ViCE
Virtual Open Science Collaboration Environment

www.alwr-bw.de/kooperationen/vice

Autoren: Projekt-Team ViCE
Kontakt: susanne.mocken@rz.uni-freiburg.de,
dirk.von.suchodoletz@rz.uni-freiburg.de

Uniform Approach to Large-Scale Research Infrastructures Provisioning & Deployment

Current large scale computational research infrastructures are composed of multitudes of compute nodes fitted with similar or identical hardware. For practical purposes, the deployment of the software operating environment to each compute node is done in an automated fashion. Data centres hosting more than one of these systems -- for example cloud and HPC clusters – benefit from a common provisioning method for all of them. The uniform provisioning approach unifies administration of the various systems and allows flexible dedication and reconfiguration of computational resources.

Reproducibility

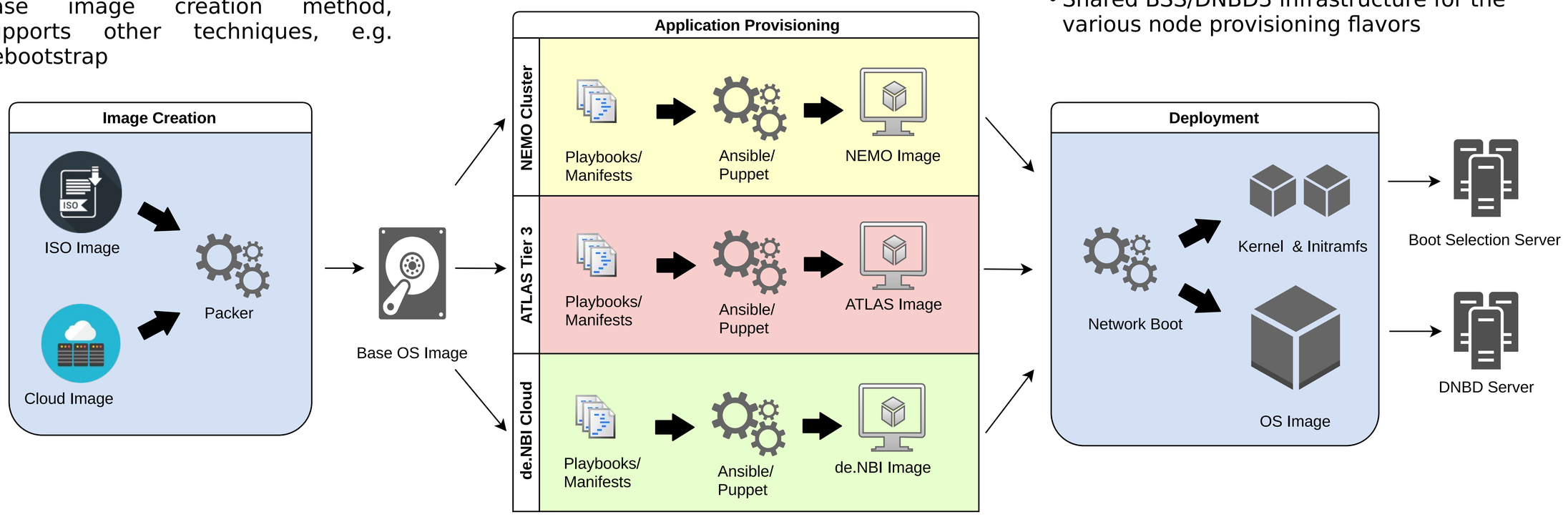
- Declarative approach instead of manual installation of template nodes
- Recipe-based base image creation with packer or well-defined cloud templates
- Deployment workflow independent of base image creation method, supports other techniques, e.g. debootstrap

Flexibility

- Project-specific images through application provisioning and configuration through Ansible, Puppet or similar tools
- Common deployment workflow for compute/infrastructure node flavors

