README: Setting up the Panda B7 Mining Rig for Model Training Using Ubuntu on a USB Drive

Overview

This document describes the process and rationale for repurposing a Panda B7 mining rig (PandaMiner) with no internal storage into a dedicated training node for an AI model. Since the PandaMiner does not have an internal hard drive, we have implemented a solution to run Ubuntu Desktop directly from a USB drive. The USBinstalled Ubuntu system will serve as the main operating system for the Panda B7, enabling GPUbased model training, and will be accessible and controlled remotely from the main workstation via LAN.

Hardware Specifications

Panda B7 (PandaMiner)

* Model: Panda B7
* No internal storage: The PandaMiner has no builtin HDD or SSD.
* GPU Setup:
* 8x AMD RX580 GPUs (each with 8GB VRAM)
* RAM: 8GB DDR3 (Sumra)
* Connectivity:
* Direct LAN port for networking
* 2 x USB ports (for bootable USB drive and peripheral access)

Objective: Transform this mining rig into a GPU training node for deep learning or other AI workloads using ROCmcompatible GPUs.

Main Workstation (Controller Machine)

* Operating System: Windows 11 Home 64bit
* CPU: AMD Ryzen 7 2700 (8 cores, 16 threads)
* RAM: 16GB DDR4
* GPU: NVIDIA GTX 1650 (4GB VRAM)
* Storage: 256GB SSD
* Networking: Direct LAN link to PandaMiner

This main workstation will serve as the controlling machine, accessing the PandaMiner via SSH and LAN, initiating training jobs, and managing data transfers.

Challenges

1. No Internal Disk on PandaMiner: The Panda B7 mining rig does not contain an internal drive, making it impossible to install a traditional OS (Ubuntu) directly on an internal disk.
2. GPU Utilization for Training: We need a fully functional Ubuntu environment with ROCm drivers to leverage the AMD RX580 GPUs for training.
3. Remote Access and Training Control: We must establish a communication channel (SSH) over LAN to remotely manage training jobs from the main workstation.

Proposed Solution

1. Two USB Drives:
   * USB Drive 1 (16GB): Used as a Live Ubuntu Desktop installer.
   * USB Drive 2 (32GB): Used to host a full Ubuntu Desktop installation, serving as the main operating system drive for the PandaMiner.
2. Installing Ubuntu on the USB Drive:
   * Prepare the 16GB USB drive with Ubuntu Desktop Live via Rufus on the Windows machine.
   * Boot the main workstation from the 16GB Live USB and install Ubuntu onto the 32GB USB drive (as if the 32GB USB were an internal disk).
   * Configure partitions, set the 32GB USB as the destination for both the root filesystem (`/`) and the GRUB bootloader.
   * After installation, the 32GB USB drive will contain a complete Ubuntu Desktop environment that can boot on any compatible machine.
3. Deploying the 32GB USB on the PandaMiner:
   * Move the 32GB USB drive (with the installed Ubuntu) to the PandaMiner.
   * In the PandaMiner’s BIOS/UEFI, set the 32GB USB drive as the primary boot device.
   * The PandaMiner now boots Ubuntu Desktop directly from the 32GB USB drive, acting like a normal workstation running Linux.
4. Networking and Remote Control:
   * Connect a LAN cable directly between the PandaMiner and the main workstation (or ensure they are on the same network).
   * On Ubuntu, install and enable the SSH server (`opensshserver`), allowing the main workstation to SSH into the PandaMiner.
   * From the main workstation (Windows), use an SSH client (e.g., PuTTY) to connect to the PandaMiner’s IP address.
   * This setup allows controlling the PandaMiner, launching training scripts, monitoring GPU usage, and managing data remotely.
5. ROCm and GPU Training:
   * Install the ROCm stack on Ubuntu to support AMD RX580 GPUs.
   * Validate GPU detection with `rocmsmi`.
   * Once ROCm and the desired deep learning frameworks (e.g., PyTorch with ROCm support) are installed, initiate model training jobs via SSH from the main workstation.

Detailed Steps Summary

1. USB Preparation (on Windows):
   1. Use Windows Disk Management to wipe both USB drives and format them as FAT32.
   2. Download the Ubuntu Desktop ISO.
   3. Use Rufus to create a Live Ubuntu Desktop USB on the 16GB drive.
2. Installing Ubuntu onto the 32GB USB:
   1. Boot the main workstation from the 16GB Live USB.
   2. Select "Try Ubuntu" to enter the live environment.
   3. Insert the 32GB USB into the workstation.
   4. Run the Ubuntu installer from the live desktop.
   5. Choose "Manual Installation" (Something Else) to partition the 32GB USB:
   6. Create an ext4 partition for `/`
   7. Install the bootloader (GRUB) onto the 32GB USB.
   8. Complete installation and reboot. Remove the 16GB USB when prompted.
   9. The workstation now boots from the 32GB USB, confirming a successful standalone Ubuntu installation on that USB.
3. Testing and Configuring Ubuntu on 32GB USB:
   1. Update Ubuntu: `sudo aptget update && sudo aptget upgrade y`
   2. Install SSH: `sudo aptget install opensshserver y`
   3. Test SSH connectivity if on the same network.
4. Deploying to PandaMiner:
   1. Power off the workstation and remove the 32GB USB.
   2. Insert the 32GB USB into the PandaMiner.
   3. Set BIOS to boot from the USB drive.
   4. Boot into Ubuntu on PandaMiner.
   5. Connect LAN cable between PandaMiner and main workstation.
   6. From the main workstation, find the PandaMiner’s IP (`ip addr show` on the PandaMiner) and SSH in: ```bash ssh username@pandaminer\_ip ``
5. Install ROCm and Frameworks:
   1. Add ROCm repository keys and install `rocmdkms`.
   2. Check GPU detection with `rocmsmi`.
   3. Install PyTorch or other frameworks compatible with ROCm to start training jobs.
6. Tools and Software Used
   1. Rufus: To create a Live USB installer from the Ubuntu Desktop ISO on Windows.
   2. Ubuntu Desktop ISO (LTS): Provides a stable and supported environment for GPU training.
   3. OpenSSHServer: For remote commandline access.
   4. ROCm: AMD’s GPU computing stack for HPC and AI workloads.
   5. PyTorch/TensorFlow with ROCm support: Deep learning frameworks capable of leveraging AMD GPUs.

Conclusion

Using this method, the PandaMiner B7 rig, originally designed for cryptocurrency mining and without any internal storage, can be repurposed as a GPUpowered model training node. By installing Ubuntu Desktop onto a 32GB USB drive, the PandaMiner can boot and run a full OS environment, connect via LAN, and facilitate remote training tasks initiated from the main workstation. This solution offers a flexible, portable, and hardwareefficient way to leverage the PandaMiner’s multiple GPUs for intensive AI workloads.