

# Ubuntu installation

March 2011 ~ November 2020

Editor: Matthew Paul Thomas

Past contributors: Michael Forrest, Evan Dandrea, Christina Li, Dimitri Ledkov

This is the design specification for the Ubuntu installer, replacing [the original specification from 2005](#).

Similar projects include the setup UI for [Wubi](#), for [Ubuntu for Android](#), [for Ubuntu Touch](#), and for [Subiquity](#).

[Design principles](#)

[Installer session](#)

["Welcome"](#)

["Try or install"](#)

["Turn off RST"](#)

["OEM ID"](#)

["Keyboard layout"](#)

["Connect to the Internet"](#)

["Checking for updates" / "Updating the installer"](#)

["Sorry" \(not enough disk space\)](#)

["Updates and other software"](#)

["Choose a kernel"](#)

["Turn off Secure Boot"](#)

["Installation type"](#)

["Advanced features"](#)

["Turn off BitLocker"](#)

["Allocate disk space" \(basic partitioning\)](#)

[Dealing with unresizable Windows installations](#)

["Allocate disk space" \(advanced partitioning\)](#)

[Implementation plan](#)

[Bugs not yet addressed by this redesign](#)

[Main screen](#)

[Adding/removing partitions or devices](#)

[Partitions and free space areas in the partition chart](#)

[Viewing/changing partition details](#)

[Purpose](#)

[File system](#)

[Size](#)

[Mount point](#)

[Label](#)

[Primary vs. logical partitions](#)

[Boot loader](#)

[LVM](#)

[Cheat sheet](#)

[Based on the old advanced partitioner](#)

[Creating a volume group](#)

[Renaming a volume group](#)

[General behavior when naming a group](#)

[Adding a physical volume to an existing volume group](#)

[Removing a physical volume from a volume group](#)

[Dismantling a volume group](#)  
[Based on the new advanced partitioner](#)  
[LUKS disk encryption](#)  
[Cheat sheet](#)  
[From the old advanced partitioner](#)  
[From the new advanced partitioner](#)  
[From the “Installation type” screen](#)  
[RAID setup](#)  
[Cheat sheet](#)  
[RAID levels compared](#)  
[Use cases](#)  
[Based on the old advanced partitioner](#)  
[Creating a new RAID array](#)  
[Adding/removing devices in an existing RAID array, and changing RAID level](#)  
[Changing other properties of an existing RAID array](#)  
[Based on the new advanced partitioner](#)  
[“Where are you?”](#)  
[“Who are you?”](#)  
[“Choose a picture”](#)  
[“Installing”](#)  
[“Installation complete”](#)  
[Implementation details](#)  
[Preseeding](#)  
[Installation](#)

## Design principles

Compared with other Ubuntu software, the installer should place *more* emphasis on these design principles:

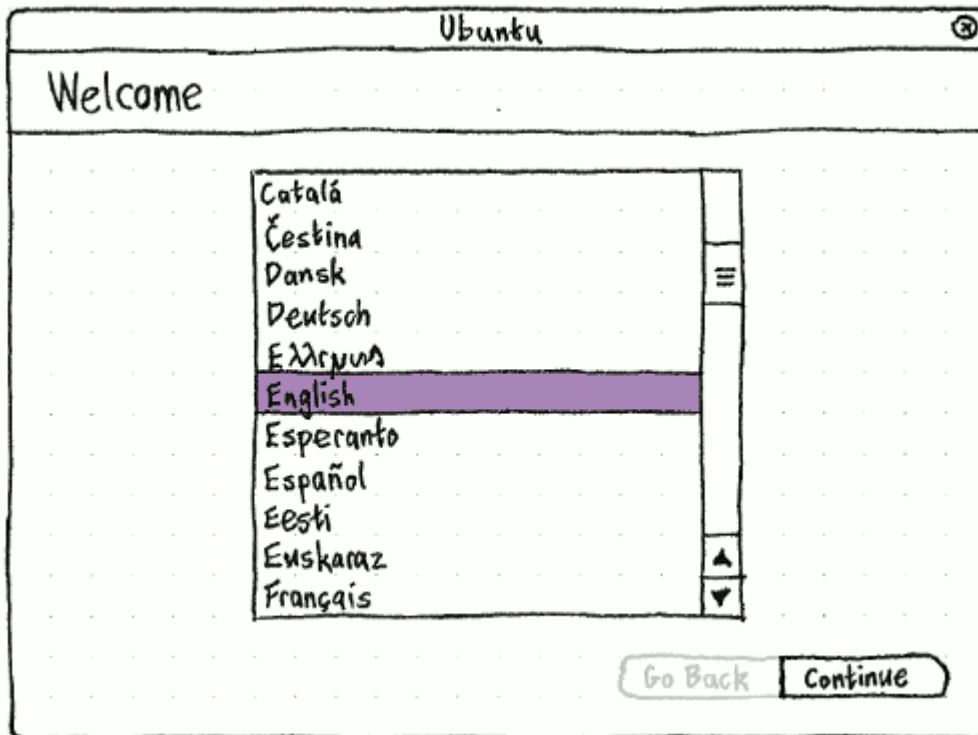
- **Universality.** Unlike with most other kinds of application, Ubuntu necessarily has only one choice of graphical installer. It must aim to satisfy all users who are sitting in front of a screen — regardless of their language, experience, accessibility needs, or unusual installation requirements.
- **Delight.** The installer is the first experience many new users will have of Ubuntu. The installation experience should be attractive and painless, reassuring new users that Ubuntu is the right choice.
- **Reliability.** The process should feel safe and should highlight risk only when necessary, for example when data will be destroyed.
- **Reduced secondary windows.** Installer users are likely to be new to Ubuntu, not familiar with our particular windowing conventions, and possibly dealing with poorly-configured display or input devices. So except in complex situations (like [setting up a RAID array](#)), the installer should avoid secondary windows. For example, errors should be presented inline rather than in alert boxes.

## Installer session

When running standalone (before you have chosen “Try Ubuntu”), the installer session should include a [menu bar](#) containing the [battery](#), [Bluetooth](#), [text entry](#), [networking](#), [sound](#), [clock](#), and [system](#) menus, but not the [messaging](#) menu. Once installation begins, the session commands in the system menu (“Log Out”, “Restart”, and “Shut Down”) should be disabled.

## “Welcome”

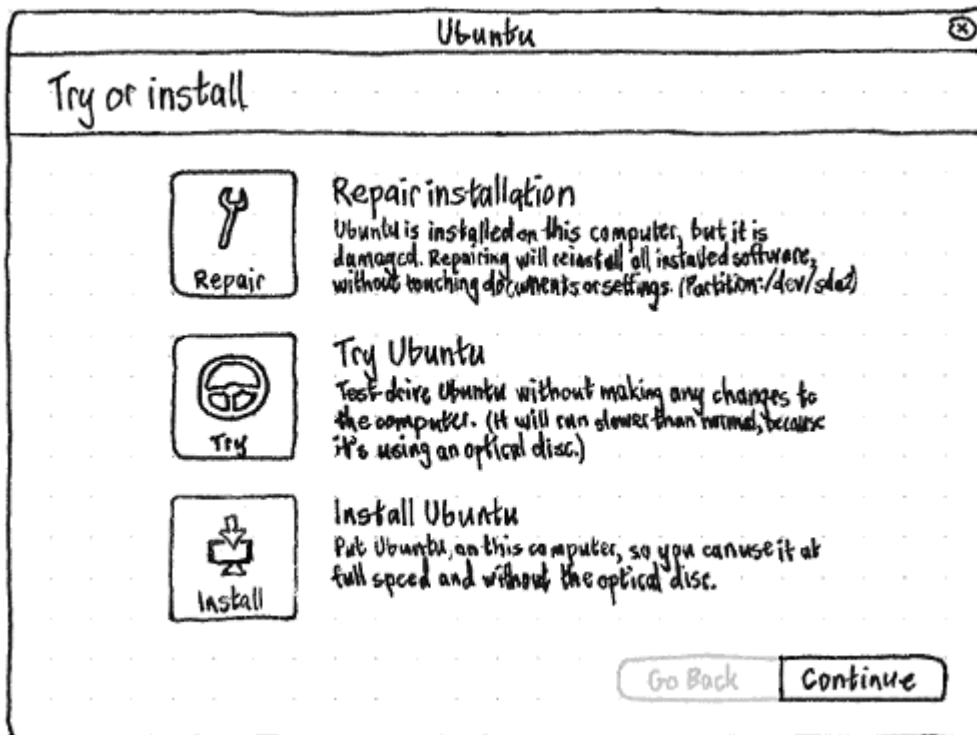
Once Ubuntu has started up, an “Ubuntu” window ([bug 750163](#)) should appear with a “Welcome” header and a list of languages. If a language can be detected on an already-installed OS, that language should be selected by default; otherwise, “English” should be selected by default.



The “Continue” button should update dynamically to reflect the selected language, helping to reassure you that you have chosen correctly.

*The visual design should not include any Ubuntu logo, as it may be distorted by low-resolution graphics before graphics drivers have been installed.*

## “Try or install”



Normally there should be two buttons:

- “Try”, with primary caption “Try Ubuntu”, and secondary caption “Test-drive Ubuntu without making any changes to the computer.”, and if necessary “(It will run slower than usual, because it is on a CD.)” or “(It will run slower than usual, because it is on a DVD.)”. If you choose this option, the window should close and the test-drive environment should load.
- “Install”, with primary caption “Install Ubuntu”, and secondary caption “Put Ubuntu on this computer, so you can use it at full speed and without the optical disc.”, or “Put Ubuntu on this computer, so you can use it at full speed and without the USB key.”. If you choose this option, the window title should change to “Install Ubuntu” for the rest of the process.

