



# openstack

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Die OpenSource Cloud

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GPN15 - 05.06.2015



## Interessen:

- Netzwerke
- Hardware
- Cocktails
- Hacking
- Musik- und Lichttechnik



Karlsruhe



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## Openstack

- 2014
- Summits (Paris, Vancouver)
- Produktiv Einsatz

 Karlsruhe

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## Einfuehrung

Was ist openstack?

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## Geschichte

Wie kam es zu OpenStack?

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## Komponenten

Keystone, Nova, Horizon ...

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## API

REST, CLI

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## Installation

Puppet, Ansible, FUEL, MaaS

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## Sicherheit

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## Foundation

OpenSource vs. Kommerz

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# Einführung

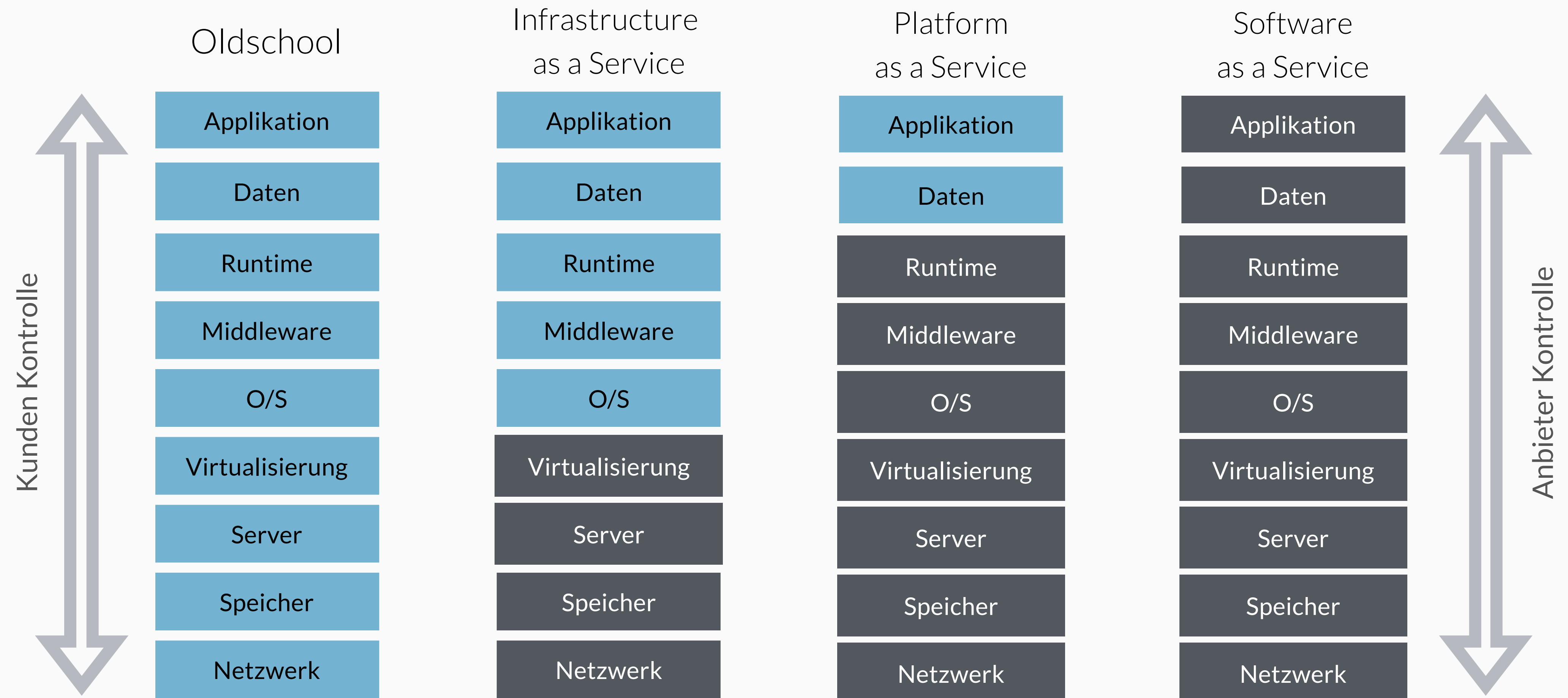
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Was ist openstack?



*OpenStack is a free and open-source cloud computing software platform.  
Users primarily deploy it as an infrastructure as a service (IaaS) solution.*

<http://en.wikipedia.org/wiki/OpenStack>





Oldschool

Infrastructure  
as a Service

Platform  
as a Service

Software  
as a Service

Beispiele:

