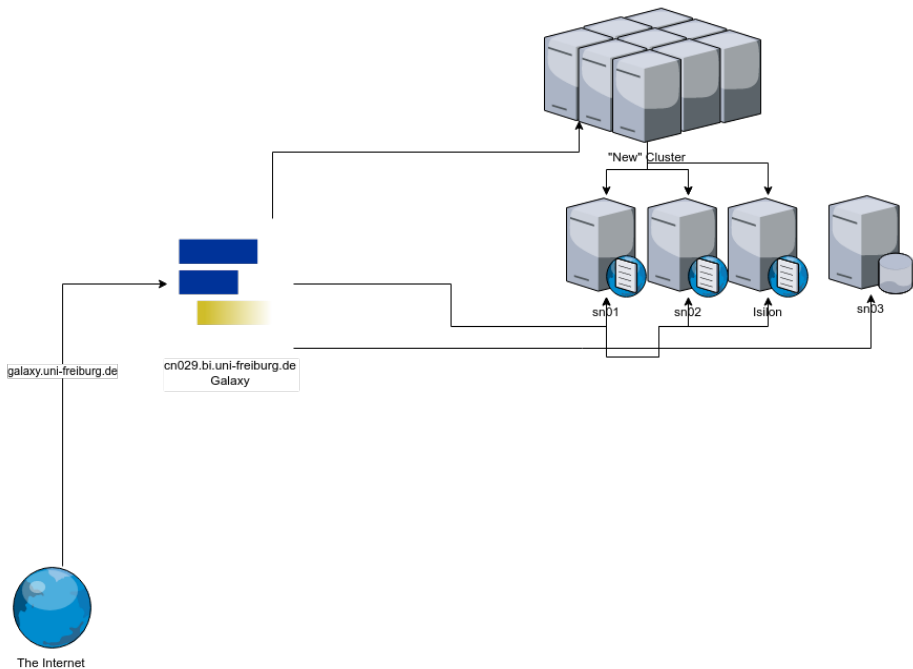
References

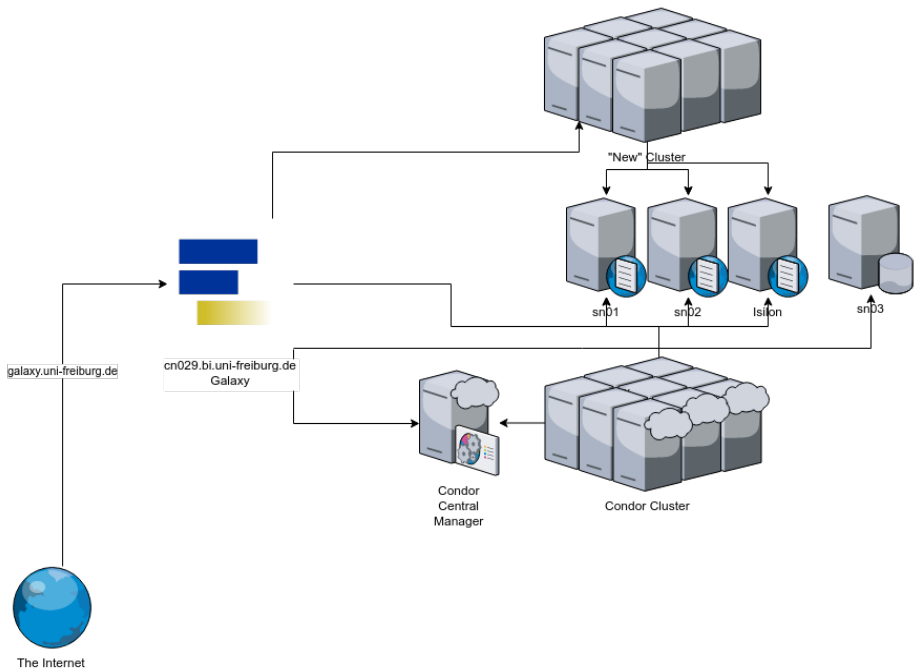
- The infrastructure behind it: humans + computers
- How we manage the complexity and work together
- Not just autonomous services (but we're getting there!)