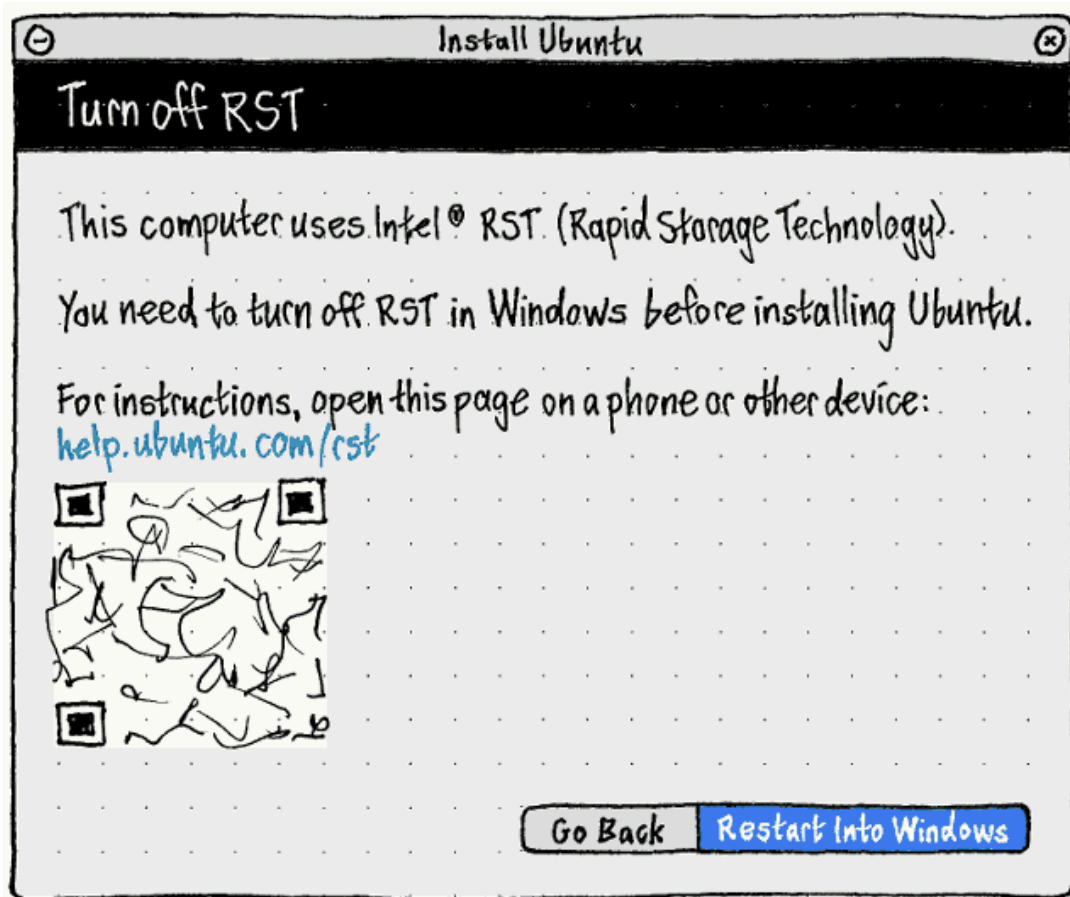
If the computer has a partition containing a damaged Ubuntu installation (as determined by `/var/log/apt/`), there should be an extra option before the other two:

- “Repair”, with primary text “Repair installation”, and secondary text “Ubuntu is already installed on this computer, but it is damaged. Repairing will reinstall all installed software, without touching your documents or settings. (Partition: {partition mount point})”. If you choose this option, the window title should change to “Repair Installation”, the repair should begin immediately, and the interface should skip ahead to [the slide show](#).

Future work: Integrate [more kinds of repair](#).

The hidden options on the welcome page, such as the changing of text when in OEM install mode, will be cleaned up and properly aligned under the install option.

## “Turn off RST”



Errata: "in Windows" should not be present, and "Restart Into Windows" should be "Restart".

The "Continue" button should be replaced by a "Restart" button.

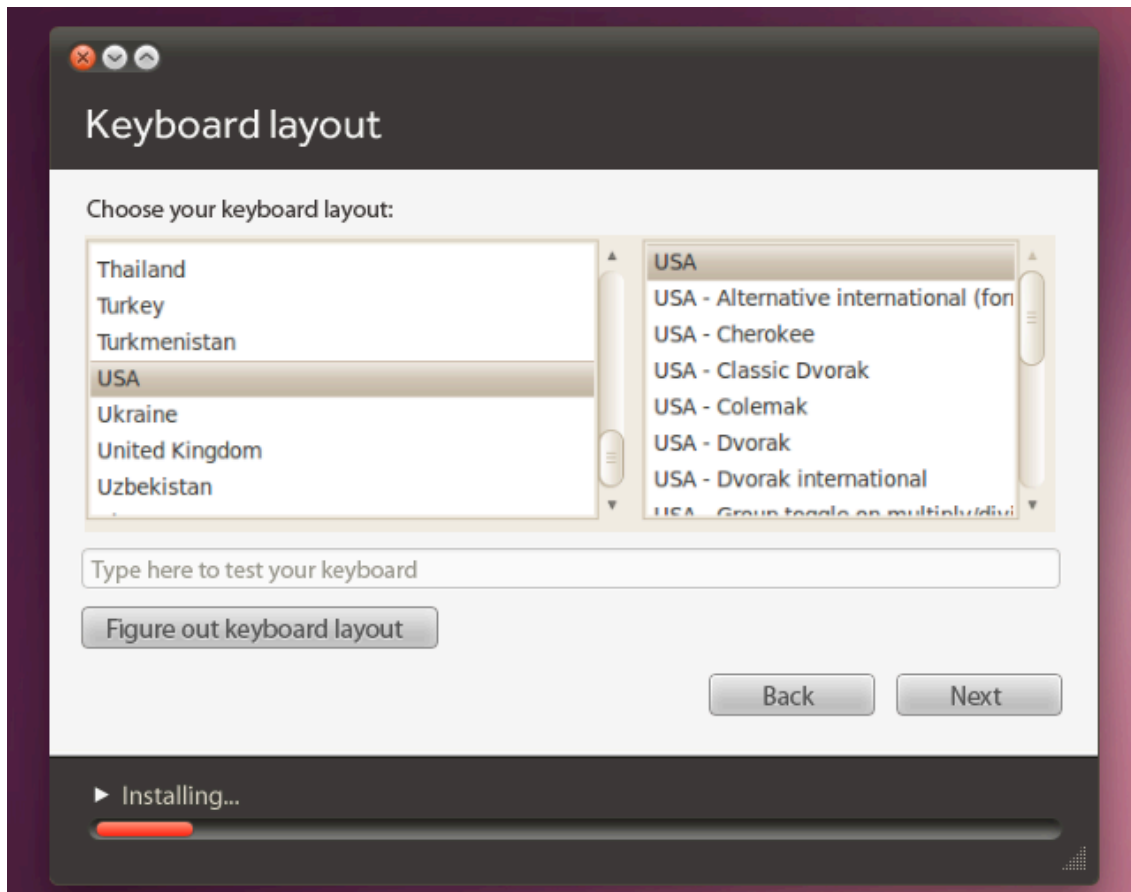
The layout and behavior is very similar to [the "Turn off BitLocker" step](#).

## "OEM ID"

"OEM ID" is a [keyboard-requiring step](#) ([bug 290421](#)).

## “Keyboard layout”

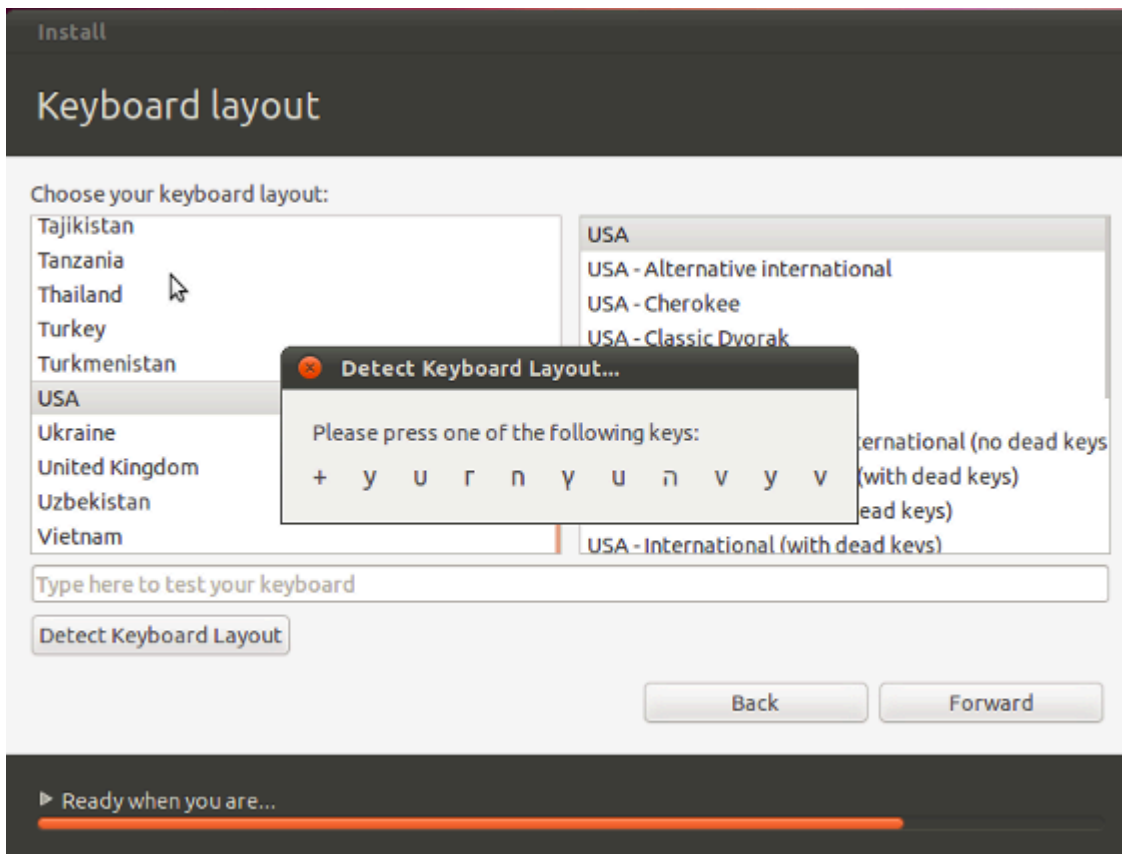
The “Keyboard layout” screen should appear *immediately before* whichever is the first **keyboard-requiring** step. This might be, for example, “[Connect to the Internet](#)”, “[Allocate disk space](#)”, or “[Where are you](#)”. (This is so that if you avoid keyboard-requiring steps until after disk changes begin, the installation will be quicker overall.)



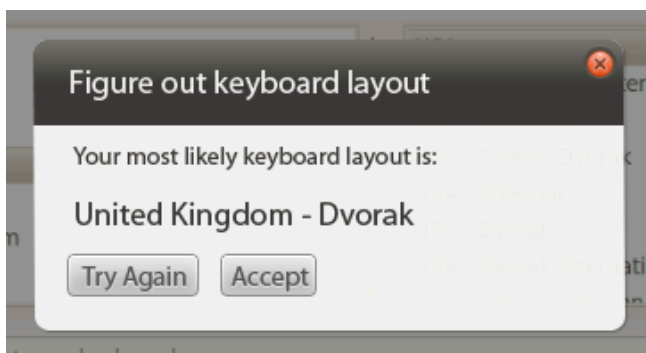
*Errata:*

- “Figure out keyboard layout” should be “I’m Not Sure...”.
- “Back” should be “Go Back”, and “Next” should be “Continue”.
- The “Installing...” progress bar should not be present.

If you choose “I’m Not Sure...”, a “Detect Keyboard Layout” dialog should appear with instructions for deducing the appropriate layout.