Colocation  
Rechenzentrum

Root Server

Webhosting

Webshop





## Infrastructure as a Service

Applikation

Daten

Runtime

Middleware

O/S

Virtualisierung

Server

Speicher

Netzwerk

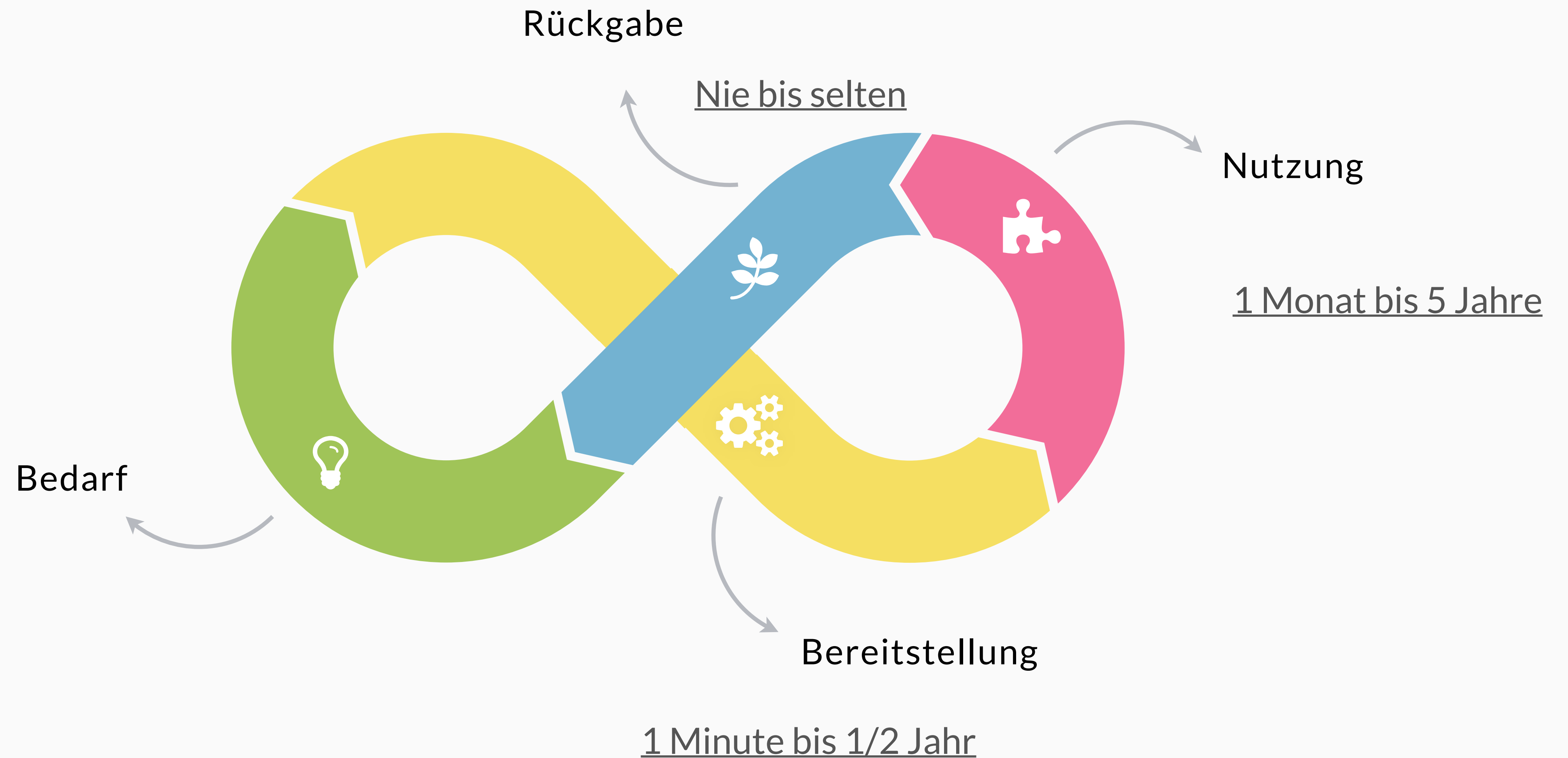


# Lifecycle

Klassische Ressourcennutzung

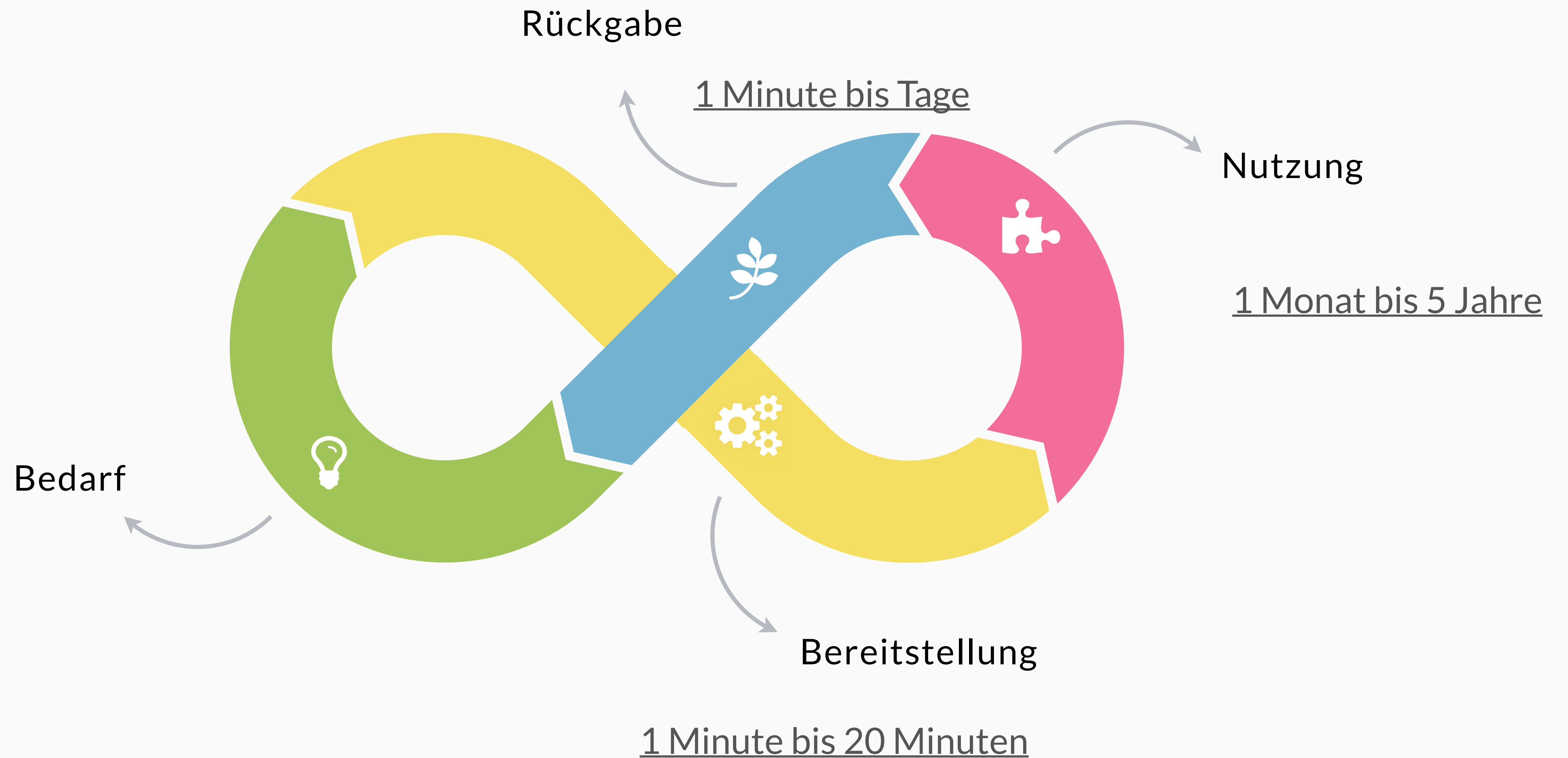


Zeitspanne





## Zeitspanne



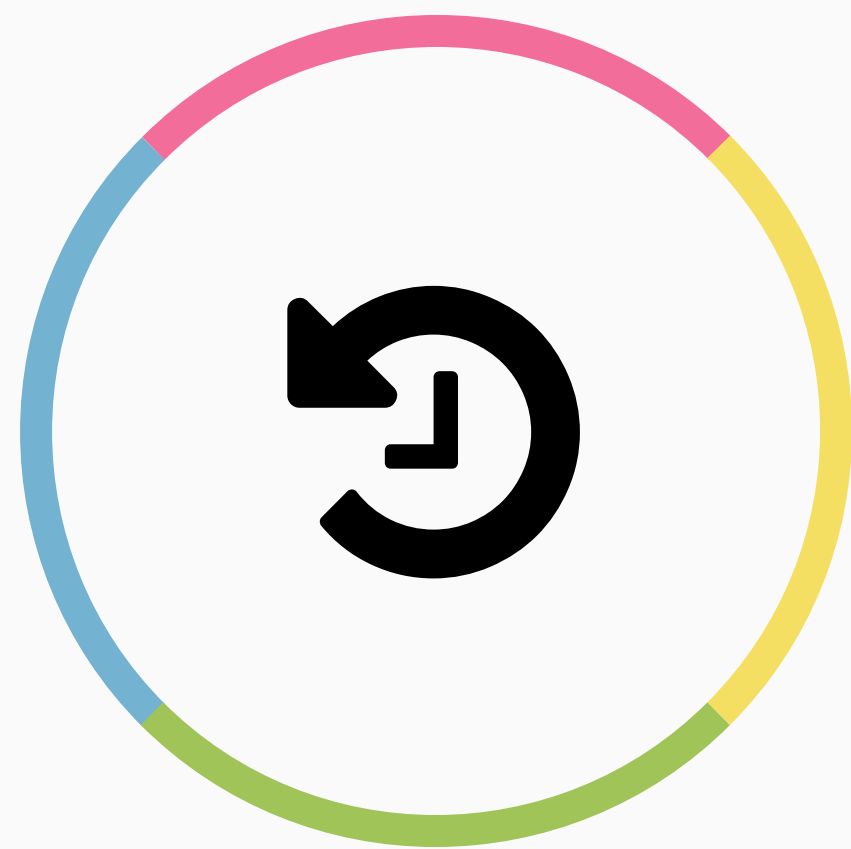


- Apache 2.0 Lizenz (OSI)
- 6-monatiger Release Prozess
- Code auf Github
- Community Strukturen:
  - PTL
  - Design Summits
- Modulares Design
- Python
- APIs