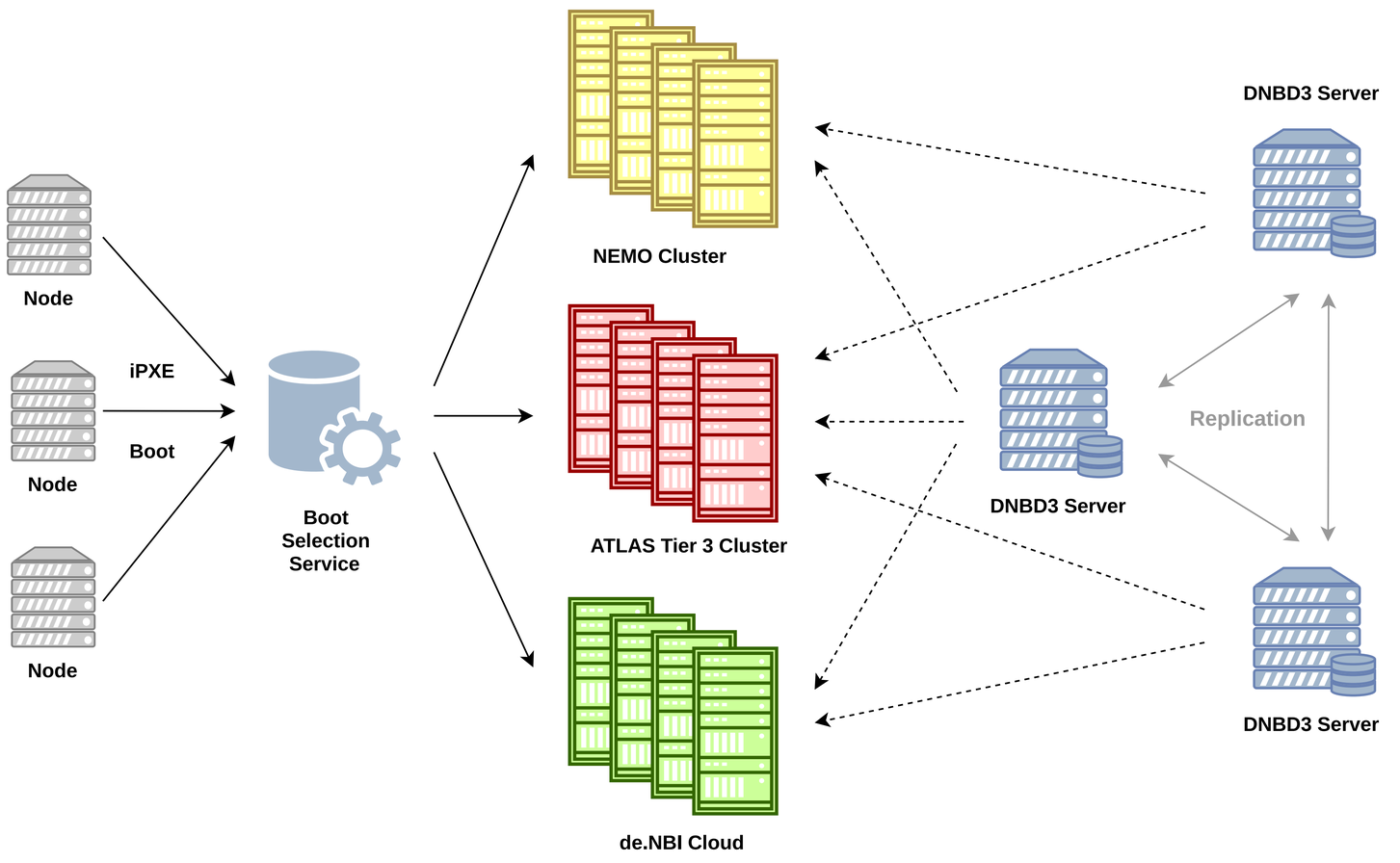
Scalability

- Scalable deployment through remote network boot via DNBD3 (Distributed Network Block Device)
- Generic network boot concept delivering custom kernel and dracut-based initramfs and main operating system image
- Shared BSS/DNBD3 infrastructure for the various node provisioning flavors



Boot Selection Service

- Global entry point for nodes booting from network
- iPXE-based framework reacting dynamically to requests based on node-specific attributes like MAC/UUIDs
- Fast machine commisioning and rededication via BSS configuration
- Early network segregation possible through preboot VLAN configuration



Distributed Network Block Devices

- Extension of Network Block Devices (NBD)
- Efficient on-demand data delivery on block layer
- Scalability and resiliency through proxy servers
- Automatic background replication of images with unused network bandwidth
- Implicit load balancing through automatic server switching during operations

Universität Freiburg:
Rechenzentrum,
Lehrstuhl Experimentelle Teilchenphysik,
Zentrum für Biosystemanalyse (ZBSA), Anglistik

Universität Tübingen:
Lehrstuhl Allgemeine Sprachwissenschaften und Computerlinguistik

Universität Mannheim:
Rechenzentrum,
Institut für Wirtschaftsinformatik

Universität Ulm:
Institut für Organisation und Management von Informationssystemen (IOMI)

Karlsruher Institut für Technologie (KIT):
Institut für Experimentelle Kernphysik

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