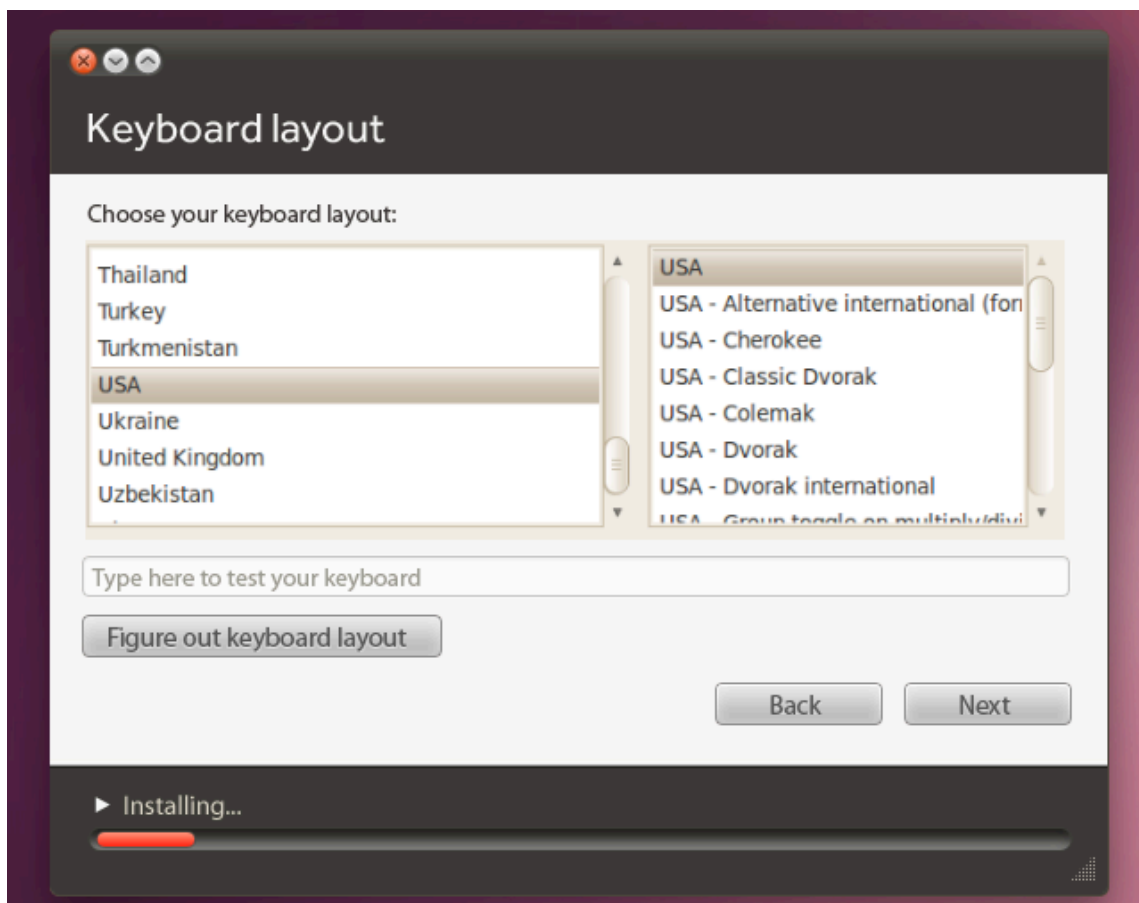
*Erratum: "Figure out keyboard layout" should be "Detect Keyboard Layout".*



*Erratum: "Try Again" and "Accept" should be on the right, not the left.*

Choosing "Accept" should close the dialog and show the calculated layout selected in the "Keyboard layout"

screen.



## “Connect to the Internet”

If you chose “Install Ubuntu” and the computer is not connected to the Internet ([bug 656706](#), [bug 831746](#)), the next step should be “Connect to the Internet” ([bug 1024192](#)). This is a [keyboard-requiring step](#), because you will likely need to enter a wi-fi password ([bug 871752](#)).



Install Ubuntu

Connect to the Internet

Connecting this computer to the Internet will help Ubuntu install any extra software needed and help choose your time zone.

Connect by Ethernet cable, or choose a wi-fi network.

✗ No wired connection detected.

☒ Connect to this wi-fi network:

▼ Broadcom BCM4312

📶 Albercah

🔒

📶 Brad\_living-room

🔒

📶 twisty

🔒

▲

▼

☐ Connect to a hidden wi-fi network:

☐ I don't want to connect to the Internet just now

Go Back

Connect...

☒ Connect to a wi-fi network

To use wi-fi on this computer, Ubuntu needs to install wi-fi driver software.

Install Driver Now

☐ I don't want to connect to the Internet just now

The intro text should be "Connecting this computer to the Internet will help Ubuntu choose your time zone and install any extra software needed."

If the computer does not have any recognized wi-fi cards, this should be followed by: "This computer doesn't seem to have any wi-fi networking. Try connecting by Ethernet cable." Otherwise, it should be followed by: "You can connect by Ethernet cable, or choose a wi-fi network."

Next should be the text "No wired connection detected" with a cross, or "Use wired connection" with a checked radio button. Then, if any recognized wi-fi cards are present:

- If any of them are turned on and the driver for at least one is installed, two more radio buttons:

9 / 48

- “Connect to this wi-fi network:”, with a list of detected wi-fi networks. In the rare case that there is more than one wireless card, the list should be organized into expanded-by-default branches labelled with the name of the wi-fi card ([bug 1542904](#)). A spinner should appear occasionally above the top right of the list to indicate that it is constantly updating.
- “Connect to a hidden Wi-Fi network:”, with a field for entering the network name;
- If all of them are turned off, the text “This computer’s Wi-Fi is turned off.” with a cross.
- If any of them are turned on but all of those require a driver that isn’t currently installed, the text “To use Wi-Fi on this computer, Ubuntu needs to install proprietary driver software.”, and an “Install Driver Now” button, that — if you click it — changes to the text “Installing...” and a progress bar.

And finally, a(nother) radio button, “I don’t want to connect to the Internet just now”.

The “Continue” button should be:

- disabled, whenever “Connect to a hidden Wi-Fi network:” is selected but the field does not contain a possible network name;
- “Connect...”, if “Connect to this Wi-Fi network:” and a particular network are selected, and that network will require further authentication;
- “Connect”, if “Connect to this Wi-Fi network:” and a particular network are selected, and that network will not require further authentication, or if “Connect to a hidden Wi-Fi network:” is selected;
- “Continue”, if “Use a wired connection” or “I don’t want to connect to the Internet just now” are selected.

If the selected network does require authentication, as soon as you choose “Connect...”, [the standard networking dialog](#) should open for you to enter those authentication details ([bug 1107935](#)). While trying to connect, the installer should stay on this screen, the “Connect” button should be disabled, the “Go Back” button should change to “Stop”, and a spinner should appear in the bottom leading corner with the text “Connecting...”. If it fails, the text should change to “Connection failed.” until you change anything further in this step (or try connecting again), whereupon the error text should disappear.

If connection succeeds, “Stop” should become disabled too, the spinner and “Connecting...” should change to a green checkmark and “Connected”.

*Future work: Add network proxy setup.*

## “Checking for updates”/“Updating the installer”

If the system is now connected to the Internet, the installer should switch to a “Checking for updates” screen, with with a horizontally and vertically centered indeterminate progress bar and the “Continue” button disabled, while it checks online to see if a critical update is available for the installer.

If a critical update is available, the header should change to “Updating the installer”, and the progress bar should become determinate, advancing to 50% as the download completes, then from 50% to 100% as the in-memory installation completes. Then the text “We’ll be right back...” should appear for five seconds below the progress bar, the installer should automatically restart itself, and it should advance to the next step.

If the update fails to download:

- the header should change to “Could not update the installer”
- the rest of the screen should change to the text “Ubuntu needs to install an update, but it can’t be

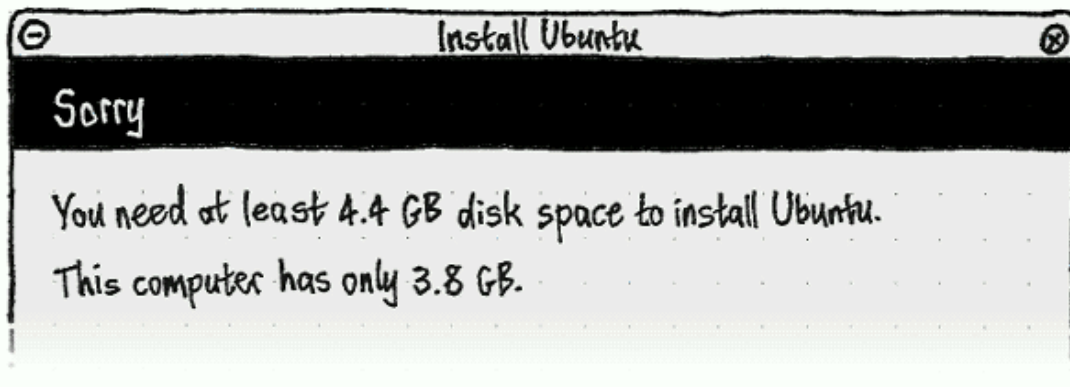
downloaded right now. Please try again in a few minutes.”

- the “Continue” button should change to “Retry”.

If no critical update is available, the installer should advance automatically to the next step.