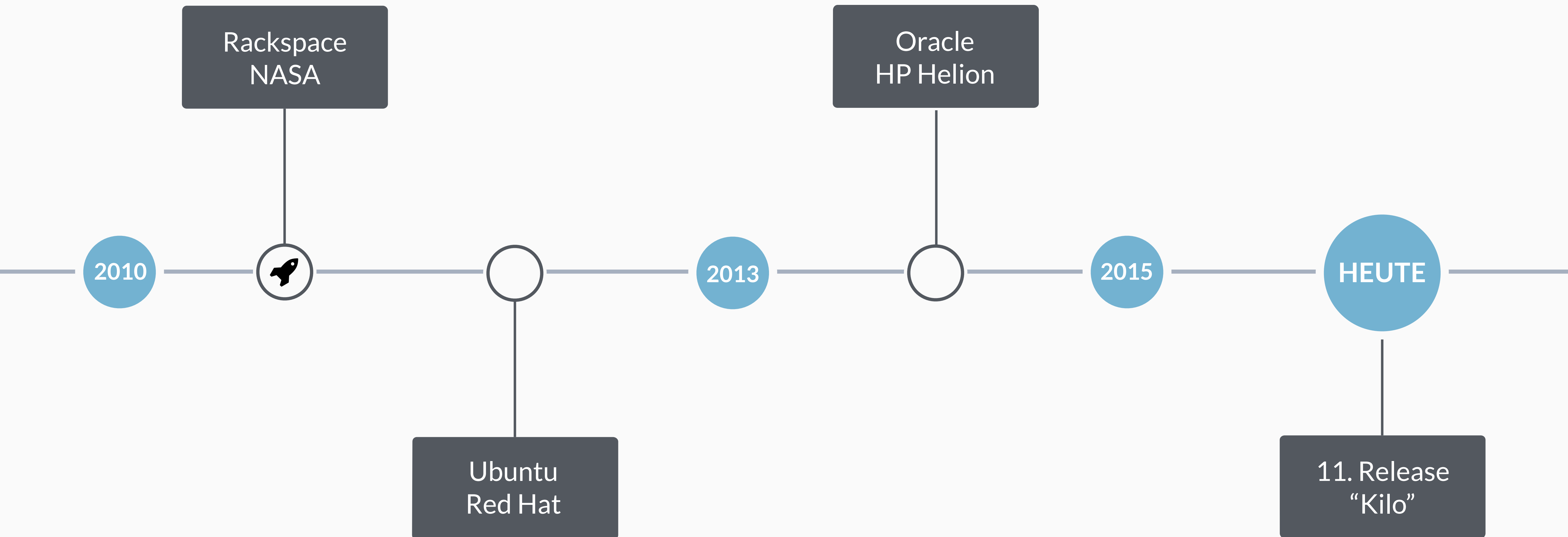
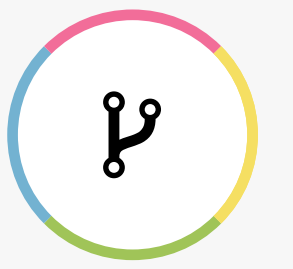


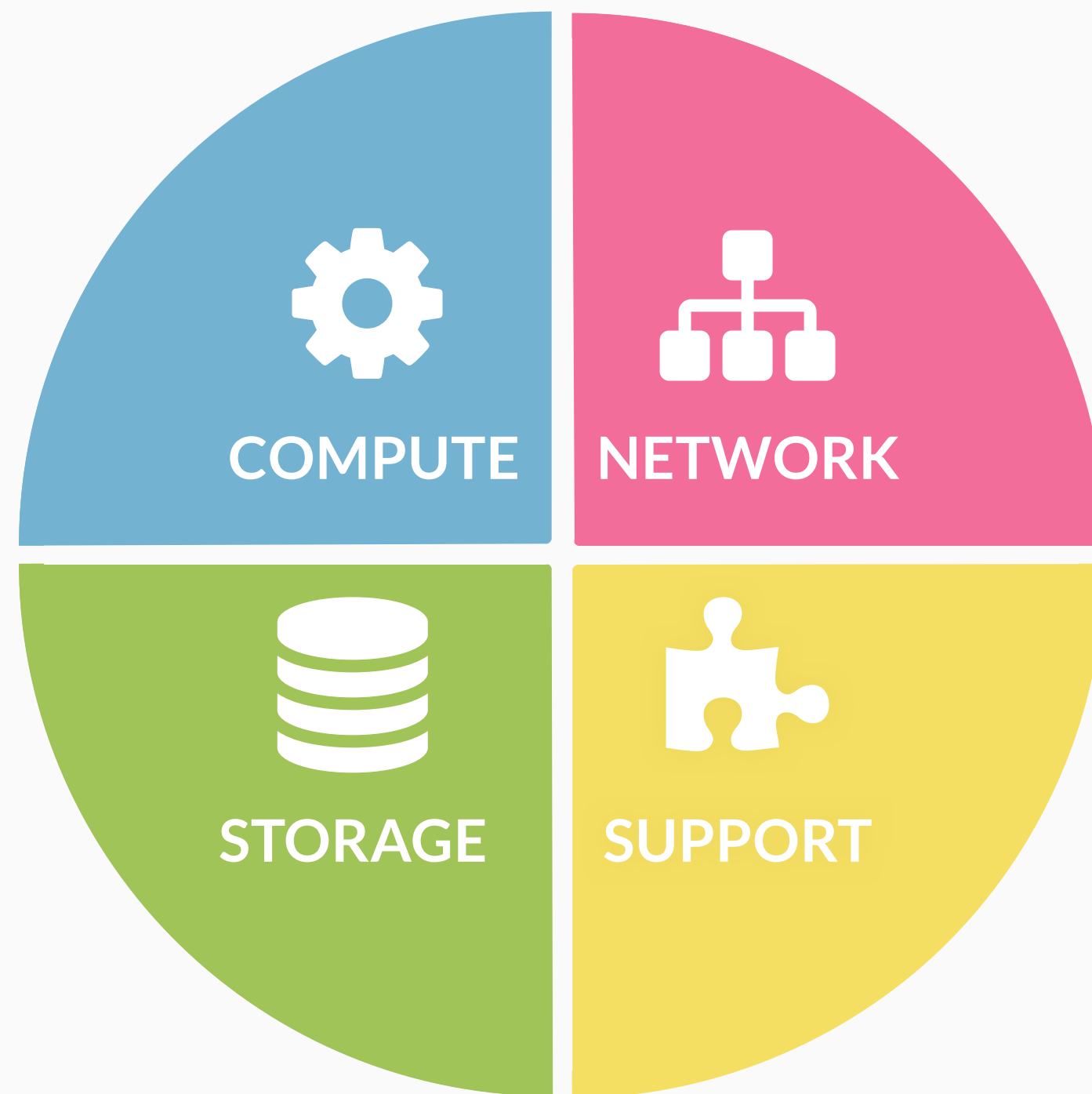
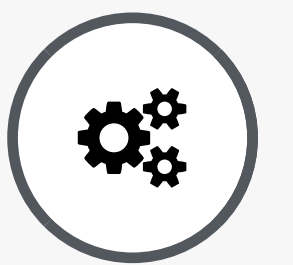




GESCHICHTE

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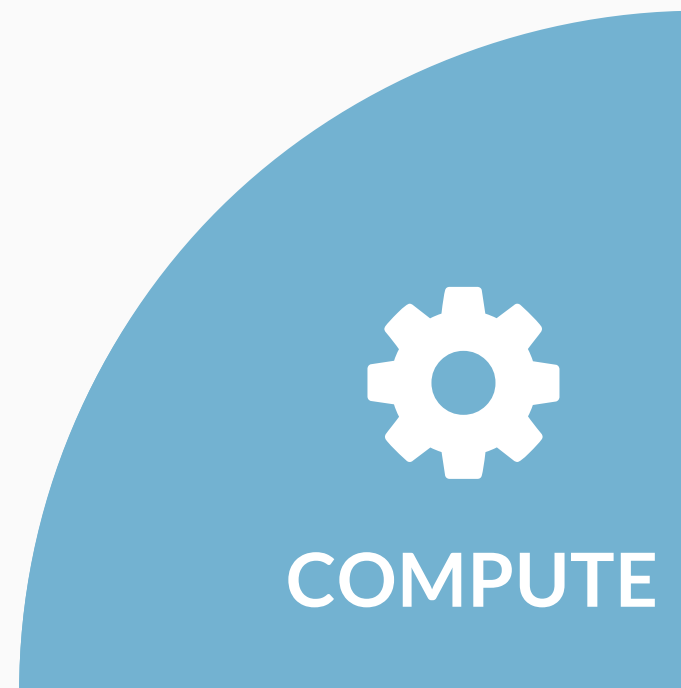
- Zusammenschluss vieler Einzelkomponenten
- 4 Hauptbereiche:
  - Compute (Nova)
  - Network (Neutron..)
  - Storage (Glance, Cinder..)
  - Support (Horizon, Keystone, Ceilometer, Ironic..)





