Canonical

Ubuntu on IBM

Canonical

Contents

Ubuntu on IBM is a set of customized Ubuntu images that allow easy access to a wide range of products and services - offered by both IBM cloud and Canonical. These images have an optimized kernel that boots faster, has a smaller footprint and includes IBM-specific drivers.

These images provide a foundation for deploying cloud-based software solutions, specifically for software built on Ubuntu and running on IBM cloud. They focus on providing the optimal tools and features needed to run specific workloads.

The images create a stable and secure cloud platform that is ideal for scaling development work done on Ubuntu-based systems. Since Ubuntu is one of the most favored operating systems among developers, using an Ubuntu-based image for the corresponding cloud deployment becomes the simplest option.

Everyone from individual developers to large enterprises use these images for developing and deploying their softwares. For highly regulated industries from the government, medical and finance sectors, various security-certified images are also available.

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1. In this documentation

How-to guides (page 4)

Step-by-step guides covering key operations and common tasks related to using Ubuntu images on IBM Cloud.

Explanation (page 19)

Discussion and clarification of key topics, such as our offerings on IBM Cloud and an overview of available security features.

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2. Project and community

Ubuntu on IBM is a member of the Ubuntu family and the project warmly welcomes community projects, contributions, suggestions, fixes and constructive feedback.

- Get support[1]
- Join our online chat[2]
- Discuss on Matrix[3]
- Talk to us about Ubuntu on IBM[4]
- *Contribute to these docs* (page 21)
- Code of conduct[5]

2.1. How-to guides

These guides provide instructions for using Ubuntu images on IBM Cloud. They include operations such as finding images, launching an Ubuntu instance, and upgrading from one version of Ubuntu to another.

- *Find Ubuntu images on IBM Cloud* (page 4)
- *Launch an Ubuntu instance on IBM Cloud* (page 5)
- *Upgrade from Ubuntu 20.04 LTS to Ubuntu 22.04 LTS* (page 7)
- *Upgrade from Ubuntu 22.04 LTS to Ubuntu 24.04 LTS* (page 11)

2.1.1. Find Ubuntu images on IBM Cloud

Using the web console

IBM VPC infrastructure

IBM Classic infrastructure (legacy)

On your IBM Cloud console, you can find the latest Ubuntu images by navigating to *VPC Infrastructure* > *Compute* > *Images* > *Stock Images* > and then searching for `Ubuntu` in the *Search Images* search bar.

On your IBM Cloud console, you can find the latest Ubuntu images by selecting `Ubuntu` as the operating system vendor under *Classic Infrastructure* > *Devices* > *Device List* > *Order +* > *Virtual Server for Classic* > *Operating System* > *Ubuntu*

[1] https://ubuntu.com/cloud/public-cloud
[2] https://discourse.ubuntu.com/c/project/public-cloud/176
[3] https://matrix.to/#/#ubuntu-cloud:ubuntu.com
[4] https://ubuntu.com/ibm#get-in-touch
[5] https://ubuntu.com/community/docs/ethos/code-of-conduct

Using the CLI

IBM VPC infrastructure

IBM Classic infrastructure (legacy)

For a programmatic way to find the latest Ubuntu images, you can use the IBM Cloud CLI along with grep to filter the output.

```
ibmcloud is images --visibility "public" --status available | grep "ubuntu"
```

For further information about this command, refer to IBM's CLI documentation on is_images[6].

For a programmatic way to find the latest Ubuntu images, you can use the IBM Cloud CLI along with grep to filter the output.

```
ibmcloud sl image list --public --name "Ubuntu"
```

For further information about this command, refer to IBM's CLI documentation[7].

2.1.2. Launch an Ubuntu VSI on IBM Cloud

To launch a Virtual Server Instance (VSI) with Ubuntu on IBM Cloud, you can use either the IBM Cloud web console or the CLI.

Note:

A Virtual Server Instance (VSI) is IBM's equivalent of a virtual machine. For more information, refer to IBM's documentation about VSI[8].

[8] https://cloud.ibm.com/docs/vpc?topic=vpc-about-advanced-virtual-servers

Before starting, ensure that you have an active IBM Cloud account. If you don't, you can sign up for one[9].

Using the web console

On the IBM Cloud web console:

- Go to *VPC Infrastructure* > *Compute*> *Virtual server instances*>, and select *Create +* to open the virtual server creation form.
- Enter a unique name for your VSI in the *Name* field.
- Under the image section, go to *Change image* > *Stock Images* and search for "Ubuntu" in the search bar to select the Ubuntu OS of your preference.
- Choose the desired profile for your VSI under the *Profile* section.
- Select an existing ssh key or create a new one using *Add SSH key*.
- Customize any other settings as needed and select *Create virtual server* to launch your VSI.