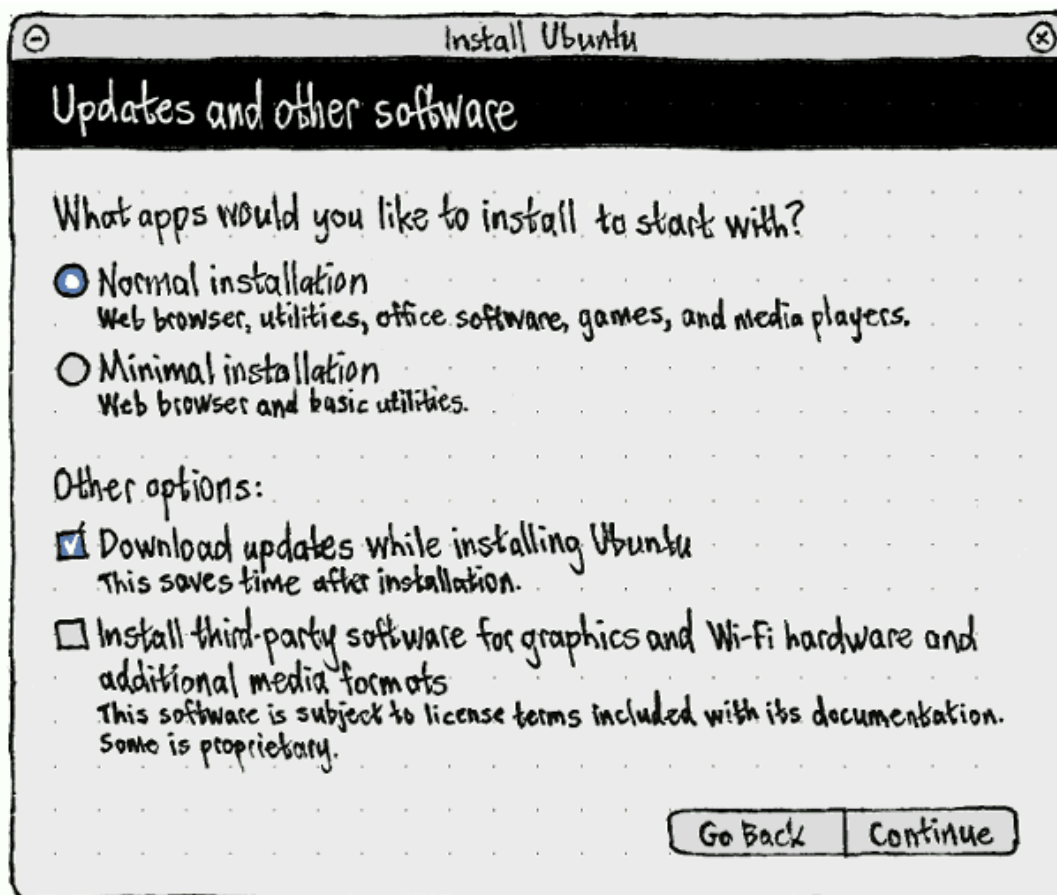
## “Sorry” (not enough disk space)

If the PC does not have any disk that Ubuntu can be installed on, the next step should explain the problem: “You need at least {minimum size} disk space to install Ubuntu.”, followed by either “This computer has only {size}.” or “The biggest disk on this computer is only {size}.”.



The “Continue” button should be disabled.

## “Updates and other software”



If the PC is not connected to a power source, this screen should begin with a ⚠ warning icon and the text "You should connect to power before continuing."

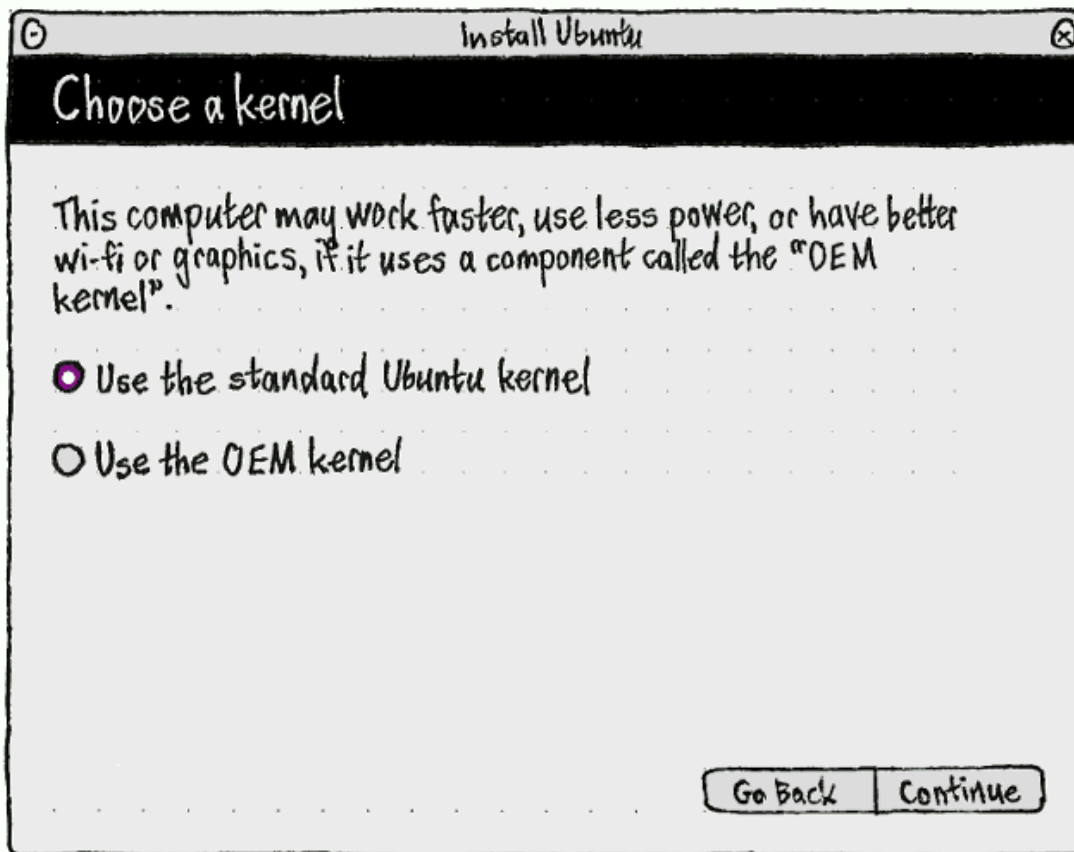
If there is enough disk space for a minimal installation but not a normal installation, the "Normal installation" radio button should be disabled, and the caption should instead be "There isn't enough disk space ({size} required, {size} available)".

The checkbox "Download updates while installing Ubuntu" should take the distribution name from `/cdrom/.disk/info`, as in other locations. If there is an Internet connection, the checkbox should be checked by default ([bug 940334](#)), and it should have the caption "This saves time after installation.". If there is no Internet connection, the checkbox should be both disabled and unchecked ([bug 723826](#)), and it should have the caption "Not available because there is no Internet connection".

The checkbox, "Install third-party software for graphics and Wi-Fi hardware and additional media formats" should be unchecked by default, to comply with [Tech Board policy](#). Its caption should be "This software is subject to license terms included with its documentation. Some is proprietary."

## "Choose a kernel"

This design is not recommended, because it does not present a useful choice. It is included here to show what the option would look like, as a basis for discussion.

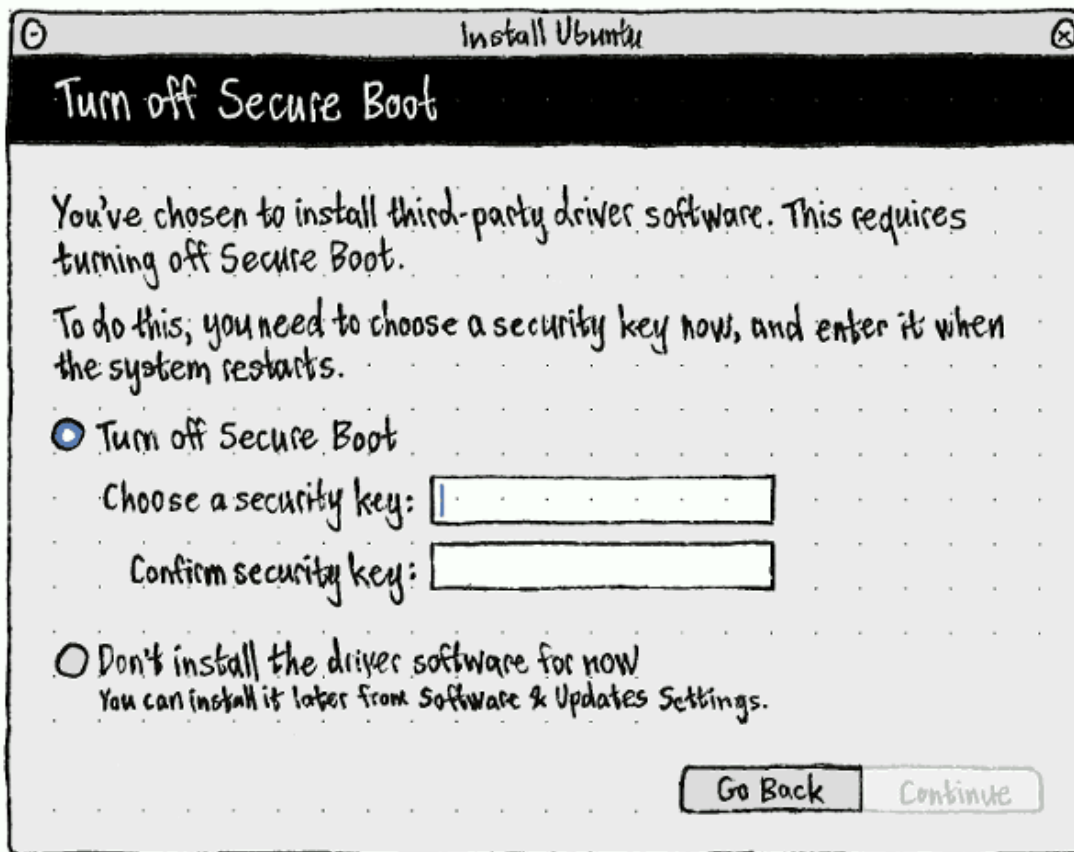


If this system is one where the OEM kernel is recommended, the next step should be "Choose a kernel". Per Tech Board policy, "Use the standard Ubuntu kernel" should be the default choice.

## "Turn off Secure Boot"

This screen should appear if all these are true:

- you chose "Install third-party software" in the previous step
- for this system, that third-party software includes hardware drivers
- the system is using UEFI Secure Boot.



Whenever “Turn off Secure Boot” is *not* chosen, the “Choose a security key:” and “Confirm security key:” fields should be both disabled and empty.

Whenever “Turn off Secure Boot” is chosen:

- If the first key field is unfocused, and not empty, but too short, “Too short” should appear alongside.
- If the fields do not match, “Continue” should be disabled.
- If the fields do not match, *and* both fields contain text, *and* the second field is not focused, “Keys don’t match” should appear alongside.