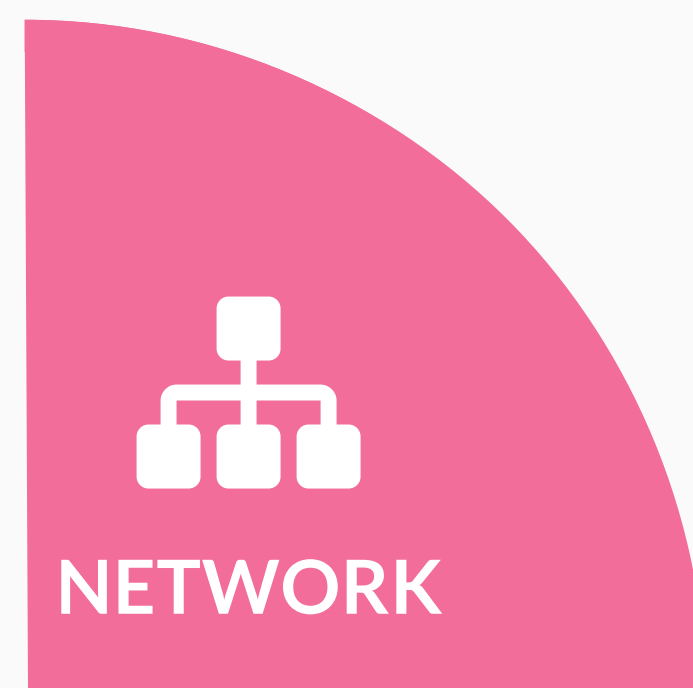
# Komponenten

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## Projekt Name: Nova

- Hypervisors: Libvirt, KVM, XEN, Hyper-V, VMWare
- Management (Start, Stop ..)
- Pooling (Availability Zones)
- Bare Metal Provisioning
- Container Support (Docker, LXD..)
- Nova API
  - EC2 kompatibel
  - Asynchron



STORAGE

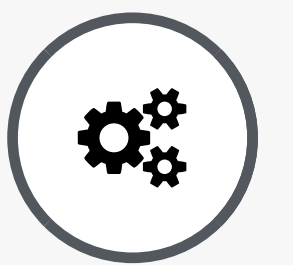
## Projekt Name: Neutron

- Netzwerkverwaltung
  - Subnetze
  - IP Adressen
- Floating IPs
- Alle Komponenten austauschbar
- Komplexitätsskala unendlich
- Neutron API
  - Hersteller Plugins



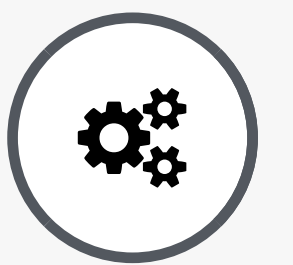
## Projekt Name: Cinder

- Block Storage
- Storage für Compute Instances
- Multiple Backends:
  - LVM, iSCSI, Ceph, \$Kommerz
- Cinder API
  - Hersteller Plugins



## Projekt Name: Swift

- Object Storage
- Redundanzen in/über Datacenter
- Privat und Public Interfaces
- Multiple Backends:
  - Ceph, \$Kommerz
- Swift API
  - Hersteller Plugins



## Projekt Name: Glance

- Image Verwaltung
- Formate: QCOW2, RAW, ISO, VHD...
- Container Abbilder
- Speicher Backends:
  - Swift, Ceph, LVM...
- Glance API
  - Hersteller Plugins



## Projekt Name: Horizon

- Web GUI JavaScript
- API Backend
- Erweiterbar pro Komponente
- Rebranding





## Projekt Name: Keystone

- Benutzer Directory
- Authentifizierung
- Dienste Katalog
- Multiple Datacenter
- Backends:
  - LDAP, Google...
- Keystone API



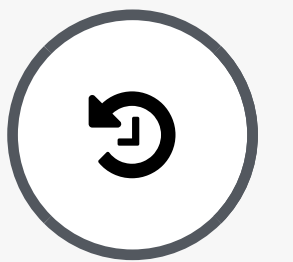




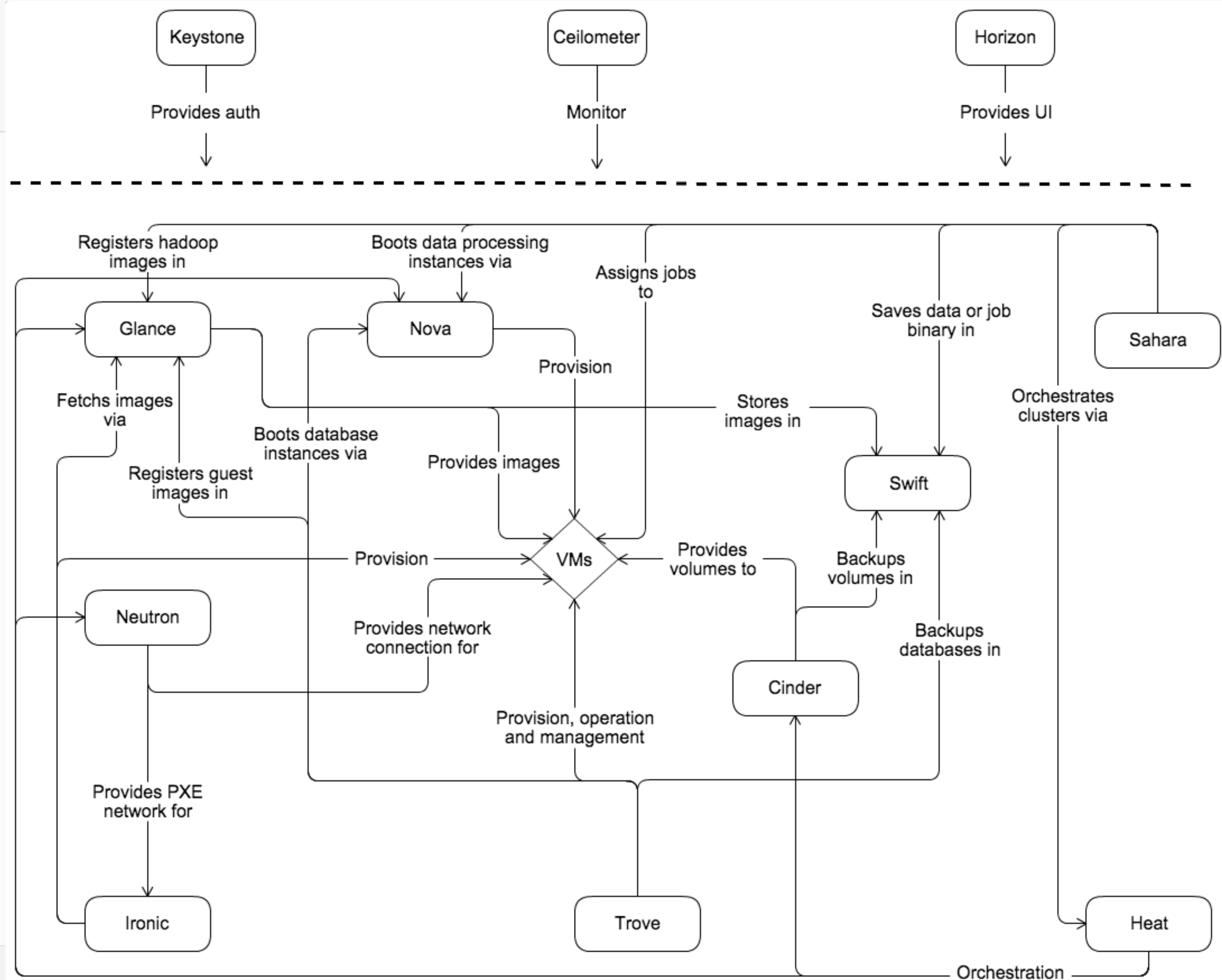
## Projekt Name: Ceilometer

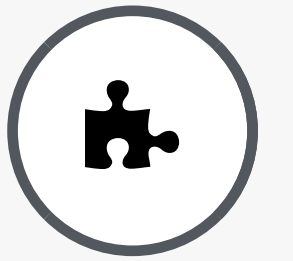
- Abrechnung
- Counter pro Komponente und Benutzung
- Erweiterbar
- Agenten basiert



