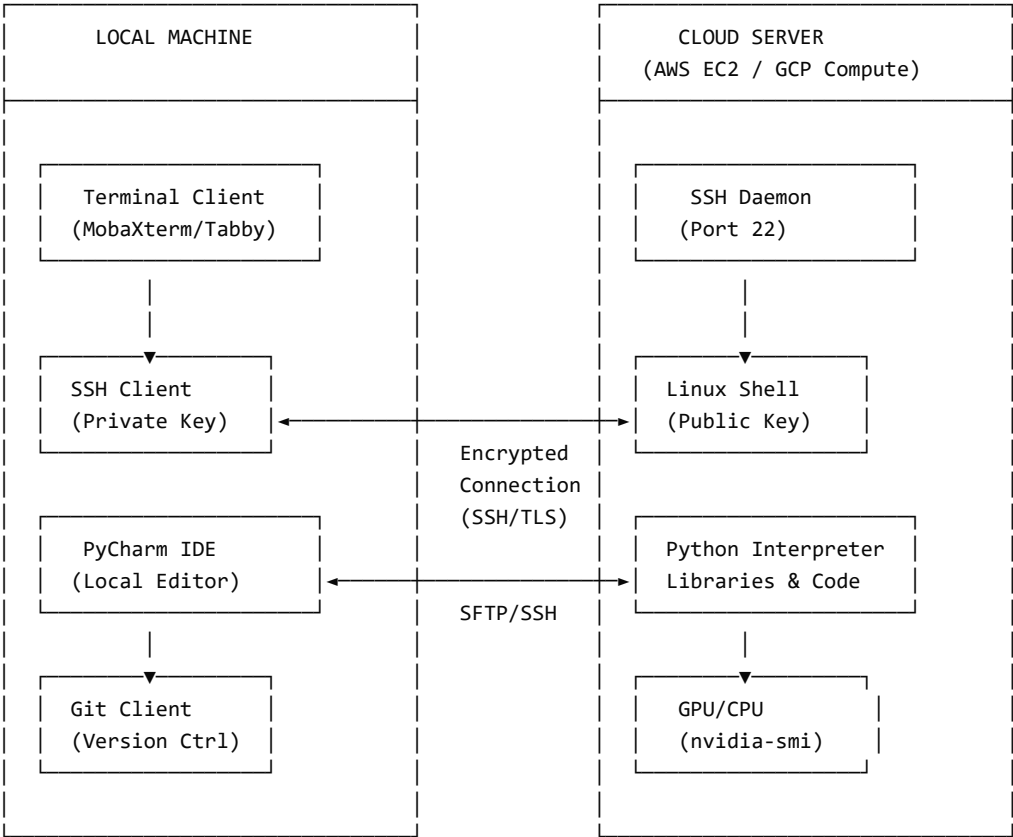# Cloud Computing Software Setup Checklist

A comprehensive guide to setting up your development environment for cloud computing coursework.

Getting Started

☐ **Introduction** - Remote connections, SSH, terminals, cloud platforms, servers, VMs, engines, and AMI concepts

Architecture Overview

```
┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│          LOCAL MACHINE          │        │          CLOUD SERVER           │
│                                 │        │      (AWS EC2 / GCP Compute)    │
├─────────────────────────────────┤        ├─────────────────────────────────┤
│                                 │        │                                 │
│   ┌─────────────────────┐       │        │   ┌─────────────────────┐       │
│   │  Terminal Client    │       │        │   │    SSH Daemon       │       │
│   │  (MobaXterm/Tabby)  │       │        │   │    (Port 22)        │       │
│   └─────────────────────┘       │        │   └─────────────────────┘       │
│             │                   │        │             │                   │
│             │                   │        │             │                   │
│             ▼                   │        │             ▼                   │
│   ┌─────────────────────┐       │        │   ┌─────────────────────┐       │
│   │  SSH Client         │       │        │   │  Linux Shell        │       │
│   │  (Private Key)      │◄──────┼────────┼──►│  (Public Key)       │       │
│   └─────────────────────┘       │        │   └─────────────────────┘       │
│                       Encrypted │        │                                 │
│                       Connection│        │                                 │
│                       (SSH/TLS) │        │                                 │
│   ┌─────────────────────┐       │        │   ┌─────────────────────┐       │
│   │  PyCharm IDE        │       │        │   │  Python Interpreter │       │
│   │  (Local Editor)     │◄──────┼────────┼──►│  Libraries & Code   │       │
│   └─────────────────────┘       │        │   └─────────────────────┘       │
│             │           SFTP/SSH│        │             │                   │
│             ▼                   │        │             ▼                   │
│   ┌─────────────────────┐       │        │   ┌─────────────────────┐       │
│   │  Git Client         │       │        │   │  GPU/CPU            │       │
│   │  (Version Ctrl)     │       │        │   │  (nvidia-smi)       │       │
│   └─────────────────────┘       │        │   └─────────────────────┘       │
│                                 │        │                                 │
└─────────────────────────────────┘        └─────────────────────────────────┘

Connection Flow:
1. Launch cloud instance → 2. Generate SSH keys → 3. Connect via terminal
4. Configure environment → 5. Setup PyCharm remote → 6. Deploy & debug code
```