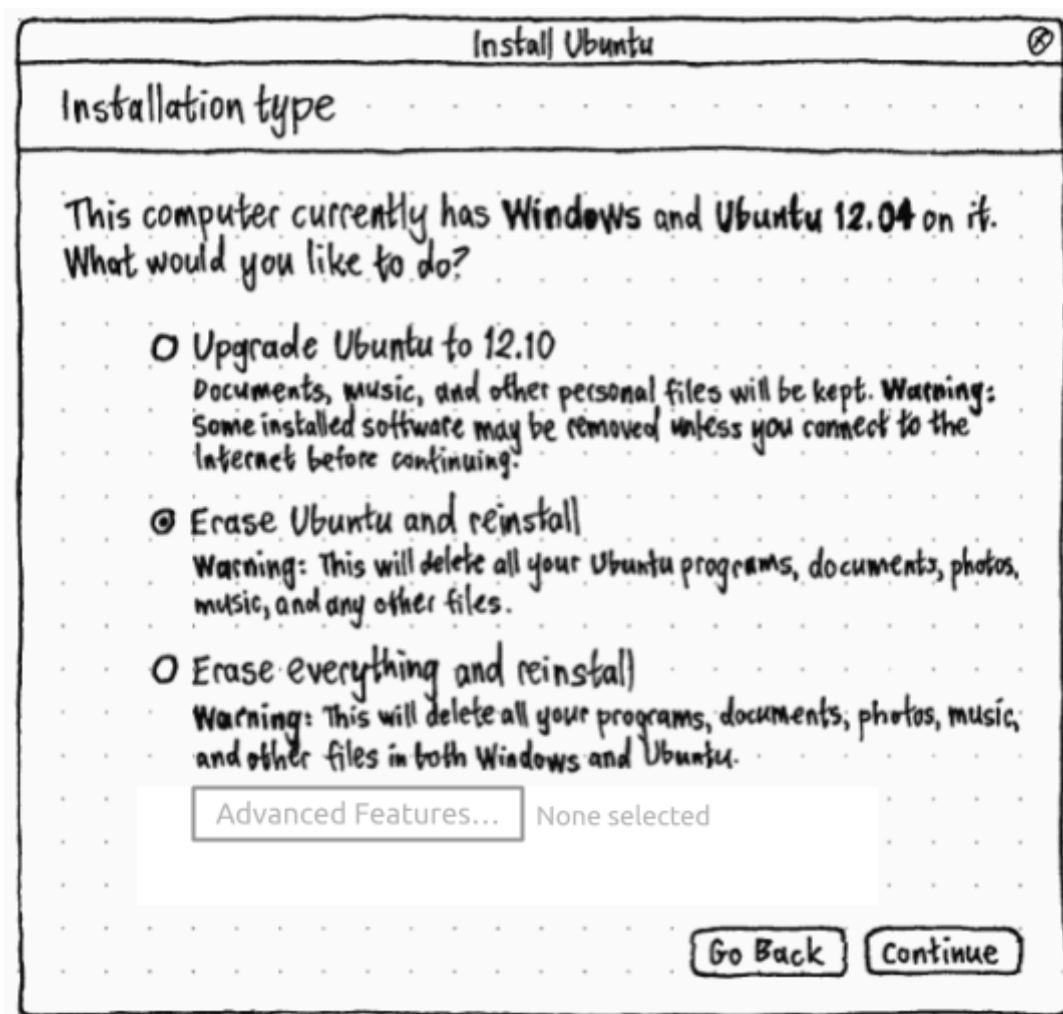
“Continue” should be disabled whenever “Turn off Secure Boot” is chosen and the key fields do not have matching valid values.

“is connected to the Internet” should no longer be in this screen ([bug 970765](#)), because the Internet connection was checked or set up earlier.

*Checking “Install this third-party software” should result in ubuntu-restricted extras being added to /var/lib/ubiquity/apt-installed and Jockey being told that it can install non-free drivers. We may need to modify Jockey to understand this distinction when making a selection. We may need to run libdvdcss.sh as part of scripts/install.py.*

## “Installation type”

The next step, “Installation type”, should show options depending on which other operating systems are on the computer and how much free space there is.



Should "Restore from backup" go here? If not, where? (Install from scratch / Restore from backup / Migrate from a previous Ubuntu PC)

In the intro, the identified operating systems should be in bold.

This computer currently has ... What would you like to do?

... {a non-Ubuntu OS} on it. ...	... {a non-Ubuntu OS} on it. ...
<p>[if maximum primary partitions are <i>not</i> in use]</p> <ul style="list-style-type: none"> <li>• <b>Install Ubuntu alongside {other OS}</b> [maps to <code>resize_use_free</code> or <code>use_biggest_free</code>] Documents, music, and other personal files will be kept. You can choose which operating system you want each time the computer starts up. or (option disabled) (<a href="#">bug 438709</a>) There isn't enough space on any disk to install Ubuntu alongside {other OS}.</li> <li>• <b>Replace {other OS} with Ubuntu</b> [maps to <code>use_device</code>] <b>Warning:</b> This will delete all of your {other OS} programs, documents, photos, music, and any other</li> </ul>	<p>[if maximum primary partitions <i>are</i> in use (<a href="#">bug 734031</a>)]</p> <ul style="list-style-type: none"> <li>• <b>Install Ubuntu inside Windows</b> [present only if the other OS is Windows] Documents, music, and other personal files will be kept. You can choose which operating system you want each time the computer starts up. ["Continue" button becomes "<a href="#">Restart to Continue</a>"] or (option disabled) (<a href="#">bug 438709</a>) There isn't enough space to install Ubuntu inside Windows.</li> <li>• <b>Replace {other OS} with Ubuntu</b> [maps to <code>use_device</code>]</li> </ul>



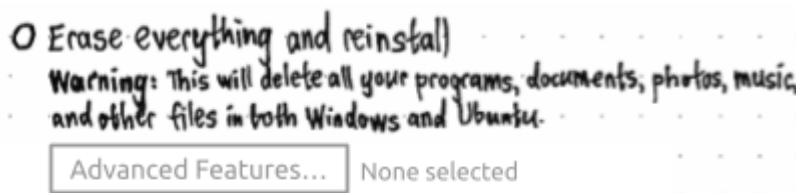
<p>files.</p> <ul style="list-style-type: none"> <li>• <b>Something else</b> [maps to custom_partitioning] You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>	<p><b>Warning:</b> This will delete all of your {other OS} programs, documents, photos, music, and any other files.</p> <ul style="list-style-type: none"> <li>• <b>Something else</b> [maps to custom_partitioning] You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>
<p>... <b>Ubuntu {older version} on it. ...</b></p> <ul style="list-style-type: none"> <li>• <b>Upgrade Ubuntu to {this version}</b> [maps to reuse] Documents, music, and other personal files will be kept. Installed software will be kept where possible. System-wide settings will be cleared. OR: <b>Upgrade Ubuntu to {this version}</b> [maps to reuse] Documents, music, and other personal files will be kept. System-wide settings will be cleared. [if no Internet connection] <b>Warning:</b> Some installed software may be removed unless you connect to the Internet before continuing.</li> <li>• <b>Erase Ubuntu and reinstall</b> [maps to use_device] <b>Warning:</b> This will delete all your Ubuntu programs, documents, photos, music, and any other files.</li> <li>• <b>Install Ubuntu {this version} alongside Ubuntu {older version}</b> [maps to resize_use_free or use_biggest_free] Documents, music, and other personal files will be kept. You can choose which operating system you want each time the computer starts up. or (option disabled) (<a href="#">bug 438709</a>) There isn't enough space on any disk to install Ubuntu {this version} alongside {older version}.</li> <li>• <b>Something else</b> [maps to custom_partitioning] You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>	<p>... <b>{a non-Ubuntu OS} and Ubuntu {older version} on it. ...</b></p> <ul style="list-style-type: none"> <li>• <b>Upgrade Ubuntu to {this version}</b> [maps to reuse] Documents, music, and other personal files will be kept. Installed software will be kept where possible. System-wide settings will be cleared. OR: <b>Upgrade Ubuntu to {this version}</b> [maps to reuse] Documents, music, and other personal files will be kept. System-wide settings will be cleared. [if no Internet connection] <b>Warning:</b> Some installed software may be removed unless you connect to the Internet before continuing.</li> <li>• <b>Erase Ubuntu and reinstall</b> [maps to replace] <b>Warning:</b> This will delete all your Ubuntu programs, documents, photos, music, and any other files.</li> <li>• <b>Erase everything and install Ubuntu</b> [maps to use_device] <b>Warning:</b> This will delete all your programs, documents, photos, music, and other files in both {other OS} and Ubuntu.</li> <li>• <b>Something else</b> [maps to custom_partitioning] You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>
<p>... <b>Ubuntu {same version} on it. ...</b></p> <ul style="list-style-type: none"> <li>• <b>Reinstall Ubuntu {same version}</b> [maps to reuse] Documents, music, and other personal files will be kept. Installed software will be kept where possible. System-wide settings will be cleared.</li> <li>• <b>Erase Ubuntu and reinstall</b> [maps to replace] <b>Warning:</b> This will delete all your Ubuntu programs, documents, photos, music, and any other files.</li> <li>• <b>Something else</b> [maps to custom_partitioning]</li> </ul>	<p>... <b>{another OS} and Ubuntu {same version} on it. ...</b></p> <ul style="list-style-type: none"> <li>• <b>Reinstall Ubuntu {same version}</b> [maps to reuse] Documents, music, and other personal files will be kept. Installed software will be kept where possible. System-wide settings will be cleared.</li> <li>• <b>Erase Ubuntu and reinstall</b> [maps to replace] <b>Warning:</b> This will delete all your Ubuntu programs, documents, photos, music, and any other files.</li> </ul>



<p>You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</p>	<ul style="list-style-type: none"> <li>● <b>Erase everything and install Ubuntu</b> [maps to use_device]  Warning: This will delete all your programs, documents, photos, music, and other files, in both {other OS} and Ubuntu.</li> <li>● <b>Something else</b> [maps to custom_partitioning]  You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>
<p>... multiple operating systems on it. ...</p> <ul style="list-style-type: none"> <li>● <b>Install Ubuntu alongside them</b> [maps to resize_use_free or use_biggest_free]  Documents, music, and other personal files will be kept. You can choose which operating system you want each time the computer starts up.  or (option disabled) (bug 438709)  There isn't enough space on any disk to install Ubuntu alongside the other systems.</li> <li>● <b>Erase everything and install Ubuntu</b> [maps to use_device]  Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.</li> <li>● <b>Something else</b> [maps to custom_partitioning]  You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>	<p>... no detected operating systems. ...</p> <ul style="list-style-type: none"> <li>● <b>Erase disk and install Ubuntu</b> [maps to use_device]  Warning: This will delete any files on the disk.</li> <li>● <b>Something else</b> [maps to custom_partitioning]  You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.</li> </ul>

The job of the long descriptions is to convey what, if anything, gets deleted. Because this is explicit, if the installation can progress without asking additional questions, it will do so without showing any superfluous pages.

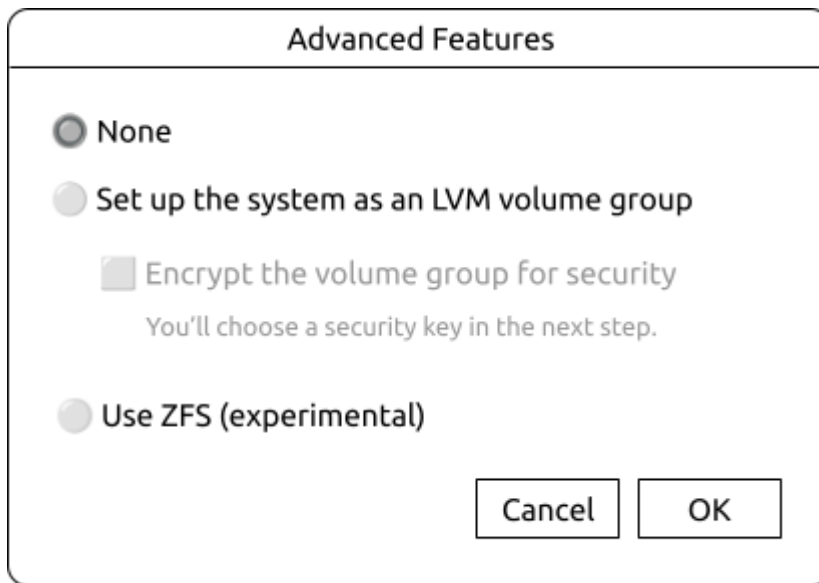
## “Advanced features”



Whichever option maps to `use_device` — or, in the same-version-only case, the “Erase Ubuntu and reinstall” option — should be followed by an “Advanced Features...” button aligned with the radio button label.