[6] https://cloud.ibm.com/docs/vpc?topic=vpc-vpc-reference#images-list
[7] https://cloud.ibm.com/docs/cli?topic=cli-sl-manage-compute-images#sl_image_list
[9] https://cloud.ibm.com/registration

Using the CLI

Install and configure the CLI

To install the CLI, follow the IBM instructions for installing CLI[10]. Once installed, authenticate with your IBM Cloud account, by running:

```
ibmcloud login
```

Install the VPC infrastructure plugin:

```
ibmcloud plugin install vpc-infrastructure
```

Set VPC CLI to use generation 2:

```
ibmcloud is target --gen 2
```

Create an SSH key pair

SSH key pairs are needed to log in to a VSI from your local machine. To create one, follow the IBM instructions for creating key pairs[11].

Find an Ubuntu image

Use *Find Ubuntu images* (page 4) to find an appropriate Ubuntu image and its ID.

Choose a zone and region

When creating a VSI, you'll need to specify a region and zone for the VSI to be created in. For a list of available regions and zones, refer to IBM's documentation about regions[12].

Set the region (e.g. us-south):

```
ibmcloud is target --region us-south
```

Create other needed resources

If you don't have an existing VPC, subnet and security group, set them up by following IBM's instructions for creating VPC resources[13]. Note the created VPC ID for later use.

For existing VPCs, you can list them using:

```
ibmcloud is vpcs
```

[10] https://cloud.ibm.com/docs/cli?topic=cli-getting-started
[11] https://cloud.ibm.com/docs/vpc?topic=vpc-managing-ssh-keys&interface=cli
[12] https://cloud.ibm.com/docs/vpc?topic=vpc-creating-a-vpc-in-a-different-region&interface=cli
[13] https://cloud.ibm.com/docs/vpc?topic=vpc-creating-vpc-resources-with-cli-and-api&interface=cli#creating-a-vpc-using-cli

Launch the VSI

Create the VSI using:

```
ibmcloud is instance-create MyInstance \
         <vpc-id> <zone> <instance-type> <image-id> \
         --keys <ssh-key-id>
```

Replace `<vpc-id>`, `<zone>`, `<image-id>` and `<ssh-key-id>` with the information gathered above. If you need help deciding on the instance-type refer to IBM's documentation on instance profiles[14].

An example command with the image ID for Ubuntu 24.04 LTS (and other IDs hidden) would look something like this:

```
ibmcloud is instance-create MyUbuntuInstance \
         xxxx-xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx us-south-1 bx2-2x8 \
         r006-3a44e4ee-9c9f-4693-98ae-fced7a46ffce \
         --keys xxxx-xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
```

The command initiates the creation of your VSI and may take a few minutes to complete.

Access Your VSI

After the instance is provisioned, access it via SSH:

```
ssh -i ~/.ssh/id_rsa ubuntu@<Instance-Public-IP>
```

where *<Instance-Public-IP>* is the public IP address of your new VSI.

Terminate Your VSI

When you are finished with your VSI, you can terminate it using:

```
ibmcloud is instance-delete <instance-id>
```

2.1.3. Upgrade from Focal to Jammy on IBM Cloud

Introduction

This how-to guide explains how to upgrade from Focal (Ubuntu 20.04) to Jammy (Ubuntu 22.04) on both IBM VPC and IBM Classic using the *do-release-upgrade* command. Despite many differences between the two, the upgrade process is identical for both IBM VPC and IBM Classic.

[14] https://cloud.ibm.com/docs/vpc?topic=vpc-profiles&interface=ui

General Advice

Once you have decided to upgrade your system, the next question is how? There are two options depending on whether your system is setup/deployed with automation or whether it requires manual configuration.

For fully automated system deployments it is recommended to redeploy with new Jammy instances instead of upgrading from Focal.

For systems that cannot be easily created or destroyed and require manual configuration, running do-release-upgrade[15] is a good option. However this option requires some *manual intervention* (page 8) as explained below.

Getting started

Ensure your machine is updated and running the latest kernel:

```
sudo apt update
sudo apt upgrade
sudo reboot
```

Run the following command to start the upgrade process:

```
sudo do-release-upgrade
```

Manual intervention steps

While upgrading from Focal to Jammy, manual decision making will be needed for the following options that are presented.

Additional SSH daemon

When upgrading in a session over SSH there is an inherent risk of losing access if something goes wrong with the SSH daemon. To mitigate this risk an additional SSH daemon is started on a different port as a backup.

The prompt notifies you that an additional SSH daemon will be started and you can either continue or cancel the upgrade.