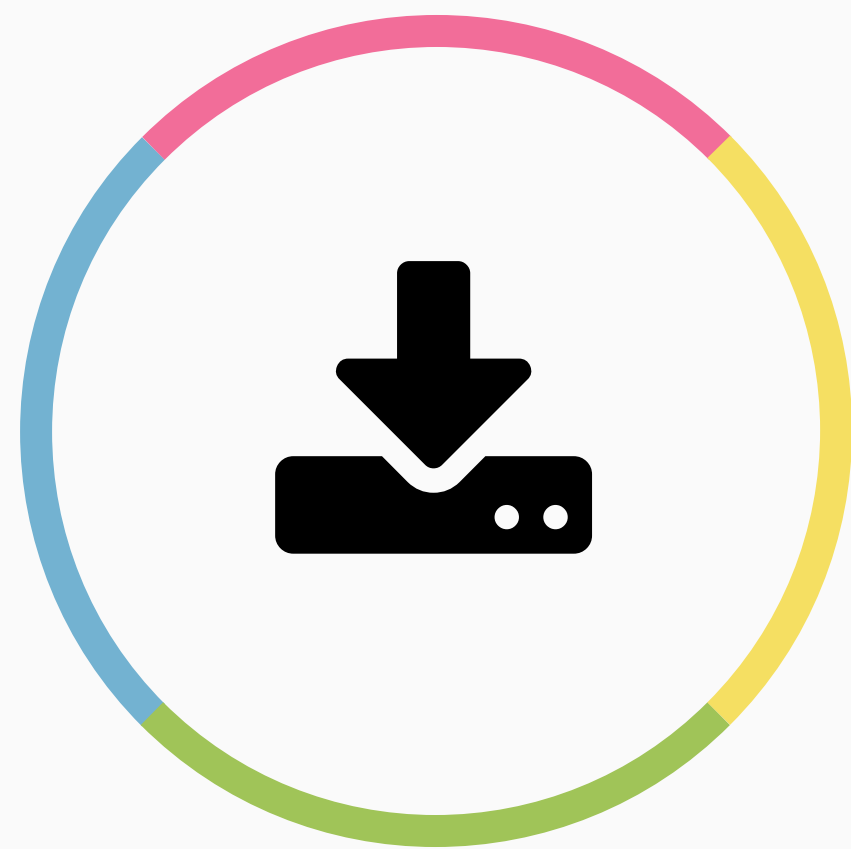


2010, Okt	Austin	<ul style="list-style-type: none"><li>• Compute (Nova)</li><li>• Object Storage (Swift)</li></ul>	2013, Okt	Havanna	<ul style="list-style-type: none"><li>• Telemetry (Ceilometer)</li><li>• Orchestration (Heat)</li></ul>
2011, Feb	Bexar	<ul style="list-style-type: none"><li>• Image Service (Glance)</li></ul>	2014, Apr	Icehouse	<ul style="list-style-type: none"><li>• Database (Trove)</li></ul>
2012, Apr	Essex	<ul style="list-style-type: none"><li>• Identity (Keystone)</li><li>• Dashboard (Horizon)</li></ul>	2014, Okt	Juno	<ul style="list-style-type: none"><li>• Data Processing (Sahara)</li></ul>
2012, Sep	Folsom	<ul style="list-style-type: none"><li>• Networking (Neutron)</li><li>• Block Storage (Cinder)</li></ul>	2015, Apr	Kilo	<ul style="list-style-type: none"><li>• Bare-Metal Provisioning (Ironic)</li></ul>





- Über 20 offizielle HTTP APIs
- SDKs fuer Java, Node.js, Python, Ruby,.NET, PHP
- CLI für alle offiziellen Projekte
- Granuläre Zugriffsrechte und Quotas

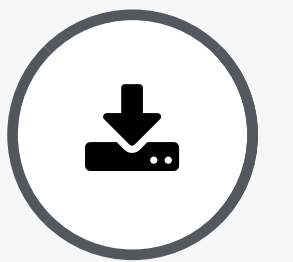


# Installation

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# Hardware Anforderung

Nicht Kleckern sondern Klotzen!



## Controller 0

### Controller Node:

- 2 - 8 Cores
- 32 GB RAM
- 100 GB SSD

## Compute 0

### Compute Node:

- 16 - 32 Cores
- > 128 GB RAM
- 100 GB SSD

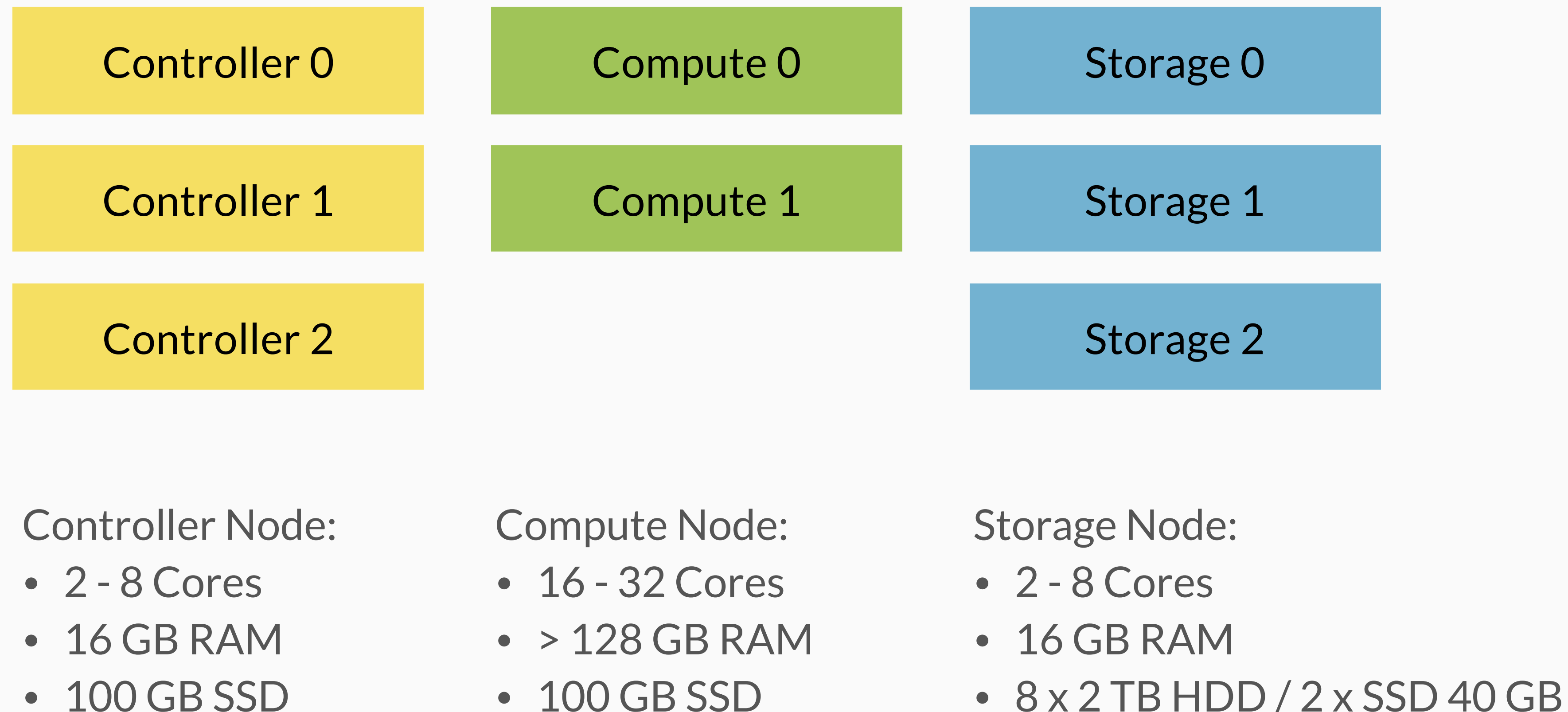
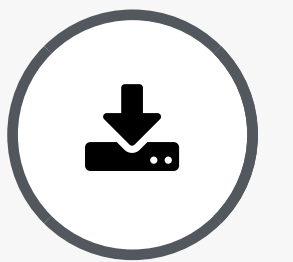
## Storage 0