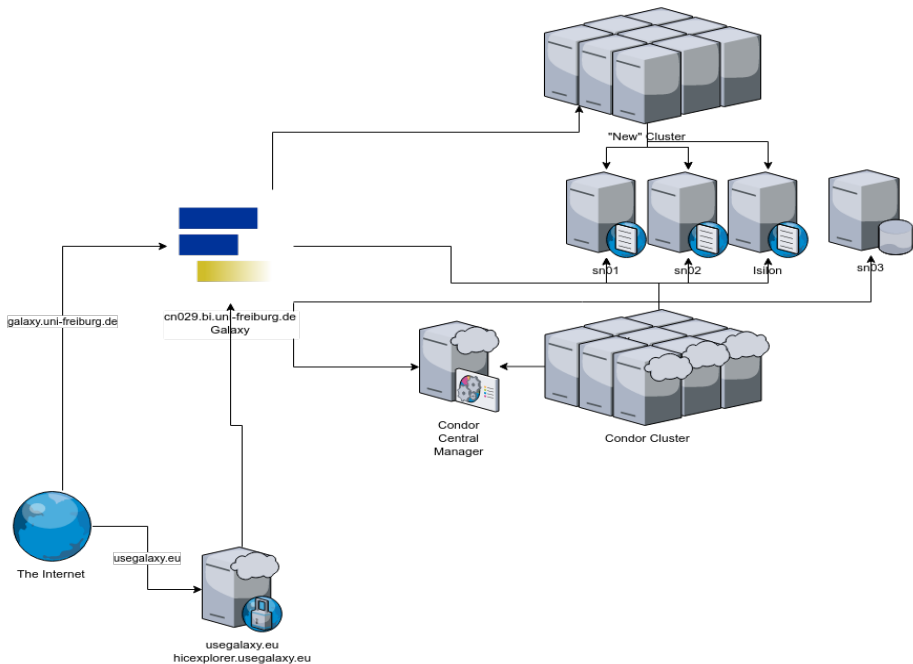


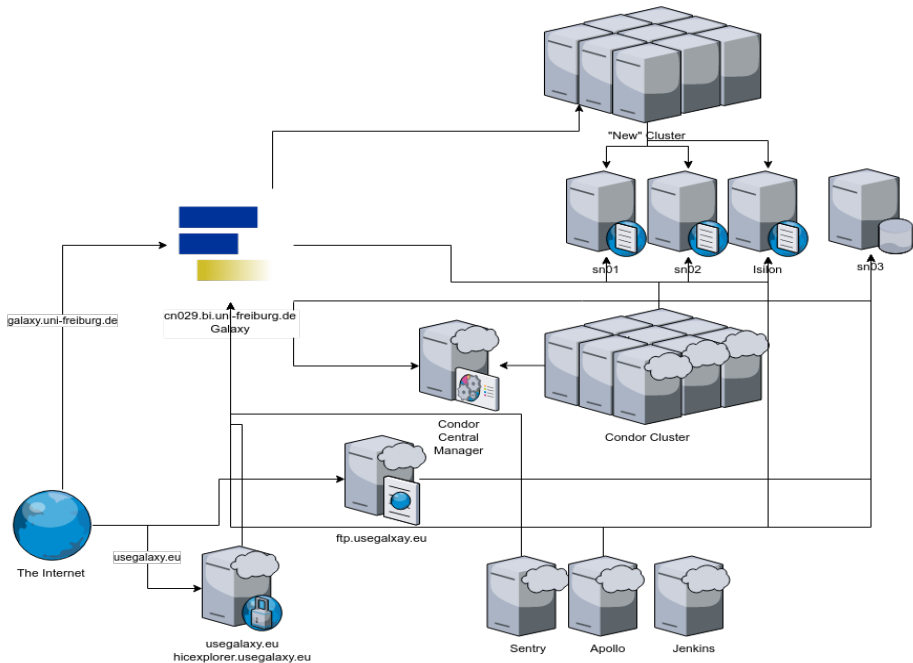
The logo for Galaxy Europe. It features a stylized blue equals sign icon on the left, followed by the word "Galaxy" in a large, bold, blue sans-serif font. Below "Galaxy" is the word "EUROPE" in a smaller, blue, all-caps sans-serif font.