[15] https://manpages.ubuntu.com/manpages/jammy/en/man8/do-release-upgrade.8.html

```
Reading cache

Checking package manager

Continue running under SSH?

This session appears to be running under ssh. It is not recommended
to perform a upgrade over ssh currently because in case of failure it
is harder to recover.

If you continue, an additional ssh daemon will be started at port
'1022'.
Do you want to continue?

Continue [yN] 
```

Update sources.list

Since the IBM VPC Focal image is configured to use internal mirrors by default, the `sources.list` entries will likely need to be updated from 'focal' to 'jammy'. Confirm 'Y' on the prompt to automatically update the `sources.list` entries.

```
 kB]
Get:40 http://mirrors.adn.networklayer.com/ubuntu focal-security/multiverse amd64 Packages [22.2 kB]
Get:41 http://mirrors.adn.networklayer.com/ubuntu focal-security/multiverse Translation-en [5376 B]
Get:42 http://mirrors.adn.networklayer.com/ubuntu focal-security/multiverse amd64 c-n-f Metadata [50
8 B]
Fetched 24.7 MB in 6s (3952 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done

Checking for installed snaps

Calculating snap size requirements

Updating repository information

No valid mirror found

While scanning your repository information no mirror entry for the
upgrade was found. This can happen if you run an internal mirror or
if the mirror information is out of date.

Do you want to rewrite your 'sources.list' file anyway? If you choose
'Yes' here it will update all 'focal' to 'jammy' entries.
If you select 'No' the upgrade will cancel.

Continue [yN] 
```

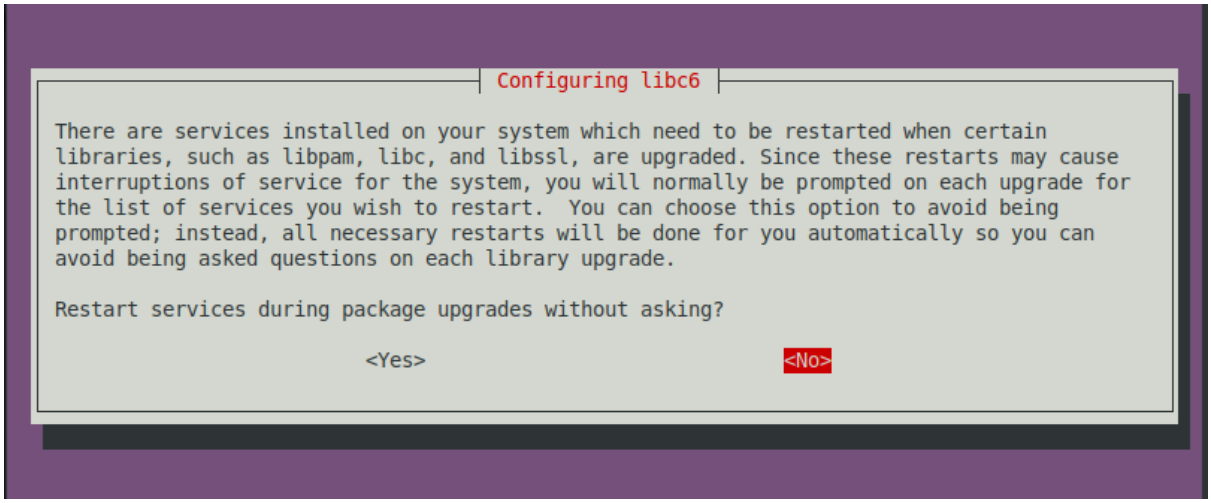
Start upgrade

A final prompt is provided before starting the upgrade. It gives information about the number of changes and the estimated time to complete because once started, the upgrade process cannot be canceled. At this stage you can continue, cancel or see additional details.

```
Get:47 http://mirrors.adn.networklayer.com/ubuntu jammy-security/multiverse Translation-en [900 B]
Get:48 http://mirrors.adn.networklayer.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [22
8 B]
Fetched 26.0 MB in 6s (4247 kB/s)

Checking package manager
Reading package lists... Done
Building dependency tree
Reading state information... Done

Calculating the changes

Calculating the changes

Do you want to start the upgrade?


4 packages are going to be removed. 91 new packages are going to be
installed. 551 packages are going to be upgraded.

You have to download a total of 308 M. This download will take about
1 minute with your connection.

Installing the upgrade can take several hours. Once the download has
finished, the process cannot be canceled.

 Continue [yN]  Details [d]
```