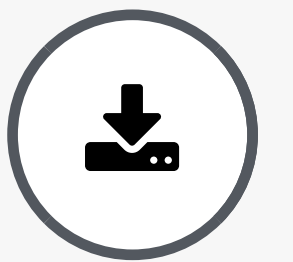
### Storage Node:

- 2 - 8 Cores
- 16 GB RAM
- 8 x 2 TB HDD / 2 x SSD 40 GB

# Hardware Anforderung

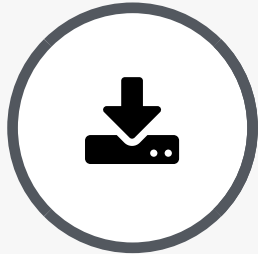
Darf es ein bisschen Ausfallsicherheit sein?



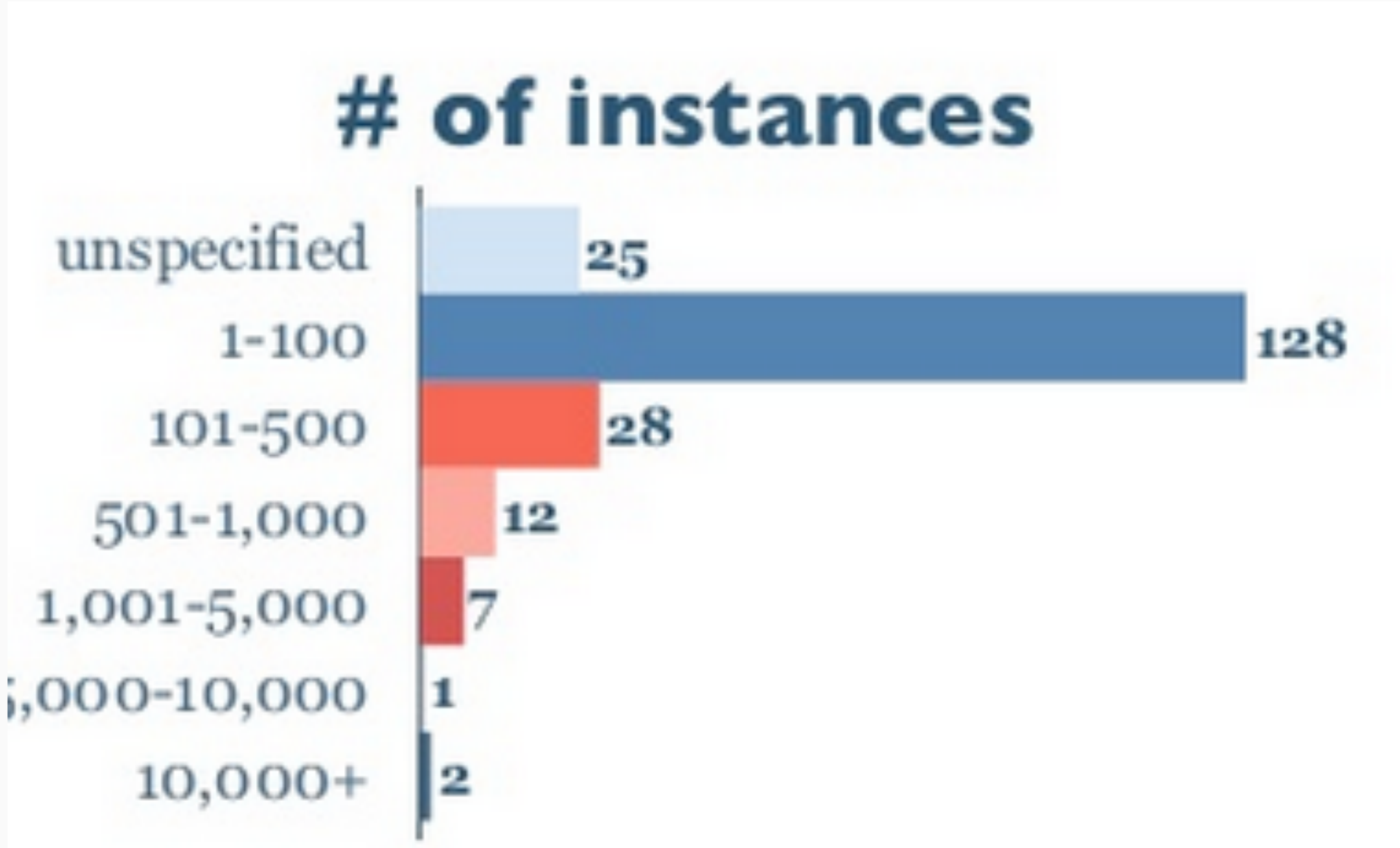


- Dedizierte Ports für Public-, Management- und Storage Netze
- 10 Gbit/s Anbindungen wo nötig: Storage, Public
- Rackspace 1 - 4 HE pro Server
- Redundanzen Netzwerk, Hardware...
- Kühlung
- Switches & Router & Firewalls
- Aussenanbindung mit Public IP Netzen IPv4 (/20 = 1000 VMs) & IPv6