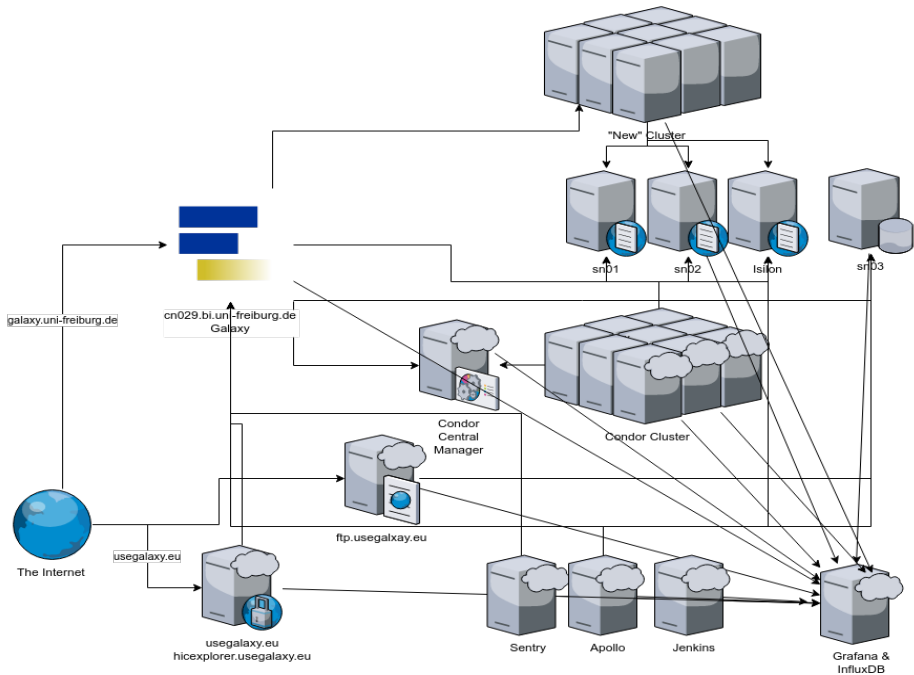


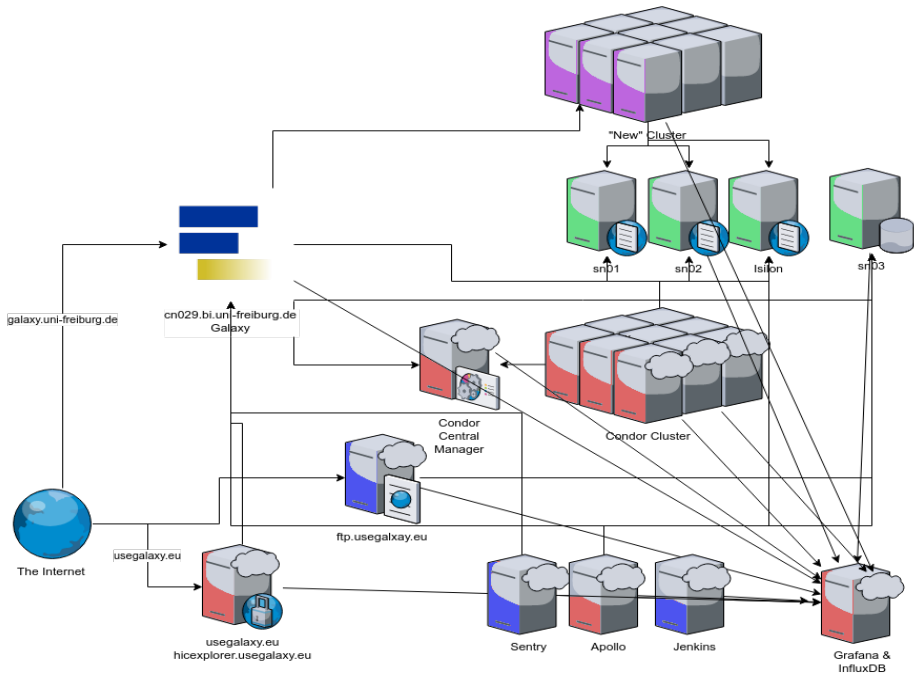


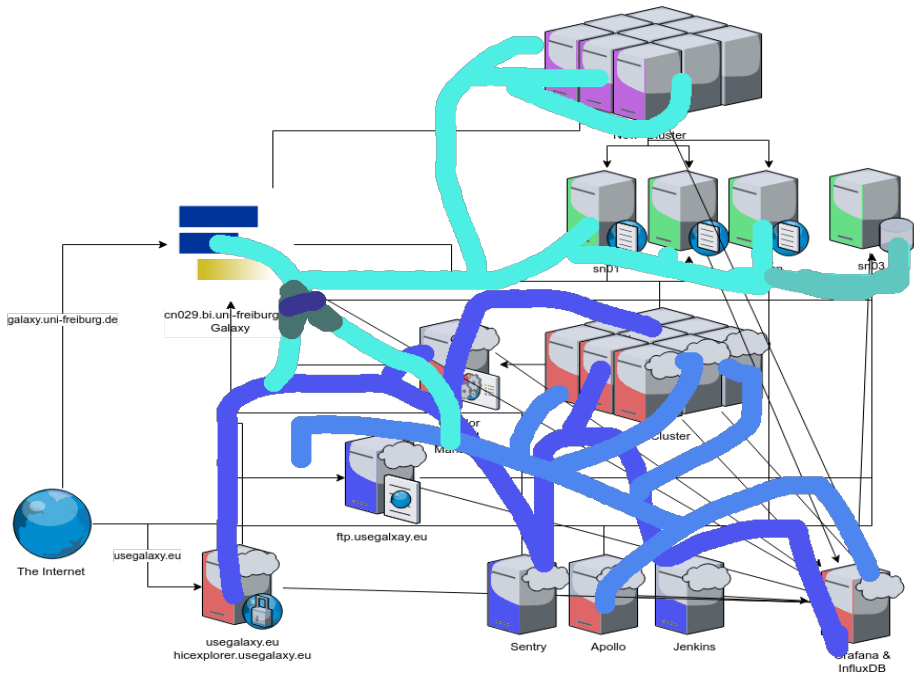












Overall System Goals

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

We have to balance the needs of the system:

- Galaxy is up and functioning correctly
- Even when things are going wrong
- Automatically handle bad situations where possible
- Related services are available to users

Overall System Goals

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

We have to balance the needs of the system:

- Galaxy is up and functioning correctly
- Even when things are going wrong
- Automatically handle bad situations where possible
- Related services are available to users

With our needs:

- We aren't burning out
- Work is enjoyable
- We feel like we're making a positive impact
- We can take holidays

The Humans Behind the Infrastructure

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

We are more than a chatbox in glitter or the voices on the other side of the phone.

- We make mistakes
- So we have to plan for this and write validation and guards against it
- Sometimes problems are bigger than one person's abilities
- So we have to work together efficiently and effectively

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Must balance

- High system uptime (and the engineering required to achieve that)
- Manageable amount of work for sysadmins
- Guard against sources of error (esp. humans)

Managing the Insanity

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Some strategies:

- Standardisation
- Bus Factor
- KISS
- Code defensively
- Validate *everything*
- Documentation & Read-Only Fridays
- Do not trust the Cloud
- Empathy

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Standard corporate programming attitudes:

- Custom services are written in Python
- VMs are based on CentOS 7
- *Everything* configured with Ansible
- Makefile for everything

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