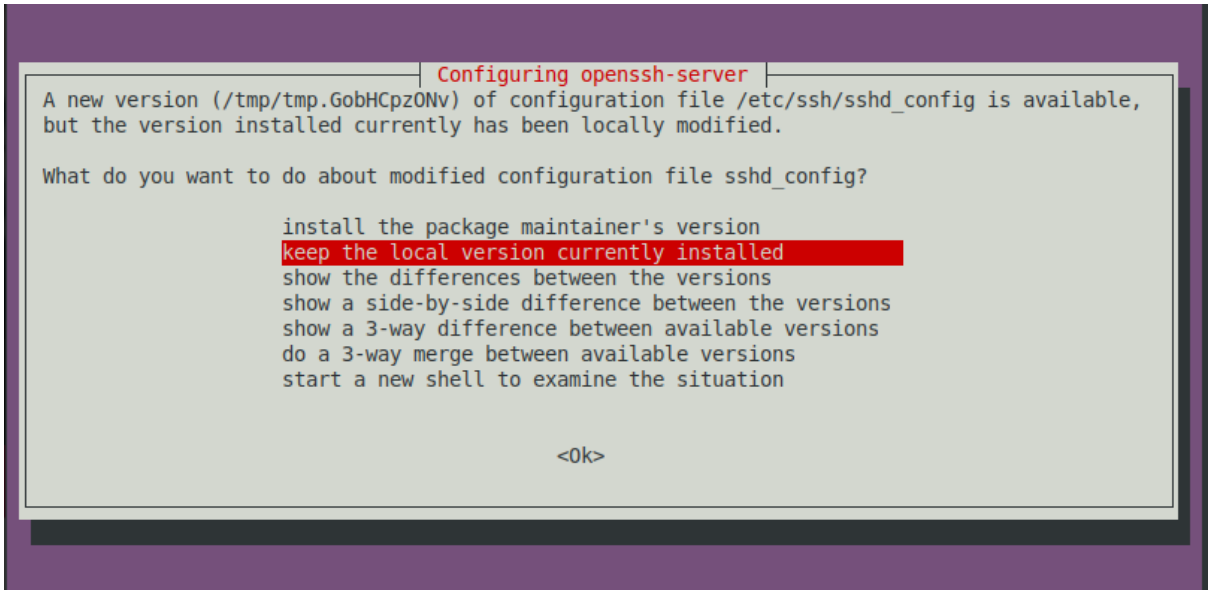
Restart services automatically

During the upgrade of certain libraries, some services have to be restarted. You have the option of allowing the services to be restarted automatically during the upgrade. If you select 'no' here, you'll be asked about the services that you want to restart after each library upgrade.



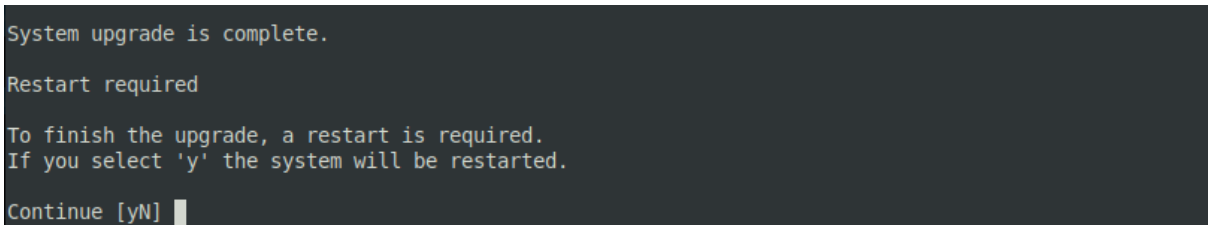
SSHD configuration modified

Canonical makes changes to `/etc/ssh/sshd_config` for IBM VPC images. As a result, during upgrade you'll see a prompt notifying you about the availability of a newer version of the sshd_config file. You'll be asked if you want to keep the existing modified version, use the default one from the new upgrade or take some other action.



Restart to finish upgrade

Finally, a restart will be necessary for some parts of the upgrade to be applied. If you select no, you can use `/var/run/reboot-required.pkgs` to check for the packages that need a reboot.



2.1.4. Upgrade from Jammy to Noble on IBM Cloud

Introduction

This how-to guide explains how to upgrade from Jammy (Ubuntu 22.04) to Noble (Ubuntu 24.04) on both IBM VPC and IBM Classic using the *do-release-upgrade* command. Despite many differences between the two, the upgrade process is identical for both IBM VPC and IBM Classic.

General Advice

Once you have decided to upgrade your system, the next question is how? There are two options depending on whether your system is setup/deployed with automation or whether it requires manual configuration.

For fully automated system deployments it is recommended to redeploy with new Noble instances instead of upgrading from Jammy.

For systems that cannot be easily created or destroyed and require manual configuration, running do-release-upgrade[16] is a good option. However this option requires some *manual intervention* (page 12) as explained below.

Getting started

Ensure your machine is updated and running the latest kernel:

```
sudo apt update
sudo apt upgrade
sudo reboot
```

Run the following command to start the upgrade process:

```
sudo do-release-upgrade
```

Manual intervention steps

While upgrading from Jammy to Noble, manual decision making will be needed for the following options that are presented.

Initial continue prompt

When you run the upgrade command, you'll be prompted to continue. This is the first step in the upgrade process. You can either continue or cancel the upgrade.

Type `y` and press Enter to continue.

