

## Linux/Windows Dual Boot Issues

- Objectives:
  - Keep things simple for users to encourage adoption of Linux
    - We hope most distros are evolving and problems are minimal
    - Identify possible problems in dual booting Linux with Windows
    - Develop work-arounds to overcome dual boot problems to improve documentation provided with USB Linux distros
    - Agree where more research is needed for problems not resolved
- Problems with dual booting Linux with Windows
  - Adoption by CPU manufacturers of increased security measures with protocols
    - Intel
      - Verified Boot Mode
        - Hard wired into chip and bios to prevent unauthorized use of OS and software
        - Example: My Asus Ultrabook prevents installation of other OS such as Linux
      - Measured Boot
        - Gives computer manufacturers choice on how to govern implementation of OS and software
          - Trusted Platform Module (TPM)- Boot process starts with trusted hardware & software
            - US DoD requires TPM

- Commercial hardware companies use various versions (problematic)
- Unified Extensible Firmware Interface (UEFI) -
  - Only signing authority was Microsoft
  - Linux distributions gradually building in updates to handle UEFI
    - openSUSE
    - Ubuntu
    - Fedora
    - Red Hat (support enhancements)
  - UEFI usually includes a feature in Bios called Secure Boot
    - Problem for older Legacy software in reading or booting disks (older systems could have compatibility issues)
    - Many Linux distributions have incorporated features to handle Secure Boot for installation, but some drivers may not install unless Secure Boot disabled
      - Example: My Dell laptop required disabling Secure Boot to install audio driver when installing Linux
    - Microsoft implemented encryption
      - Includes 48 digit BitLocker keys, which are required to make changes for both encryption and certain changes made to Bios when booting into Windows

- An issue for disengaging Secure Boot, TPM, CSM or other changes made to Bios for dual booting back into Windows
- No issue if only Linux is installed

- ★ • Summary of my experience in dual booting Linux/Windows on several systems
  - ★ ○ Best to already have Windows installed, then install Linux
  - On same drive, even if systems are compatible with Microsoft security measures, it is best to configure drive to provide free space for Linux distribution
  - ★ ○ May need to disable Secure Boot if problems occur, but be ready to input 48 digit BitLocker security code when booting back into Windows
  - If installing Linux on separate drive, best to use Other selection on Linux installation, instead of selecting install alongside Windows
    - Make small partition for Root /
    - Make small partition for Swap /swap
    - Make large partition for Home /home
    - ★ ▪ Select Linux disk Root partition for Boot location
    - After install, use grub-customizer to adjust boot order

MICROSOFT ACCT HAS BIT LOCKER KEYS