The bus factor is a measurement of the risk resulting from information and capabilities not being shared among team members, from the phrase “in case they get hit by a bus”.^[2]

- “Bus Factor” is continually a concern
- Strategies to decrease:
 - Two people responsible per item
 - Explicitly training + Continual communication of knowledge
 - make must be accomplish every task
 - make help explains everything necessary to run it

Keep It Simple Silly

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- Do you really need another makefile task?
- Is this feature needed?
- Can I eliminate this code?
- Can I simplify this (while avoiding code golf)
- *But keep it readable*

Less I have to think \Rightarrow Less chance for a mistake

Code Defensively

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

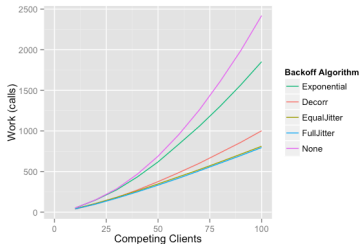
FTP

Condor Cluster

End

References

- Validate *all* inputs
- Do not trust “trusted” sources
- Timeout all network operations
- Retry all network operations
- Add jitter[1]



Validate Everything

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Why:

- It makes life easier
- Catch errors before they're live
- Better UX for users/devs

Validate your:

- Configuration files
- Code
- Datasets
- Servers/Functionality

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

HAproxy

JCaaS

FTP

Condor Cluster

End

References

Do not make changes to production services on friday.
You will lose your weekend; you will be unhappy

Instead:

- Document your own code
- Document other people's code
- Read/test new strategies locally
- Simulate failures

Rules of Cloudland

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- 1 VMs will go down without warning
- 2 VMs can be deleted at any time
- 3 Everything is flexible
- 4 Nothing is certain

Cloudy With a Chance of Downtime

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- How to handle this uncertainty?
- SLA: Service Level Agreement
- SLO: Service Level Objectives

