The Transition from CentOS to Rocky Linux at SESAME

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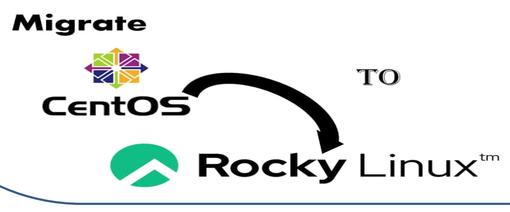
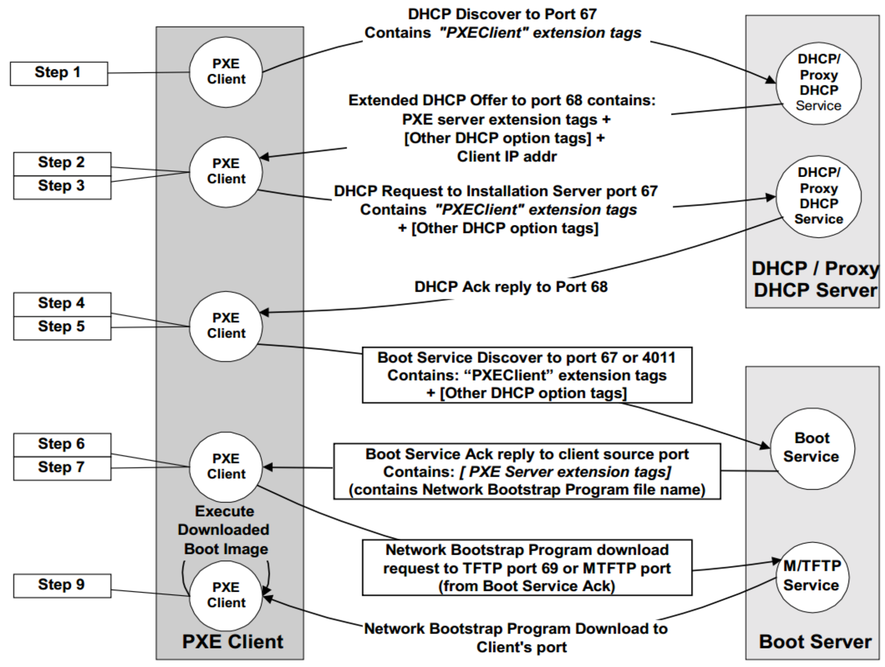
Abstract & Objectives

The emergence of Rocky Linux, a community-driven enterprise operating system, represents a significant shift in SESAME's Scientific computing landscape. This paper explores the transition from CentOS to Rocky Linux by the computing group, examining motivations, advancements, and implications institution-wide.
In 2008, the Computing and Control group at SESAME initially adopted Scientific Linux as the primary Linux distribution due to its maintenance by CERN and widespread use in research communities. However, technical challenges and the cessation of support for Scientific Linux led to a switch to CentOS in 2013.
Unfortunately, CentOS's announced of reaching End of Life (EOL) by end of 2021, means no further updates or support, posing significant challenges for ongoing operations and development at SESAME.
Motivated by the need for stability and long-term support amid changes in CentOS, the decision to migrate to Rocky Linux ensures continuity in computing operations.
Technical aspects of Rocky Linux development, such as system configurations and integration, are examined, highlighting collaborative efforts within SESAME to enhance the operating system.
Adoption of Rocky Linux fosters open collaboration and innovation, empowering research teams to tackle complex tasks. Challenges, including compatibility issues, are addressed through proactive planning and testing.
In summary, SESAME's switch to Rocky Linux shows their commitment to teamwork and using the best tools available. This change demonstrates SESAME's ability to adapt to new challenges, driving progress in science and innovation.

the Method that we have used in SESAME is the PXE server (Pre-boot Execution Environment) and in this article we'll explain the concept of the PXE server and SESAME experience and the befit of using this method and some technical details about our PXE server, as this project is under the development by the Scientific Computing & Systems Commutation group.

