Integration of UEFI PXE support into the BIOS PXE ATLAS environment

SoC Talk - November 23rd, 2022
ATLAS TDAQ SysAdmins
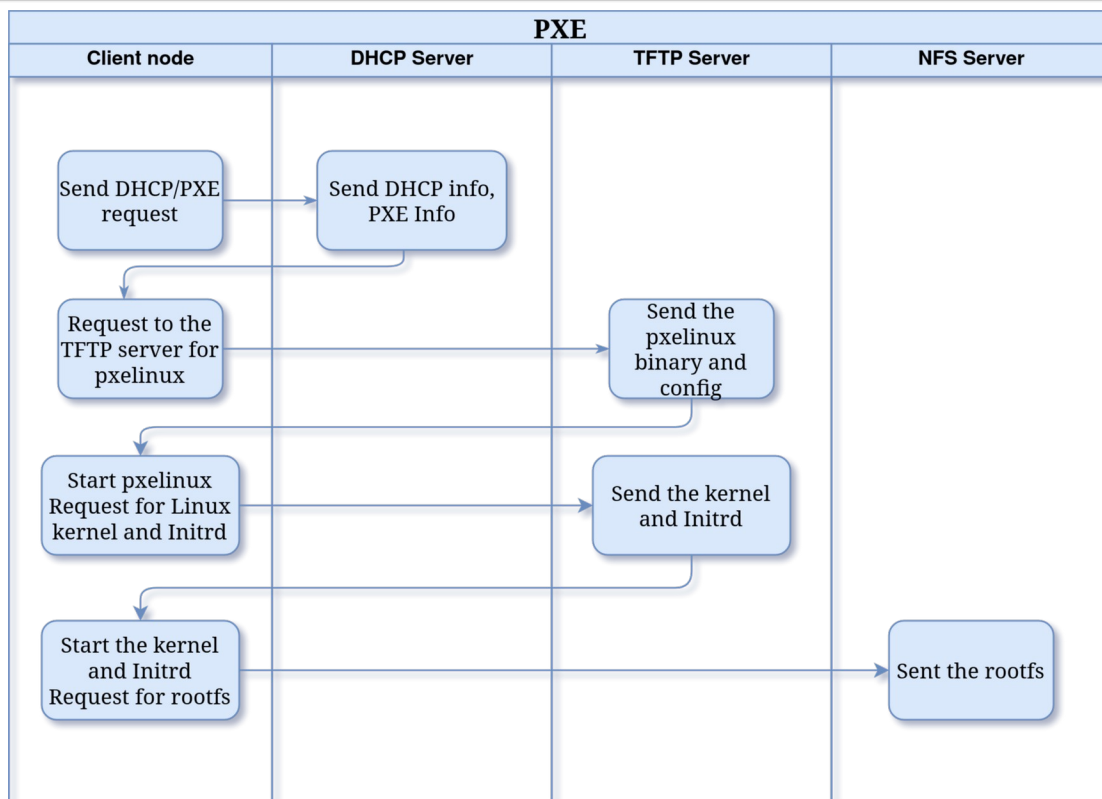-
Quentin Duponnois on behalf of ATLAS TDAQ SysAdmins

UEFI

- UEFI (Unified Extensible Firmware Interface) is the replacement for the legacy BIOS (Basic Input/Output System).
- BIOS is not anymore available on the newest hardware and OS.
- UEFI also starts to become the standard for aarch64
  - Especially, for the usage of vanilla and RedHat Linux kernel with Xilinx SoC.

Legacy System

- PXE is managed by 2 components:
  - Puppet manages the general configuration
    - Networks
    - DHCP options
  - ConfDB takes care of creating the final DHCPd configuration by combining
    - Static files from Puppet
    - Dynamically generated configuration for all the nodes managed by a DHCP server (LFS) in our ConfDB database
  - Pxelinux binary

PXE			
Client node	**DHCP Server**	**TFTP Server**	**NFS Server**
Send DHCP/PXE request	Send DHCP info, PXE Info		
Request to the TFTP server for pxelinux		Send the pxelinux binary and config	
Start pxelinux Request for Linux kernel and Initrd		Send the kernel and Initrd	
Start the kernel and Initrd Request for rootfs			Sent the rootfs

New System

- DHCP has options available which are provided by the client during the first request, in that case we will use the option 93 (Client System).
- Option 93 can be handled via an if statement by ISC DHCP server to give the good binary depending of the architecture of the client.
- Moving to GRUB as Pxelinux does not support UEFI (and SysLinux is dying, no update since 2014). GRUB is the default boot loader for UEFI.

Found issues
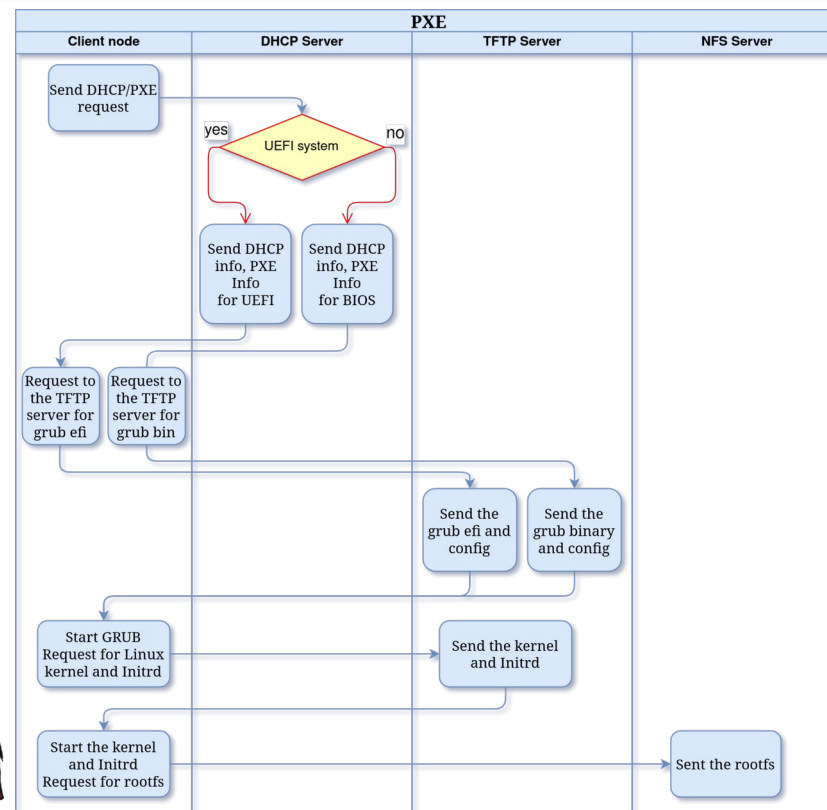
- GRUB does not support the DHCP option 208-211, this was used to have different configuration depending of the hostname.
- GRUB documentation is not correct, for the usage of mac address you need to add "01-" before the mac address.
- GRUB do not set the BOOTIF kernel cmdline like pxelinux, this is used by dracut and systemd to know from which interface is the boot started.

Status

- Localbooted:
  - Done

- Netbooted:
  - Configuration ongoing
  - Test ongoing in TestBed