Beside the button should be a (baseline-aligned) caption: “None selected” (the initial state), “LVM selected”, “LVM and encryption selected”, or “ZFS”.

Both button and caption should be enabled only when the radio item is checked.

A dialog box titled "Advanced Features" with a white background and a thin black border. It contains three radio button options: "None" (selected), "Set up the system as an LVM volume group", and "Use ZFS (experimental)". Under the "Set up the system as an LVM volume group" option, there is a checkbox labeled "Encrypt the volume group for security" which is checked. Below this checkbox is the text "You'll choose a security key in the next step." At the bottom right of the dialog are two buttons: "Cancel" and "OK".

Advanced Features

☒ None

☐ Set up the system as an LVM volume group

☒ Encrypt the volume group for security

You'll choose a security key in the next step.

☐ Use ZFS (experimental)

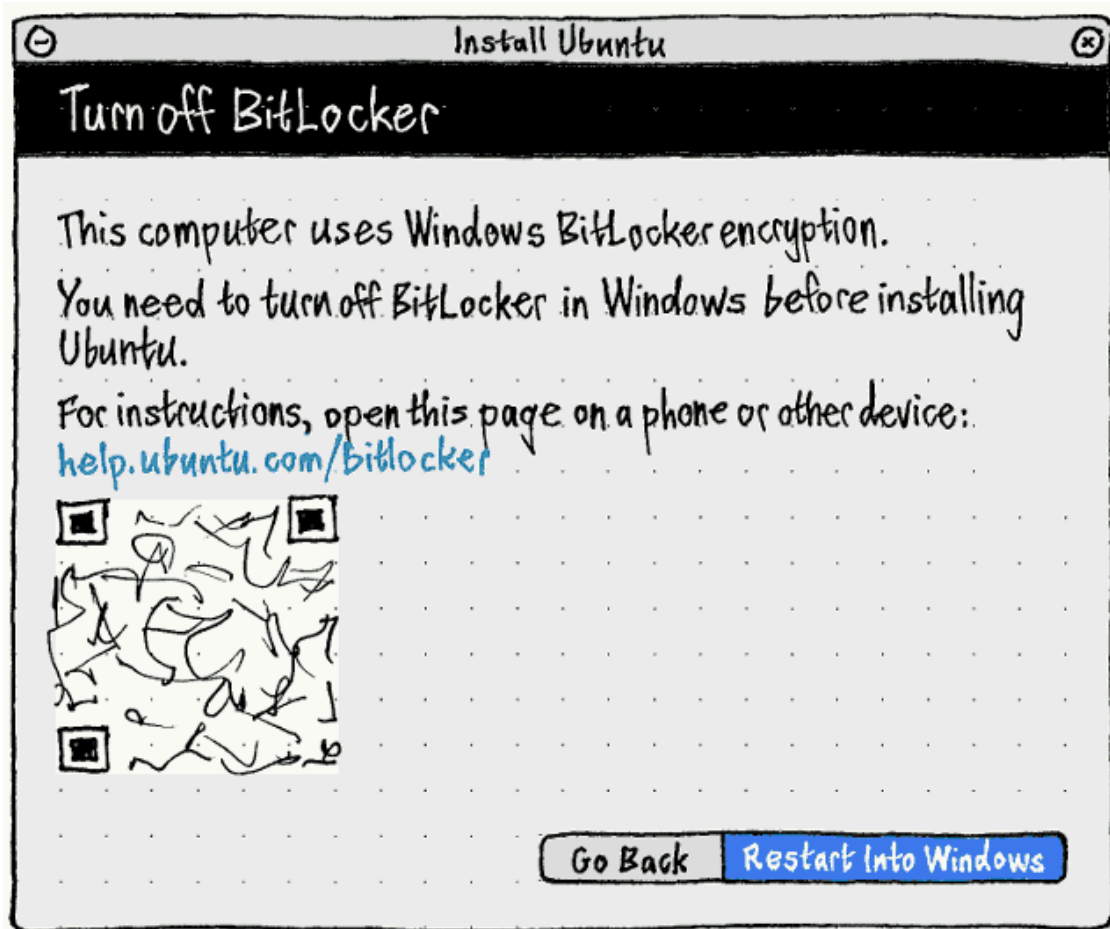
Cancel OK

Whenever "Encrypt the new installation for security" is checked in the parent page, then in this dialog:

- "Set up the system as an LVM volume group" should be checked and disabled, with an explanatory caption indented below: "Encryption requires using LVM."
- "Use ZFS (experimental)" should be unchecked and disabled, with an explanatory caption indented below: "ZFS can't be used with an encrypted Ubuntu installation."

## "Turn off BitLocker"

If you have chosen any option that involves installing Ubuntu alongside a Windows installation with BitLocker, the next step should be "Turn off BitLocker". (In particular, this should appear before any advanced partitioning, so that you do not waste time entering complex partitioning details only to discover that you'll need to turn off BitLocker then re-enter them all.)

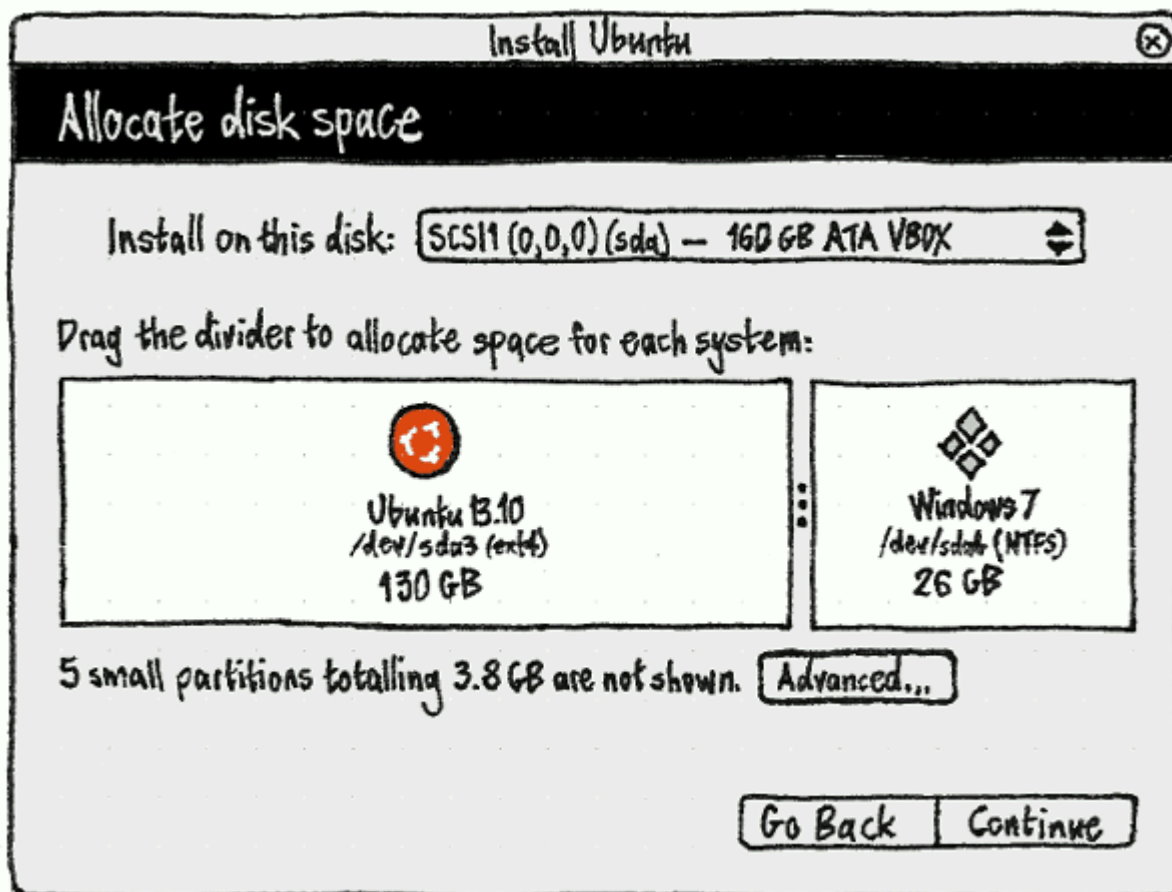


The "Continue" button should be replaced by a blue "Restart Into Windows" button.

The layout and behavior is very similar to [the "Turn off RST" step](#).

## "Allocate disk space" (basic partitioning)

If you choose "Install Ubuntu alongside {another OS}", "Install Ubuntu inside Windows", "Install Ubuntu {this version} alongside Ubuntu {older version}", or "Install Ubuntu alongside them", the installer should next show an "Allocate disk space" step.



The “Install on this disk:” menu should contain an item for each disk present. Each item should consist of the disk name, followed in brackets by its size, and a comma-separated list of up to three of the systems present on that disk, with an ellipsis if there are more than three. For example, “Western Digital (80 GB)” or “ATA VBOX (120 GB: Ubuntu, Windows, Ubuntu...)”.

Each partition item should contain data obtained from partman and udisks:

- the icon for the operating system
- the name and (where possible) version of the operating system (for example, “Windows XP”)
- the block device or partition label, followed by the filesystem type in brackets
- the size, for example “117 GB”.

If resizing is possible, separating the largest available partition that can be resized and the new installation will be a horizontal slider. Moving this slider will change the size of both of these boxes, and thus the size of each partition. The slider will be bound to the minimum size the existing partition can be on the right and the minimum size Ubuntu can be on the left. Code for this will be taken from the existing implementation.

If any partitions are too small to be shown, below the chart should be text of the form “X small partitions totalling Y GB are not shown.”, opposite an “Advanced...” button that switches to [the “Allocate disk space” step](#) (bug 1241464).

<http://seogadget.co.uk/wp-content/uploads/2008/06/diskpartition4.gif> - 'largest continuous free space' here really means 'largest unpartitioned space'.