[16] https://manpages.ubuntu.com/manpages/jammy/man8/do-release-upgrade.8.html

```
Checking for a new Ubuntu release

= Welcome to Ubuntu 24.04 LTS 'Noble Numbat' =

The Ubuntu team is proud to announce Ubuntu 24.04 LTS 'Noble Numbat'.

To see what's new in this release, visit:
  https://wiki.ubuntu.com/NobleNumbat/ReleaseNotes

Ubuntu is a Linux distribution for your desktop or server, with a fast
and easy install, regular releases, a tight selection of excellent
applications installed by default, and almost any other software you
can imagine available through the network.

We hope you enjoy Ubuntu.

== Feedback and Helping ==

If you would like to help shape Ubuntu, take a look at the list of
ways you can participate at

  http://www.ubuntu.com/community/participate/

Your comments, bug reports, patches and suggestions will help ensure
that our next release is the best release of Ubuntu ever.  If you feel
that you have found a bug please read:

  http://help.ubuntu.com/community/ReportingBugs

Then report bugs using apport in Ubuntu.  For example:

  ubuntu-bug linux

will open a bug report in Launchpad regarding the linux package.

If you have a question, or if you think you may have found a bug but
aren't sure, first try asking on the #ubuntu or #ubuntu-bugs IRC
channels on Libera.Chat, on the Ubuntu Users mailing list, or on the
Ubuntu forums:

  http://help.ubuntu.com/community/InternetRelayChat
  http://lists.ubuntu.com/mailman/listinfo/ubuntu-users
  http://www.ubuntuforums.org/


== More Information ==

You can find out more about Ubuntu on our website, IRC channel and wiki.
If you're new to Ubuntu, please visit:

  http://www.ubuntu.com/


To sign up for future Ubuntu announcements, please subscribe to Ubuntu's
very low volume announcement list at:

  http://lists.ubuntu.com/mailman/listinfo/ubuntu-announce


Continue [yN] 
```

Additional SSH daemon

When upgrading in a session over SSH there is an inherent risk of losing access if something goes wrong with the SSH daemon. To mitigate this risk an additional SSH daemon is started on a different port as a backup.

The prompt notifies you that an additional SSH daemon will be started and you can either continue or cancel the upgrade.

Type y and press Enter to continue.

```
Reading cache

Checking package manager

Continue running under SSH?

This session appears to be running under ssh. It is not recommended
to perform a upgrade over ssh currently because in case of failure it
is harder to recover.

If you continue, an additional ssh daemon will be started at port
'1022'.
Do you want to continue?

Continue [yN] 
```

Optional firewall configuration

The new SSH daemon will be started on a different port (1022) and you'll be asked if you want to update the firewall configuration to allow connections on this port. At this point, if you need to make changes, open a new terminal and ssh back into the instance (on port 22) and update the firewall configuration to allow connections on port 1022. If you need to make changes, follow the iptables instructions provided in the prompt.

Once you have made the changes, or are certain that you do not need to make any changes, type y and press Enter to continue.

```
Starting additional sshd

To make recovery in case of failure easier, an additional sshd will
be started on port '1022'. If anything goes wrong with the running
ssh you can still connect to the additional one.
If you run a firewall, you may need to temporarily open this port. As
this is potentially dangerous it's not done automatically. You can
open the port with e.g.:
'iptables -I INPUT -p tcp --dport 1022 -j ACCEPT'

To continue please press [ENTER]
```

Update sources.list

Since the IBM Classic Jammy image is configured to use internal mirrors by default, the `sources.list` entries will likely need to be updated from 'jammy' to 'noble'.

Type `y` and press enter to automatically update the `sources.list` entries.

```
Get:39 http://mirrors.service.networklayer.com/ubuntu jammy-security/main amd64 c-n-f Metadata [13.3 kB]
Get:40 http://mirrors.service.networklayer.com/ubuntu jammy-security/restricted amd64 Packages [2836 kB]
Get:41 http://mirrors.service.networklayer.com/ubuntu jammy-security/restricted Translation-en [498 kB]
Get:42 http://mirrors.service.networklayer.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [580 B]
Get:43 http://mirrors.service.networklayer.com/ubuntu jammy-security/universe amd64 Packages [961 kB]
Get:44 http://mirrors.service.networklayer.com/ubuntu jammy-security/universe Translation-en [205 kB]
Get:45 http://mirrors.service.networklayer.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [19.5 kB]
Get:46 http://mirrors.service.networklayer.com/ubuntu jammy-security/multiverse amd64 Packages [37.6 kB]
Get:47 http://mirrors.service.networklayer.com/ubuntu jammy-security/multiverse Translation-en [8260 B]
Get:48 http://mirrors.service.networklayer.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [224 B]
Fetched 37.9 MB in 6s (2622 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done

Checking for installed snaps

Calculating snap size requirements

Updating repository information

No valid mirror found

While scanning your repository information no mirror entry for the
upgrade was found. This can happen if you run an internal mirror or
if the mirror information is out of date.

Do you want to rewrite your 'sources.list' file anyway? If you choose
'Yes' here it will update all 'jammy' to 'noble' entries.
If you select 'No' the upgrade will cancel.

Continue [yN] 
```