Service	SLO	Outage (30d)	User-Facing?
Haproxy	99.9%	43 min	Yes
JCaaS	99.0%	7 h	Yes-ish
FTP	95.0%	36 h	Yes
Condor Cluster	95.0%	36 h	Yes-ish
Apollo	90.0%	72 h	Yes
Sentry	50.0%	15 d	No
Jenkins	50.0%	15 d	No
Grafana	50.0%	15 d	Yes-ish
InfluxDB	50.0%	15 d	No
CSP	50.0%	15 d	No

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- Empathy is part of the job
- Bad things happen \Rightarrow be kind to each other/ourselves
- Small changes affect 100s-1000s of people
- Having empathy for users when we break something helps defuse bad situations



useGalaxy.eu infrastructure

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Some examples where we've applied these principles to our services and it has helped us.

Haproxy

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

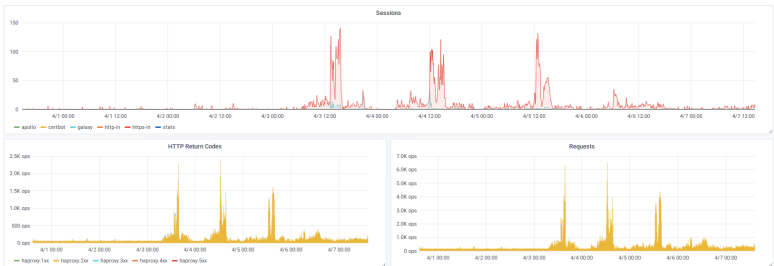
FTP

Condor Cluster

End

References

- Responds to your requests for `usegalaxy.eu`
- Routes incoming traffic to correct backend
- Enables future Galaxy frontend failover



Job Configuration... as a Service!

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- Enables Training Infrastructure as a Service
- Makes life so much easier
- Tool destination (memory, CPU cores, environment) changes can take effect without a slow handler restart
- Can turn off a mis-behaving cluster instantaneously

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- Example of the ideal human-managed service
- All state is stored in playbooks or in NFS
- When it fails or misbehaves in any way, we can just replace it

Condor Cluster

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

- Cluster in the Cloud
- Easy to roll out new images
- Easy for humans to manage

```
image: vgcnbw7-26
```

```
deployment:
```

```
# Dedicated VMs for running upload jobs.
```

```
upload:
```

```
count: 2
```

```
flavor: m1.xlarge2
```

```
# Dedicated VMs for running metadata setting jobs.
```

```
metadata:
```

```
count: 2
```

```
flavor: m1.xlarge2
```

```
# VMs for general computation.
```

```
compute-general:
```

```
count: 20
```

```
flavor: c.c10m55
```

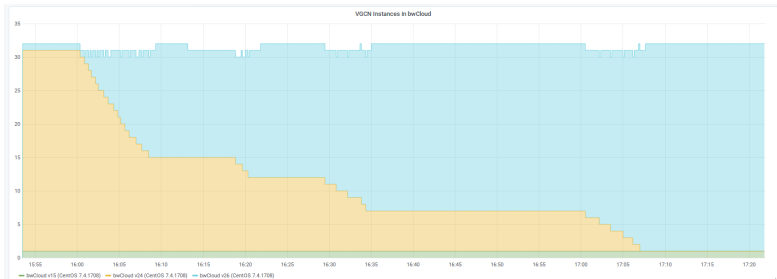
```
compute-gen-extra:
```

```
count: 30
```

```
flavor: c.c10m55
```

```
start: 2017-11-17
```

```
end: 2017-11-20
```





Thank y'all

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References

Thank *you* for the bug reports and your patience when outages happen.

We are doing our best. Don't hesitate to let us know when things aren't working like expected! Maybe we aren't monitoring it yet.

Helena Rasche

About

Galaxy

Human Infra

Standardisation

Bus Factor

KISS

Defense

Validation

Fridays

Cloud Services

Empathy

Non-Human

Infra

Haproxy

JCaaS

FTP

Condor Cluster

End

References



Marc Brooker.

Exponential backoff and jitter.

<https://aws.amazon.com/blogs/architecture/exponential-backoff-and-jitter/>, 2018.

[Online; accessed 08-April-2018].



Wikipedia.

Bus factor — Wikipedia, the free encyclopedia.

<https://en.wikipedia.org/w/index.php?title=Bus%20factor&oldid=822673664>, 2018.

[Online; accessed 07-April-2018].