1. **Set Up an AWS Account and Instance**: Create and configure an AWS EC2 instance with Ubuntu 20.04 LTS.
2. **Install ROS Noetic on the Cloud Instance**: Set up the necessary repositories, install ROS Noetic, and configure the environment for usage.
3. **Test and Configure ROS Environment**: Ensure the environment is correctly set up, and source the ROS setup in your terminal.

Step 1: Set Up an AWS EC2 Instance

1. **Log in to your AWS Account**:
    - Go to the **AWS Management Console** and navigate to **EC2** (Elastic Compute Cloud) to create a new instance.
2. **Launch an Ubuntu 20.04 LTS EC2 Instance**:
    - Click on **Launch Instance**.
    - Choose **Ubuntu Server 20.04 LTS** as the Amazon Machine Image (AMI).
    - Select the **t2.micro** instance type (General purpose, 1 vCPU, 1 GiB memory).
    - Allocate **30 GB of storage** (as specified in the requirements).
3. **Configure Security Group**:
    - Configure the security group to allow SSH access by setting **Inbound Rules** to include port 22 for SSH.
    - Optionally, include other ports if you intend to run additional applications or need to access the instance externally.

4. **Launch the Instance and Connect**:
    - Launch the instance and use SSH to connect. For example, if using a terminal, run:

bash

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```
ssh -i /path/to/your-key.pem ubuntu@your-ec2-public-dns
```

Step 2: Install ROS Noetic on the EC2 Instance

Once you're connected to the EC2 instance, proceed with the ROS Noetic installation as per the provided instructions.

1. **Update Package Lists**:

bash

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```
sudo apt update
```

2. **Configure Ubuntu Repositories for ROS**:
    - Ensure that your repositories are correctly set up to include ROS package sources.

bash

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```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
```

3. **Add the ROS Package Key**:
    - Install curl if it's not already installed.

bash

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```
sudo apt install curl
```

- Add the ROS key.

bash

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```
curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -
```

4. **Install ROS Noetic**:
    - Update the package index again.

bash

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```
sudo apt update
```

- Install the recommended full version of ROS Noetic (Desktop-Full).

bash

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```
sudo apt install ros-noetic-desktop-full
```

5. **Environment Setup**:
    - Source the ROS setup file to configure your environment every time you start a new session.

bash

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```
echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc
source ~/.bashrc
```

Step 3: Configure and Test the ROS Installation

1. **Initialize rosdep**:
    - rosdep is a dependency management tool in ROS. Initialize it as follows:

bash

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sudo apt install python3-rosdep

sudo rosdep init

rosdep update

2. **Verify ROS Installation**:
    - Run a basic ROS command to check that it's properly set up.

bash

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roscore

    - roscore should start without issues, indicating that ROS is ready to use.

3. **Optional: Run a Simple ROS Simulation**:
    - If you want to test the installation further, you can run a simple ROS package such as turtlesim.

bash

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sudo apt install ros-noetic-turtlesim

rosrun turtlesim turtlesim_node