Start upgrade

A final prompt is provided before starting the upgrade. It gives information about the number of changes and the estimated time to complete because once started, the upgrade process cannot be canceled. At this stage you can continue, cancel or see additional details.

```
Get:42 http://mirrors.service.networklayer.com/ubuntu noble-security/universe Translation-en [171 kB]
Get:43 http://mirrors.service.networklayer.com/ubuntu noble-security/universe amd64 c-n-f Metadata [13.5 kB]
Get:44 http://mirrors.service.networklayer.com/ubuntu noble-security/multiverse amd64 Packages [12.4 kB]
Get:45 http://mirrors.service.networklayer.com/ubuntu noble-security/multiverse Translation-en [2940 B]
Get:46 http://mirrors.service.networklayer.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [356 B]
Fetched 30.0 MB in 6s (4679 kB/s)

Checking package manager
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done

Calculating the changes

Calculating the changes

Do you want to start the upgrade?


3 installed packages are no longer supported by Canonical. You can
still get support from the community.

48 packages are going to be removed. 160 new packages are going to be
installed. 507 packages are going to be upgraded.

You have to download a total of 996 M. This download will take about
3 minutes with your connection.

Installing the upgrade can take several hours. Once the download has
finished, the process cannot be canceled.

 Continue [yN]  Details [d]
```

Auto-remove obsolete packages

After the upgrade is complete, you'll be asked if you want to remove obsolete packages. This is a good practice to keep your system clean and free of unnecessary packages.

Type `y` and press Enter to automatically remove obsolete packages.

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done

Processing snap replacements

refreshing snap lxd

Searching for obsolete software
Reading state information... Done

Remove obsolete packages?


49 packages are going to be removed.

 Continue [yN]  Details [d]
```

Restart to finish upgrade

Finally, a restart will be necessary for some parts of the upgrade to be applied. If you select no, you can use `/var/run/reboot-required.pkgs` to check for the packages that need a reboot.

```
(Reading database ... 115857 files and directories currently installed.)
Purging configuration files for irqbalance (1.9.3-2ubuntu5) ...
Purging configuration files for binutils-common:amd64 (2.42-4ubuntu2.3) ...
Purging configuration files for isc-dhcp-client (4.4.3-P1-4ubuntu2) ...
Purging configuration files for libblockdev2:amd64 (2.26-1) ...
Purging configuration files for python3.10-minimal (3.10.12-1~22.04.7) ...
Purging configuration files for libpython3.10-minimal:amd64 (3.10.12-1~22.04.7) ...
Purging configuration files for ubuntu-advantage-tools (34~24.04) ...
Purging configuration files for policykit-1 (124-2ubuntu1.24.04.2) ...
packages have been installed but needrestart is suspended
packages have been installed but needrestart is suspended
packages have been installed but needrestart is suspended

System upgrade is complete.

Restart required

To finish the upgrade, a restart is required.
If you select 'y' the system will be restarted.

Continue [yN] 
```

Re-connect and confirm upgrade

After the upgrade is complete, you'll be disconnected from the instance. Reconnect to the instance and confirm that the upgrade was successful.

Type `lsb_release -a` to check the release version. The output should show '24.04' as the release and 'Noble' as the codename.

```
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04.1 LTS
Release:        24.04
Codename:       noble
```

Celebrate

Congratulations! You have successfully upgraded your IBM Classic instance from Jammy to Noble.

Enjoy your instance running the latest Ubuntu LTS release with all the new features, improvements, and security updates.

2.2. Explanation

If you are curious about our offerings on IBM Cloud or about the security features available, then this is the place to look.

2.2.1. Canonical's offerings on IBM Cloud

Canonical and the Ubuntu community work together with IBM to ensure that Ubuntu works seamlessly across IBM platforms, including IBM Z and LinuxONE, IBM Power Systems and the IBM Cloud.

Canonical provides optimized Ubuntu LTS images with a custom kernel, minimal size, livepatch and support.

These images are available on IBM Cloud for both the IBM VPC infrastructure and the IBM Classic infrastructure.

IBM VPC vs IBM Classic infrastructures

IBM Cloud offers two types of infrastructures: IBM VPC infrastructure and IBM Classic infrastructure (Legacy). For new users, IBM only offers the VPC infrastructure. However, some long term users may still have access to the legacy Classic infrastructure.

IBM VPC offers multiple advantages over the legacy infrastructure such as better performance, scalability, and ease of use.

Ubuntu Pro

Ubuntu Pro is a comprehensive subscription for open-source software security and management running on Ubuntu LTS. It provides a suite of services, including advanced tooling and optional phone and ticket support, to give you confidence in the security of your Ubuntu infrastructure.

Ubuntu Pro can be enabled on any Ubuntu instance running in IBM Cloud. After setting up an account[17], attach the machine to your Ubuntu Pro subscription using the Pro client[18]. Once attached, run *pro status* to view available features:

```
SERVICE          ENTITLED  STATUS    DESCRIPTION
cc-eal           yes       disabled  Common Criteria EAL2 Provisioning Packages
cis              yes       disabled  Security compliance and audit tools
esm-apps         yes       enabled   Expanded Security Maintenance for Applications
esm-infra        yes       enabled   Expanded Security Maintenance for Infrastructure
fips             yes       disabled  NIST-certified core packages
fips-updates     yes       disabled  NIST-certified core packages with priority security
updates
livepatch        yes       enabled   Canonical Livepatch service
ros              yes       disabled  Security Updates for the Robot Operating System
ros-updates      yes       disabled  All Updates for the Robot Operating System

Enable services with: pro enable <service>
```

(continues on next page)

[17] https://documentation.ubuntu.com/pro/account-setup/
[18] https://documentation.ubuntu.com/pro-client/en/latest/howtoguides/how_to_attach/

(continued from previous page)

```
        Account: USER ACCOUNT
        Subscription: USER SUBSCRIPTION
        Valid until: 9999-12-31 00:00:00+00:00
        Technical support level: essential
```

Canonical Support

Ubuntu instances on IBM Cloud can receive 24/7 enterprise support[19] from Canonical. In addition to Ubuntu Pro services, a support contract entitles you to:

- Full access to our Knowledge Base
- Break-fix support
- Bug-fix support
- Phone and ticket communication channels

Flexible options allow for you to receive coverage on just the packages you need. Find additional details on our pricing[20] page and in our service description[21].

Community Support

Ad-hoc assistance can also be found on our community platforms like AskUbuntu[22] and Matrix[23].

2.2.2. Security features with Ubuntu on IBM Cloud

Ubuntu images on IBM Cloud include the security features provided by both Ubuntu and IBM Cloud. This explanation provides pointers to these features.

Ubuntu security features

Ubuntu on IBM provides all the security features available on Ubuntu Server. A detailed description of these features can be found on the Ubuntu security page[24] and in our explanation about Security in the Ubuntu cloud images[25]. For further guidance on usage refer to Ubuntu server's Introductory page on security[26].

[19] https://ubuntu.com/support
[20] https://ubuntu.com/pricing/pro
[21] https://ubuntu.com/legal/ubuntu-pro-description#ubuntu-pro-description
[22] https://askubuntu.com/
[23] https://documentation.ubuntu.com/project/community/contributors/matrix/onboarding/#matrix-onboarding
[24] https://ubuntu.com/security
[25] https://documentation.ubuntu.com/public-cloud/all-clouds-explanation/security-overview/
[26] https://documentation.ubuntu.com/server/explanation/intro-to/security/

IBM Cloud security features

IBM Cloud offers comprehensive security and data protection in the cloud. IBM cloud security[27] explains how users can benefit from the different security features.

2.3. Contribute to these docs

These docs are located on the GitHub repository named ubuntu-cloud-docs[28], and you'll need a GitHub account to make contributions. It is a good idea to fork this repository into your account before you start, otherwise, GitHub will prompt you to do so when you attempt your first change.

This documentation set is:

- structured using the Diátaxis[29] approach
- written in reStructuredText[30] as per the Canonical style guide[31]
- built with Sphinx[32]
- hosted on Read the Docs[33]

We are always looking for ways to improve our docs, so we appreciate your contributions!

2.3.1. Suggestions and questions

Use the *Give feedback* button to create a GitHub issue for any suggestions or questions that you might have.

2.3.2. Minor changes

On any page, if you find a problem that can be fixed with a small change, you can use the **pencil icon** next to the 'Give feedback' button to edit it directly on GitHub. When you are done with your edits, select *Commit changes…* to create a new branch and start a pull request (PR). Use *Propose changes* to submit the PR. We will review it and merge the changes.

2.3.3. New content

When adding new content, it's easier to work with the documentation on your local machine. Once the content is created, ensure that all checks pass and things looks satisfactory, before submitting a pull request (PR).

As a prerequisite, you'll need `make` and `python3` installed on your system.

[27] https://www.ibm.com/cloud/security
[28] https://github.com/canonical/ubuntu-cloud-docs
[29] https://diataxis.fr/
[30] https://canonical-starter-pack.readthedocs-hosted.com/stable/reference/rst-syntax-reference/
[31] https://docs.ubuntu.com/styleguide/en
[32] https://www.sphinx-doc.org/en/master/
[33] https://about.readthedocs.com/?ref=readthedocs.com

Download and install the docs

If you are working with these docs for the first time, you'll need to create a fork of the ubuntu-cloud-docs[34] repository on your GitHub account and then clone that fork to your local machine. Once cloned, go into the ubuntu-cloud-docs directory and run:

```
make install
```

This creates a virtual environment and installs all the required dependencies. You only have to do this step once and can skip it the next time you want to contribute.

Build and serve the docs

Use the `make run` command to build and serve the docs at `http://127.0.0.1:8000` or equivalently at `http://localhost:8000`. This gives you a live preview of the changes that you make (and save), without the need for a rebuild:

```
PROJECT=ibm make run
```

Setting the *PROJECT* parameter to `ibm` ensures that the documentation set for *Ubuntu on IBM* gets built. This parameter is needed to distinguish between the different documentation sets present in the repository.

Create content

Choose the appropriate folder for your content. The folders within each project are mapped to the Diátaxis[35] categories of tutorial, how-to guides, explanation and reference. If required, the categories can have subcategories as well, as shown in the tree structure below. Also, each folder includes an `index.rst` file, which acts as a landing page for the folder.