What's our story on the 'use largest unpartitioned space' option? I'm not overly concerned if we drop it, as I don't think it's a common use case and users can always resort to the advanced partitioner. -Evan Dandrea

6/3/10 11:16 AM

Are we using this new widget on the advanced partitioning page as well? If not, are we cleaning up the graphics of the old partitioner bar (changing colors, etc)? -Evan Dandrea 6/3/10 11:21 AM

## Dealing with unresizable Windows installations

If you choose an option — and, if there are multiple disks, a disk — that would involve specifying a new size for a Windows partition, but that Windows partition is not resizable because of errors, then instead of the resizing chart the installer should show this text:

### **Windows needs repairing first**

The Windows installation on this disk contains errors. It cannot be resized, to make room for Ubuntu, until these errors are fixed.

If you continue, the computer will restart into the Windows disk checker to repair the errors.

Once it has finished, restart into Ubuntu and start the installation again.

In this case, the usual “Continue” button should instead say “Restart Into Disk Checker”.

*What about the same in the advanced partitioner?*

## “Allocate disk space” (advanced partitioning)

If you choose “Something else”, the next screen should be “Allocate disk space” for manual partitioning. This is a [keyboard-requiring step](#), because you will likely have to type mount points, partition labels, LVM group names, and/or LUKS passphrases.

On this screen, the usual “Continue” button should be labelled “Start Installing”, and should be disabled whenever the current partition layout does not allow installation (fixing [bug 273925](#)).

## Implementation plan

While a lot of work, this advanced partitioning design could be implemented and merged in many small chunks. First, gradually implement [the partition detail changes](#) inside the “Edit Partition” and “New Partition” dialogs: make the changes to [the “Size” field](#), then the changes to [the “File system” menu](#), and so on, finally adding [the “Use for:” menu](#).

Separately, implement [the partition charts](#), but with the existing “New Partition Table...”, “New Partition...”, etc buttons beside them instead of the details of the selected partition.

Next, move the “New Partition...” button to [its new position and appearance](#), then [the “Delete Partition” button](#), then [the “New Partition Table...” menu item](#). Separately, add [the boot loader navigation button](#).

Finally, embed the contents of the “Edit Partition” and “New Partition” dialogs into the main window.

## Bugs not yet addressed by this redesign

- [238957](#): partitioner should clearly show which partitions will be used
- [260725](#): Manual partitioner is a bit basic

## Main screen

If there are multiple physical disks, the top of the screen should have a menu for choosing which physical disk or RAID device is displayed. The menu needs no visible label, but should have the accessible label "Partitions for this disk:". Each item in the menu should have an icon conveying whether it is a physical disk, RAID device, or LVM device. If there is only one physical disk, the menu should not be shown, and that space should be used instead for taller partition charts.

Install Ubuntu

Allocate disk space

/dev/sda (Maxtor, 600 GB)

Unchanged:

Windows 7200GB

Ubuntu 11.10398GB

Swap2GB

+ - \* ▼

Partition: /dev/sda2

☐ Erase this partition

Use for: Ubuntu 11.10

File system: Ext4 (recommended)

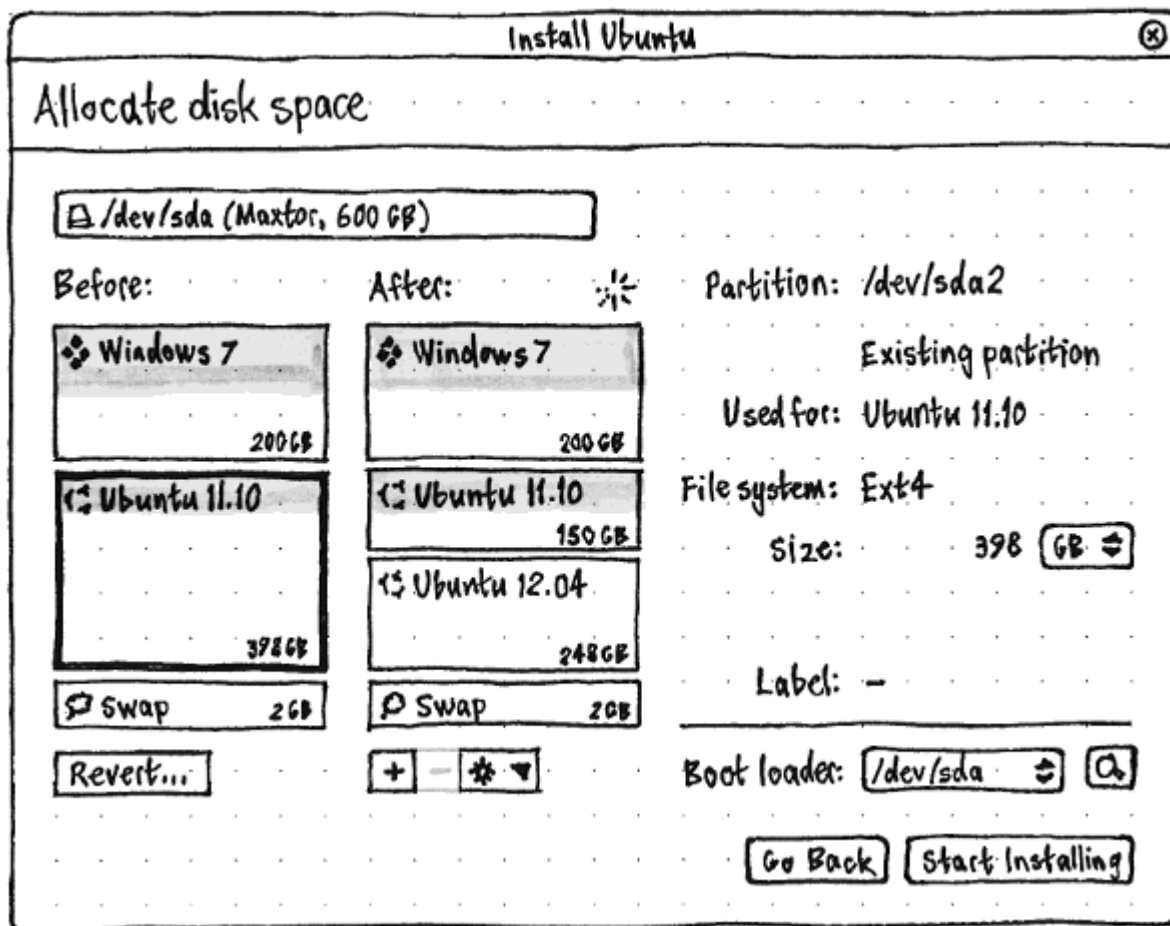
Size: 398 GB

Mount as: Automatic

Label:

Boot loader: /dev/sda

Go BackStart Installing



By default for each disk/device, only one partition chart should be shown, "Unchanged:". But that chart should be narrow enough (fixing [bug 287620](#)), and there should be enough empty space, for a second chart beside it. As soon as you make any partitioning changes to the selected disk/device (for example, when you change the size of a partition), the chart should morph into two (fixing [bug 105157](#)), "Before:" and "After:", with the "After:" partition retaining the selection.

If you make any partition change that involves long recalculation, a spinner should appear opposite the "After:" label until recalculation is complete. It should still be possible to interact with the interface during the calculation.

A "Before:" chart should have a "Revert..." button below it. If you choose "Revert", and confirm an 'Are you sure you want to revert all planned changes to the "{disk ID}" disk?' alert, the two charts should morph back into one "Unchanged:" chart.

## Adding/removing partitions or devices

An "Unchanged:" or "After:" chart should have, below it, three controls.

First, a "+" button (with accessible label "Add Partition"), enabled whenever there is enough room for a new partition on this disk/device. Initially, a new partition should appear in the free space currently selected, if it is; otherwise in the first available space after the selected partition, if there is any (and if the number of primary partitions allows creating a partition there at all); otherwise in the first possible space on the disk/device. Whatever space it is placed in by default, it should take up all of that space by default.

Second, a "-" button (with accessible label "Delete This Partition"), enabled whenever the currently



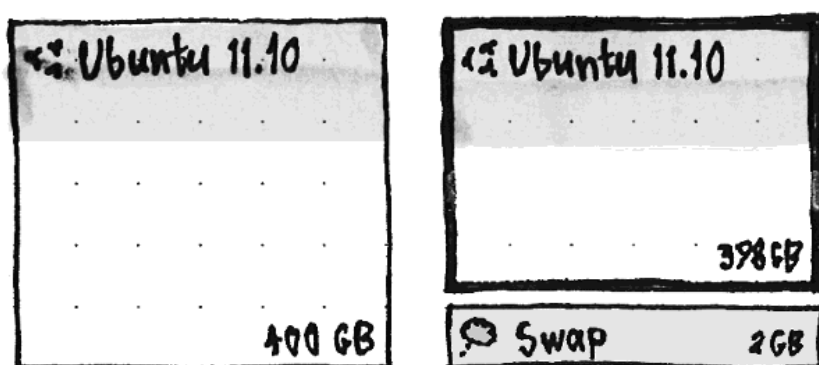
selected area is a partition in that chart. If the partition is not known to be empty or swap, removing it should involve a confirmation alert of the form ‘The partition “{id}” contains {amount} of data. Are you sure you want to delete it?’ or ‘The partition “{id}” may contain data. Are you sure you want to delete it?’.

And third, a menubutton (with accessible label “Other functions”). The menu should contain “New Partition Table...”, a separator, “RAID Setup...” (once implemented), and “LVM / RAID 0...” (once implemented).

**Implementation:** See `MenuButton()` in `softwarecenter/ui/gtk3/widgets/menubutton.py`.

## Partitions and free space areas in the partition chart

A partition chart should present all partitions in the partition table, and all areas of free space greater than \_\_\_ MB.



An area of free space (even if it is the entire partition table) should be shown as slightly inset, with no background at all. In a partition of a type where it makes sense to show how much is used (for example, Ext4), the proportion that is used should be shaded from the top down. And a partition that is *not* of a type where it makes sense to show much is used (for example, swap, RAID, or an unreadable type) should have its whole background shaded in a neutral way (fixing [bug 315257](#)).

The label for a partition should be the logo (if available) and name of the OS installed on it, if known; otherwise the volume label, if present; otherwise the disk identifier. The label should be ellipsized if necessary. All partitions *and* areas of free space should also have, in smaller type in the bottom trailing corner, their approximate total size.

The height of each partition in the chart should be at least enough to display that label and size without clipping. If this results in the overall chart being taller than the space available, the chart should be scrollable. On the other hand, if there is any height left over, that space should be allocated between partitions in proportion to their relative size.

So that you can select an area and then navigate to the details for that area without using a pointing device, the chart or charts should be treated as a single focusable control, with exactly one area out of all of them selected at any time. (For example, if you select a partition in the “Before:” chart, any selected partition in the “After:” chart should become unselected.) If you return to a disk/device, whichever area was last selected should still be selected. The selected partition’s border should be obviously distinct from the others. Left and Right keys should change the selection between charts (when there are two), and Up and Down should change which area is selected within the focused chart (like a listbox).