Cloud Platform Fundamentals

☐ **What is a Dashboard?** - Navigate cloud provider interfaces

☐ **Going Over the Document: How to Make an EC2 Instance with AWS** - Launch and configure EC2 instances

- Change instance type - Modify CPU/RAM resources
- Stop instances - Pause instances to save costs
- Terminate instances - Permanently delete instances
- IP address changes - Handle dynamic/static IP addresses
- Elastic IP - Reserve static IP addresses
- Security groups - Configure firewall rules
- Key pairs - Manage SSH authentication

Terminal Setup

- ☐ **Terminal (MobaXterm, Tabby)** - Install and configure terminal emulator
- ☐ **Useful Terminal Commands** - Master essential Linux commands
  - `ls` - List directory contents
  - `cd` - Change directory
  - `pwd` - Print working directory
  - `mkdir` - Create directory
  - `rm` - Remove files/directories
  - `cp` - Copy files/directories
  - `mv` - Move/rename files
  - `chmod` - Change file permissions
  - `chown` - Change file ownership
  - `nano` / `vim` - Text editors
  - `top` - Process monitoring
  - `htop` - Interactive process viewer
  - `nvidia-smi` - NVIDIA GPU monitoring
  - `nvtop` - Interactive GPU process viewer
  - `screen` - Keep processes running after disconnect
    - `screen -S mywork` - Start new session named "mywork"
    - `Ctrl+A, D` - Detach from session (keeps running)
    - `screen -ls` - List all screen sessions
    - `screen -r mywork` - Reattach to session "mywork"
    - `exit` - Close current screen session

SSH Configuration

- ☐ **SSHing (AWS Mac and Windows)** - Establish secure shell connections

File Transfer (SFTP)

- ☐ **SFTP File Management** - Transfer and browse remote files securely
  - MobaXterm - Built-in SFTP browser (left sidebar)

- FileZilla - Standalone SFTP client for file transfers
- PyCharm - Integrated remote file browser and sync

PyCharm IDE Setup

- ☐ **PyCharm Setup** - Install and configure PyCharm Professional
- ☐ **PyCharm Folder Mapping** - Sync local and remote directories
- ☐ **PyCharm Remote Interpreter** - Execute code on remote Python environment
- ☐ **PyCharm SSH** - Connect PyCharm to remote server
- ☐ **PyCharm SSH Debugging** - Debug code on remote server
- ☐ **PyCharm Git** - Version control integration
- ☐ **PyCharm Projects and Coding** - Develop and test applications

Google Cloud Platform (GCP)

- ☐ **GCP Coupons** - Activate free credits
- ☐ **GCP SSH Key Generator** - Create authentication keys
- ☐ **GCP Compute Engine** - Launch GCP virtual machines
- ☐ **GCP Cloud Storage** - Use cloud object storage
- ☐ **GCP and PyCharm** - Integrate GCP with PyCharm
- ☐ **GCP and PyCharm SSH** - Connect PyCharm to GCP instances

Troubleshooting & Advanced Topics

- ☐ **Change IP Each Time the Instance Is Restarted** - Handle dynamic vs static IPs
- ☐ **Change Instance Type** - Modify compute resources

Completion Notes

Once completed, you should have functional cloud instances on AWS/GCP, working SSH connections, PyCharm configured for remote development, and the ability to deploy and manage cloud-based applications.