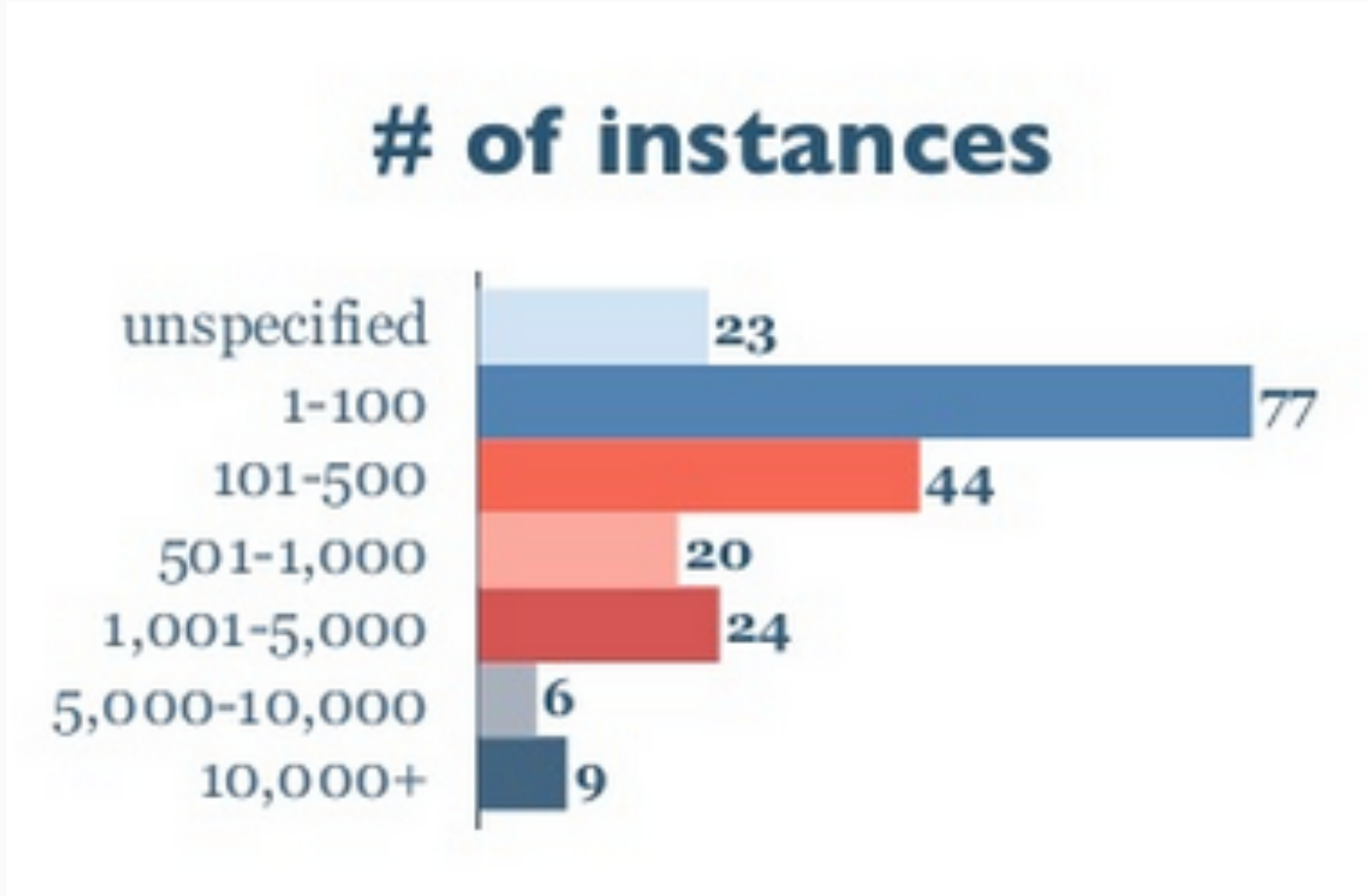




QA/DEV:



Production:

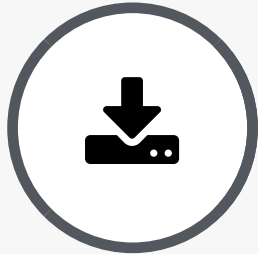


Quelle: \_\_\_\_\_

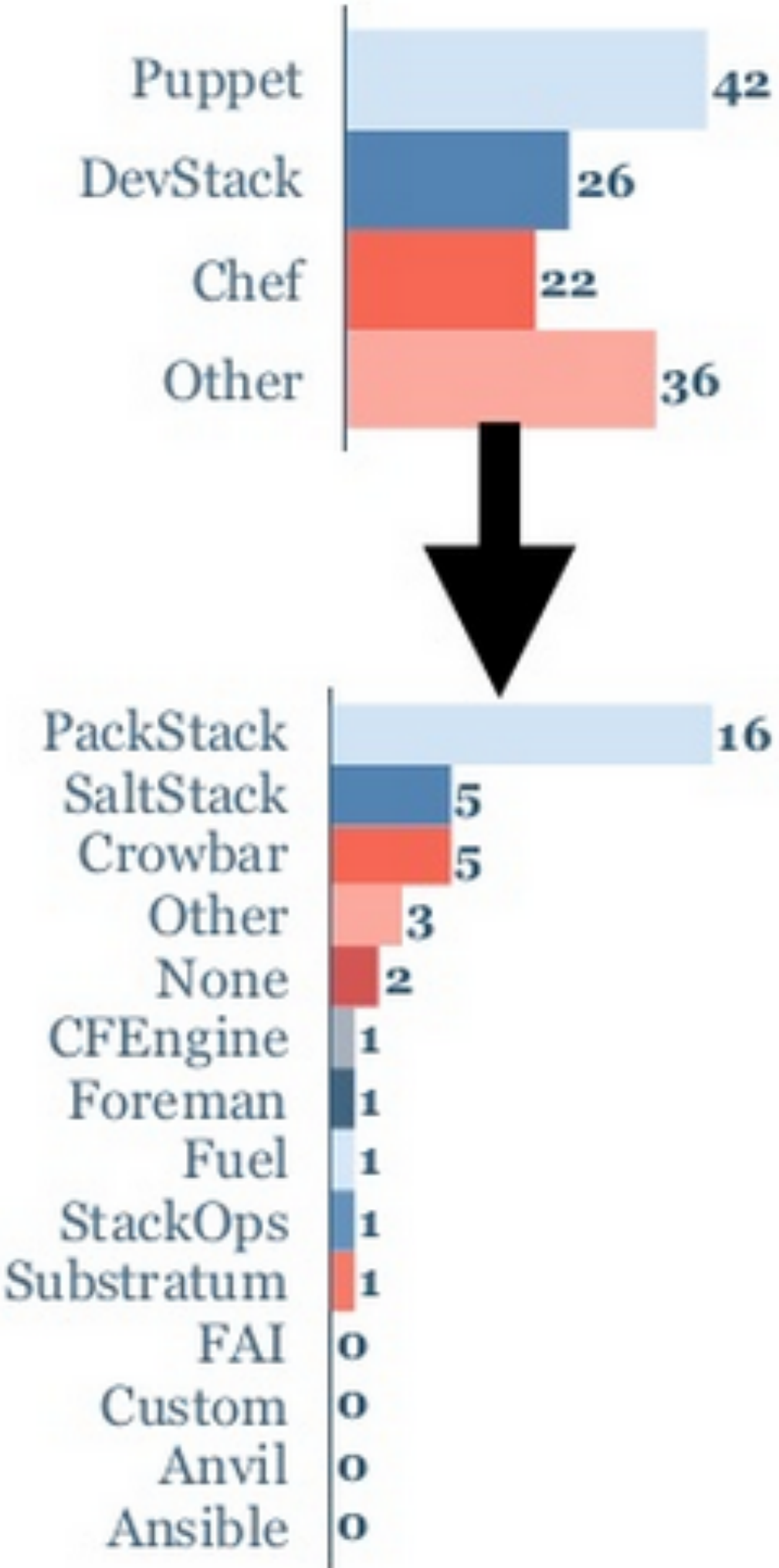


# Deployment Hilfe

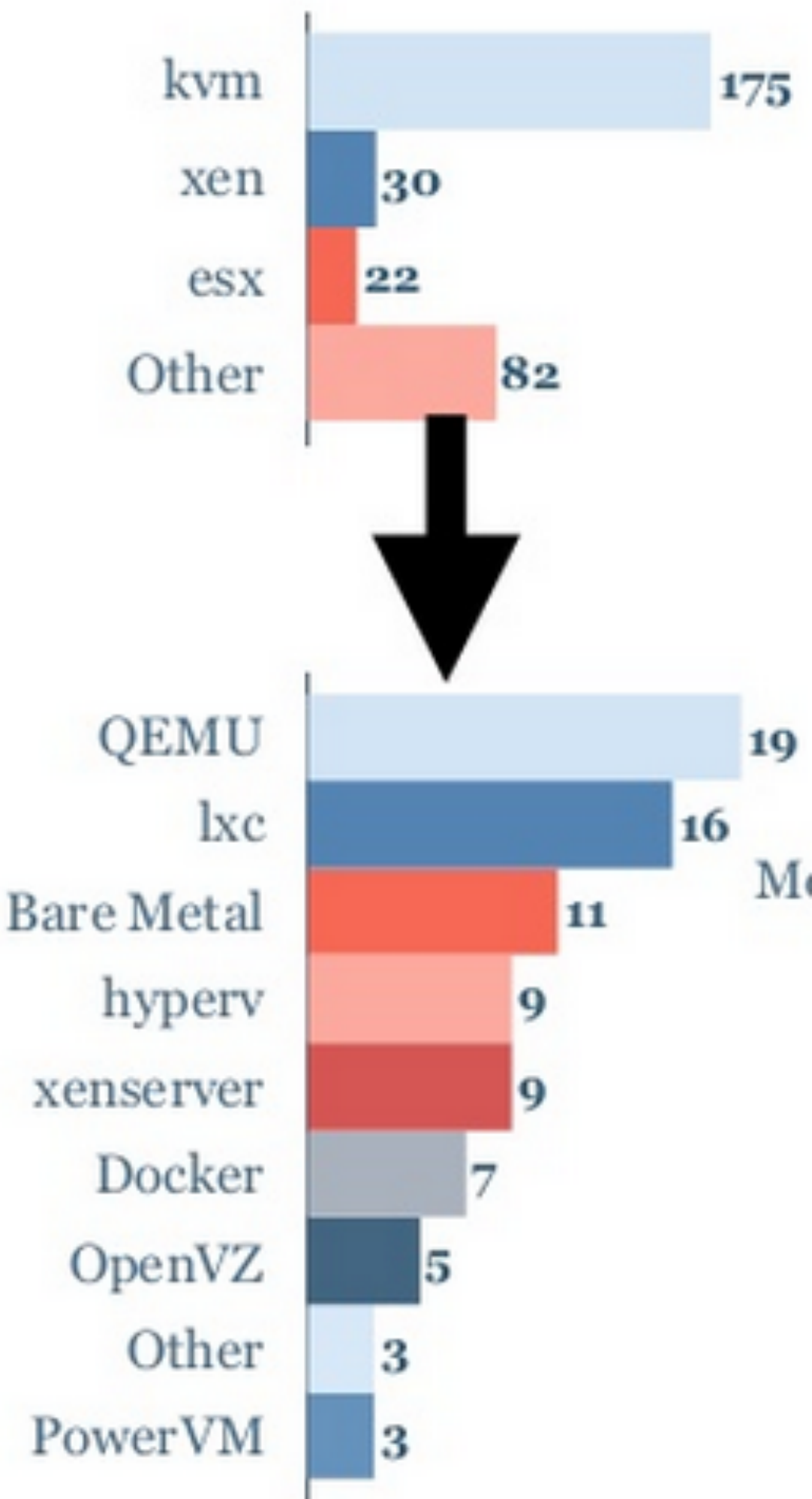
Ich komm morgen wieder, dann ist es fertig...



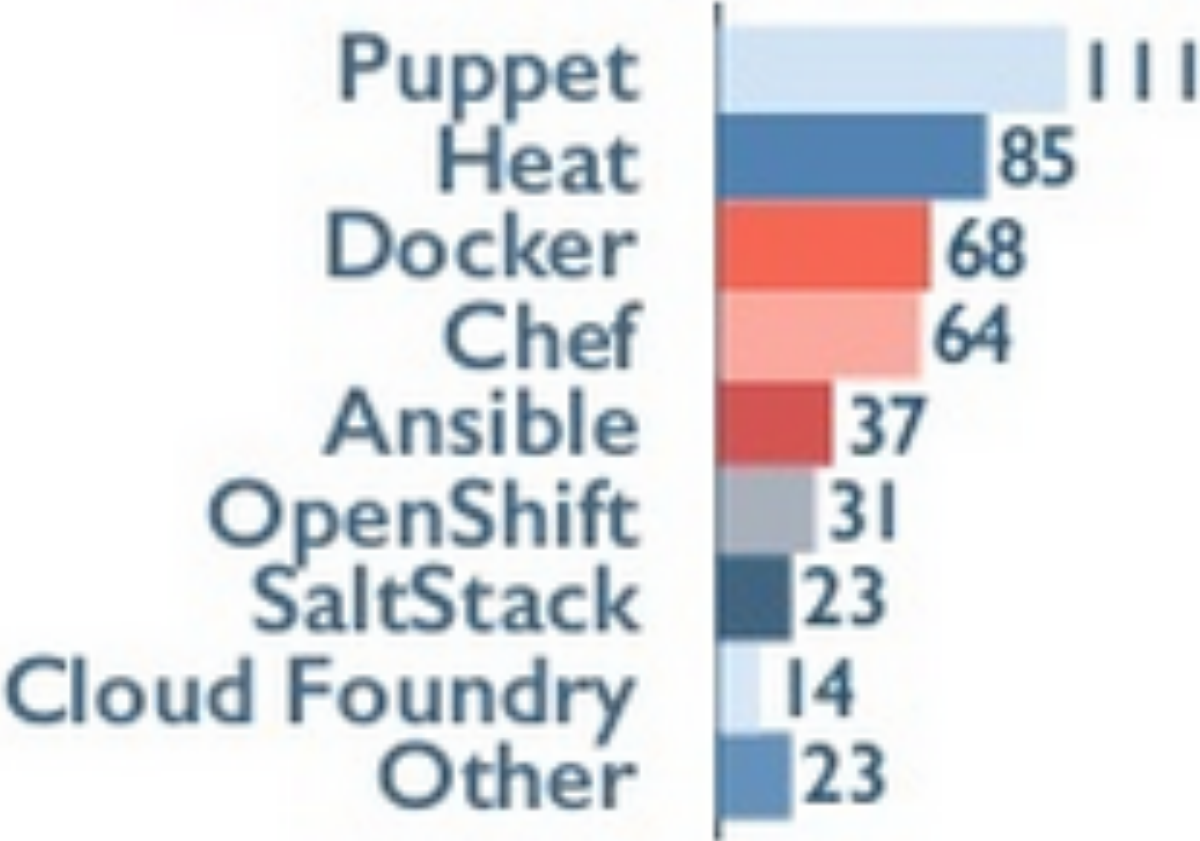
## Deployment Tool



## Hypervisor

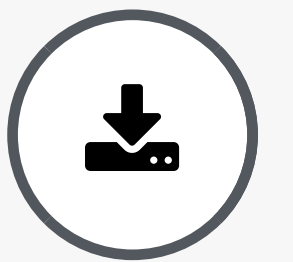


## Config Tools



Quelle: \_\_\_\_\_





## Bare-Metal

Anforderung: iPXE

- Ubuntu MaaS
- Crowbar
- Fuel
- HP Helion
- Redhat OpenStack
- ...

## Basis System

SSH Zugriff

- Ansible
- Puppet
- Chef
- ...



# Sicherheit

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Angriffsvektoren



- Hohe Komplexität
- Einzigartigkeit der Systeme
- Trennung der Netze (Management, Storage, Public)
- HTTP APIs
- SSL optional
- Public Cloud Hoster



# Foundation

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OpenSource vs Kommerz





MEET THE

TECH COMMITTEE

SOFTWARE DEVELOPMENT & DIRECTION

13

TOTAL MEMBERS

(ELECTED BY ACTIVE TECH CONTRIBUTORS)

OPENSTACK CLOUD OPERATING SYSTEM

Shared Services

Compute

Networking

Storage

DETERMINES CROSS-PROGRAM ISSUES

MEET THE

BOARD of DIRECTORS

PROTECT, PROMOTE, & EMPOWER

APPOINTED

8

PLATINUM

Appointed by Members

ELECTED

8

GOLD

Elected by Member Class

ELECTED

8

INDIVIDUAL

Elected by Individual Members

MEET THE

USER COMMITTEE

USER ADVOCACY AND FEEDBACK

REPRESENTING

75+

GLOBAL USER GROUPS

Quelle: \_\_\_\_\_

openstack

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DANKE FÜR DIE AUFMERKSAMKEIT

FRAGEN?



**VIEL SPASS AUF DER GPN15**