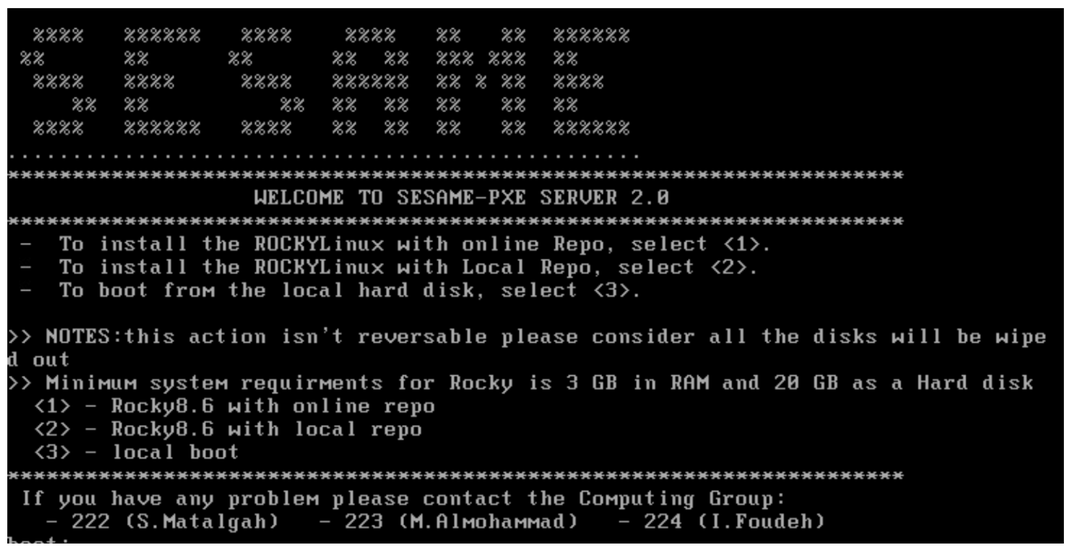


Typical IPv4 PXE boot flow



On booting new server to install the OS we have multiple options, such as: booting from local disk, CD/DVD , Flash drive, Network (PXE).
So When the host terminal (server, PC, VM ,….) boots from the NIC card, a special request sent to the DHCP server on the local network.
After receiving the PXE boot request, the DHCP server will send a DHCP response which will contains the local network configuration, as well as the IP address of the PXE boot server – TFTP Server
After the host receives the DHCP response, it uses TFTP to download the boot file – pxelinux.0 or bootx64.efi – from the Server.
The host loads and executes the boot files downloaded from the TFTP. (The boot file is usually a small Linux kernel capable of connecting to a PXE server and obtaining an OS image)
The PXE server sends the system image to the host and The host terminal loads and executes the OS image, and runs it entirely from the network within

SESAME PXE Server



SESAME's PXE server were build over Rocky Linux 8.6 virtual Machine with multiple options of booting,
Multiple protocols were used such as : TFTP, FTP, HTTP, SCP.
All these protocols were used in different ways to insure the efficiency, stability and security of the PXE server through our local network,
The OS image that we used were Rocky Linux 8.6, Different OS configuration option were included in the PXE server to maintain the environment needs as we have around +200 VM's and multiple server and work stations needed to be upgraded,
One of the major difference between different configuration option were the repository type as we have various applications needs, so we offer online repository (the regular repository which came with the OS), offline repository which represent a mirror from the online repository with fixed packages version in addition for some inhouse packages and drivers.
Also the Post-script features were used in the PXE server to configure all the needed configuration and setting such as : Network setup, fix some buggy behavior, create the needed account with fix ID's … etc. in order to reduce installation and configuration time, all these configuration depending on the group needs as this service is build and developed based on other groups needs and demands.

Automation in SESAME

On of the main role for the PXE server were to activate the automation role,
As we used the post-script feature to connect all the hosts to the ansible management point, in order to activate the security role for the local network,
Ansible is an invaluable tool for enhancing security within our network. Its ability to automate repetitive and complex tasks ensures that security protocols are consistently applied across all systems, reducing the risk of human error. With Ansible, administrators can deploy patches and updates quickly, ensuring that systems are protected against known vulnerabilities. Additionally, Ansible's configuration management capabilities allow for the enforcement of security policies, ensuring that all systems comply with organizational standards.
Overall, Ansible not only streamlines security operations but also strengthens the overall security posture of an organization and one of the main important pillars to assure SESAME readiness for Cybersecurity among the Linux on the LAN

Conclusion

Using a PXE server for migrating from CentOS to Rocky Linux offers numerous advantages, including centralized management, scalability, automation, cost-effectiveness, and flexibility. By following the outlined steps, organizations can efficiently migrate their systems, ensuring minimal downtime and consistent configurations across all machines. The PXE server approach not only streamlines the migration process but also prepares the infrastructure for future deployments and updates, making it an indispensable tool for modern IT environments, and helps in building SESAME automation system in order to assure SESAME readiness for Cybersecurity among our environment.

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