```
project/
├── tutorial
├── how-to-guides/
│   ├── subcategory-one/
│   │   ├── index.rst
│   │   ├── page-one.rst
│   │   ├── page-two.rst
│   │   └── page-three.rst
│   └── subcategory-two/
│   │   ├── index.rst
│   │   ├── page-one.rst
│   │   ├── page-two.rst
│   │   └── page-three.rst
│   └── index.rst
├── explanation
├── reference
└── index.rst
```

If your required category or subcategory is absent, create them using the instructions given below. Then add your content by creating a new page.

[34] https://github.com/canonical/ubuntu-cloud-docs
[35] https://diataxis.fr/

Create new categories (optional)

You can create new categories by following these steps:

1. Create a new folder in your documentation directory.
2. Create a new `index.rst` file within your new folder.
3. Add the title of your new category to the first line of the `index.rst` file. Underline it using equal signs (=) that match the length of your title. For more information on titles and headings, read the reStructuredText[36] style guide.
4. In the `index.rst` file, add content introducing the category, its purpose, and other relevant links.
5. In your `index.rst` file, add a toctree that specifies the file names of pages and the index files of the subcategories within your newly created category. The toctree should resemble the following structure:

```
.. toctree::
   :maxdepth: 2

   subcategory-one/index
   Subcategory two <subcategory-two/index>
   page-one-file-name
```

For more information, read the Sphinx documentation on toctree[37].

6. Update the project's main `index.rst` file by adding your new category to its toctree.

Create new subcategories (optional)

You can create new subcategories by following these steps:

1. Go to the parent category and create a new folder for your subcategory within it.
2. Create an `index.rst` file within the subcategory folder.
3. Enter the title of your new subcategory on the first line of the `index.rst` file. Underline it using equal signs (=) that match the length of your title. For more information on titles and headings, read the reStructuredText[38] style guide.
4. In the `index.rst` file, add content introducing the subcategory, its purpose, and other relevant links.
5. In your `index.rst` file, add a toctree that includes the file names or titles of pages within your new subcategory. The toctree should resemble the following structure:

```
.. toctree::
   :maxdepth: 1

   page-one-file-name
   Page Two Title <page-two-file-name>
```

[36] https://canonical-starter-pack.readthedocs-hosted.com/stable/reference/rst-syntax-reference/
[37] https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree
[38] https://canonical-starter-pack.readthedocs-hosted.com/stable/reference/rst-syntax-reference/

6. Update the `index.rst` file of the parent category by adding a reference to the newly created subcategory in its toctree.

Create new pages

You can create new pages by following these steps:

1. Create a new file within a category or subcategory.
2. Add a title to the first line of the file. Underline it using equal signs (=) that match the length of your title. For more information on titles and headings, read the reStructured-Text[39] style guide.
3. Add content to the new file using reStructuredText[40] and following the Canonical style guide[41].
4. Update the category or subcategory's `index.rst` file by adding the file name or your preferred title to the toctree. For more information, read the Sphinx documentation on toctree[42].

Perform checks and submit a PR

Before opening a PR, run the following checks and also ensure that the documentation builds without any warnings (warnings are treated as errors in the publishing process):

```
PROJECT=ibm make spelling
PROJECT=ibm make linkcheck
PROJECT=ibm make woke
```

If you need to add new words to the allowed list of words, include them in `.custom_wordlist.txt`.

Once all the edits are done, commit the changes and push it to your fork. From the GitHub GUI of your fork, select the commit and open a PR for it.

2.3.4. Maintaining Content

PR review

Once a PR is created, it will be reviewed by:

- relevant team members for technical accuracy and
- the team's Technical Author (TA) for verifying adherence to documentation standards

[39] https://canonical-starter-pack.readthedocs-hosted.com/stable/reference/rst-syntax-reference/
[40] https://canonical-starter-pack.readthedocs-hosted.com/stable/reference/rst-syntax-reference/
[41] https://docs.ubuntu.com/styleguide/en
[42] https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree

Periodic content review

A periodic review of the docs is necessary to ensure its accuracy. For this:

- The TA adds every new page to a maintenance list with details such as:
  - *Date checked*: The latest date on which the page was last reviewed
  - *Link to the page*: A URL to the page
  - *Owner*: The person who is able to verify the page's accuracy
  - *Specific content to be verified* (Optional)
- The TA has regular 1:1 meetings with every *Owner*. Any page that hasn't been checked for accuracy in the past 6 months is verified. If the verification cannot be completed during the meeting, a follow-up ticket is created for the same.