Therefore, the chart area as a whole should have an empty accessible label, but the accessible label for the selected area inside it should include (1) which chart is focused, *if* you have just entered it, (2) which area in that chart is selected, (3) the area’s name and size; and (4) (at the end, to avoid having to listen past them)



context-sensitive instructions on how to navigate. For example:

- “Unchanged state: Area 1 of 3. Windows 7, 98 of 200 gigabytes used. (Use Tab to alter or examine this area, Up or Down to select a different area.)”
  - After pressing Down: “Area 2 of 3. Ubuntu 11.10, 45 of 298 gigabytes used. (Use Tab to alter or examine this area, Up or Down to select a different area.)”
- “Before state: Area 3 of 3. Swap, 2 gigabytes. (Use Tab to examine this area, Up or Down to select another area, Right to go to the After state.)”
  - After pressing Up: “Area 2 of 3. Free space, 398 gigabytes. (Use Tab to examine this area, Up or Down to select another area, Right to go to the After state.)”
  - After pressing Right: “After state: All free space, 600 gigabytes. (Use Tab to alter or examine this area, Left to go to the Before state.)”

Every partition block should be, at a minimum, high enough to show one line of its label. If the chart area has too little height to show all partitions this way, it should scroll vertically (and if there are two charts, they should scroll together). If it does have enough height, any extra height should be allocated proportionally amongst those partitions for which their relative size is greater than represented by the minimum block height.

Partition blocks should not have any context menu (fixing [bug 465730](#)).

## Viewing/changing partition details

On the trailing side of the chart(s) should be details of the selected chart area (fixing [bug 594378](#)). The exact elements shown depend on which chart it is in, and whether it is an existing partition, a new partition, or free space.

Element	Partition in “Unchanged:”	Partition in “Before:”	Existing partition in “After:”	New partition in “After:”	Free space in any chart
<b>Partition ID</b>	“Partition:” + static text	“Partition:” + static text	“Partition:” + static text	“Partition:” + static text	“Free space” static text
<b>Treatment</b>	“Erase this partition” checkbox	“Existing partition”	“Erase this partition” checkbox	“New partition”	(empty space)
<b>Purpose</b>	“Use for:” + radio menu	“Used for:” + static text	“Use for:” + radio menu	“Use for:” + radio menu	(empty space)
<b>File system</b>	“File system:” + radio menu	“File system:” + static text	“File system:” + radio menu	“File system:” + radio menu	(empty space)
<b>Size</b>	“Size:” + spinbox + unit menu	“Size:” + static text + unit menu	“Size:” + spinbox + unit menu	“Size:” + spinbox + unit menu	“Size:” + static text + unit menu
<b>Mount point</b>	“Mount as:” + combo box	(empty space)	“Mount as:” + combo box	“Mount as:” + combo box	(empty space)
<b>Label</b>	“Label:” text field	“Label:” static text	“Label:” text field	“Label:” text field	(empty space)

### Purpose

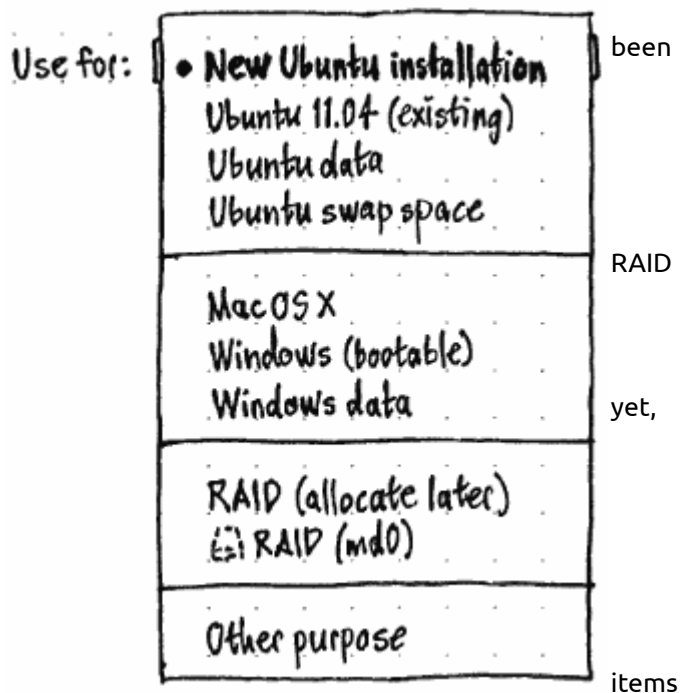
The “Use for:” menu exists as a mini guide to the appropriate file system, size, and mount point choices for

each partition.

The menu should contain items for **“New Ubuntu installation”** (in bold), disabled if it has already been chosen for another partition; “Ubuntu {version} (existing)”, present only if Ubuntu is currently installed on this partition; “Ubuntu data”; “Ubuntu swap space”; a separator; “Mac OS X”; “Windows (bootable)”; “Windows data”; a separator; “RAID (allocate later)”; any existing devices (with the correct icon for each); a separator; and “Other purpose”. For a new partition, the default value should be “New Ubuntu installation” if there is no “/” partition otherwise “Ubuntu data”.

Whenever “Erase this partition” is unchecked:

- If the partition is used for an existing Ubuntu installation, “New Ubuntu installation” and “Ubuntu {version} (existing)” should be enabled, but all other in the menu should be disabled.
- Otherwise, the whole menu should be disabled, and set to the current purpose of that partition if known, or “Other purpose” otherwise.



When “Used for:” static text is present instead, it should have the relevant one of those values, except that “Other purpose” should be “Unknown purpose”.

## File system

The “File system:” menu should be disabled for:

- an existing partition where you have not chosen “Erase this partition” (fixing [bug 236866](#) and [bug 262504](#)) (and set to “Unknown” if the file system is not recognized); *or*
- a new partition, where you have chosen “Use for: Ubuntu swap space” (in which case it should be set to “Linux swap”) or a RAID choice (in which case it should be set to the file system used by the RAID device it if has been set up, or “—” with accessible label “Not applicable” if it hasn’t).

For an existing partition where you have not changed its purpose,

Otherwise, the menu should let you choose file systems relevant to the purpose currently selected (fixing [bug 533618](#)), and should default to the most appropriate file system for that use. For example, if you selected “Use for: Windows data”, the available choices should be “FAT16”, “FAT32”, and “NTFS”, and “NTFS” should be the default. If “Use as:” is set to “Other purpose”, all possible file systems should be available. The menu for an existing partition with an unknown file system should have an extra “Unknown (existing)” item at the beginning, which should be the default.

For Ubuntu, the recommended filesystem should end with “(recommended)” when presented as a menu option, but not when presented as static text.

## Size

The “Size:” field should be disabled for any partition that can’t be resized. It should have a minimum value equal to the smallest possible partition size for that file system, or the minimum size that can hold all data currently in that partition (fixing [bug 290928](#)), whichever is larger. And it should have a maximum value equal to the largest possible partition size for that file system, or the size of the free space where it has been positioned, whichever is smaller. Changing the size value should immediately update the partition’s size in the “After:” chart, keeping the proportion used visible in the block (fixing [bug 224856](#)).

The size units menu should contain “MB”, “GB”, and “TB”. To be most understandable, any partition size should by default be presented using the smallest of these units for which the initial size has a value of less than 1500. For example, a 1 499 000 000-kilobyte partition should be shown as “1499 GB” by default, while a 1 500 000 000-kilobyte partition should be shown as “1.5 TB”. If you change the unit, the value in the field should be converted to match. Until you exit the partitioning, the installer should remember which unit was last used to show the size of each partition.

## Mount point

The “Mount as:” combo box should be disabled whenever “Use for:” is set to “Ubuntu swap space” or a RAID option (for both of which it should also be empty), or whenever this is the only partition for which “Use for:” has been set to “New Ubuntu installation” (for which its value should be “/”, fixing [bug 191112](#)).

For a new partition:

- if “Use for: Ubuntu data” is selected, the default “Mount as:” value should be “/home” unless you have changed the value or a /home partition exists already.
- If “Use for: Mac OS X”, “Windows (bootable)” or “Windows data” is selected, the default “Mount as:” value should be “Automatic” (*i.e.* given a mount point by udisks).

For an existing partition, the default “Mount as:” value should be the current value (fixing [bug 274297](#)).

If you enter anything in the field that does not start with “/”, “/” should automatically be prepended as you type.

Whenever focus leaves the field and its contents are neither “Automatic” nor a valid mount point, or it is a duplicate of another mount point, an error icon should appear inside the trailing end of the field. Clicking the icon should display a balloon pointing to the field and containing a description of the problem (for example, ‘Another partition already has mount point “/home”.’), and this error message should also be appended to the field’s accessible label.

## Label

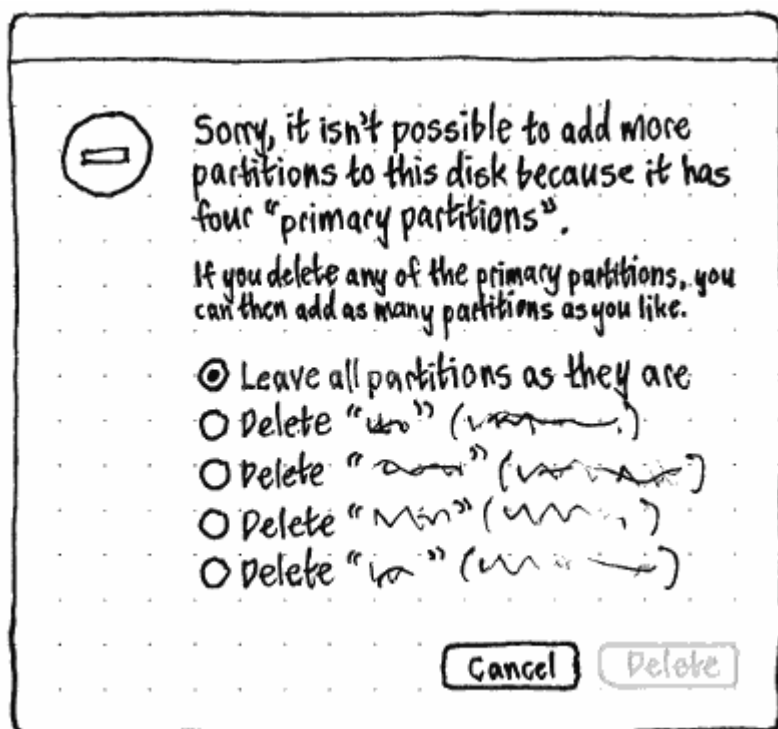
The “Label:” field should display, and allow entry of, the label for the partition (fixing [bug 63064](#)).

In both the “Mount as:” and “Label:” fields, entering an invalid character should automatically convert it to an Ascii hyphen.

## Primary vs. logical partitions

On a disk that uses MBR, if you choose “Use for: Windows (bootable)” for a new partition, it should be created as a primary partition. Any other type of new partition should be created as a logical partition. If necessary, an adjacent extended partition should be enlarged to accommodate the new logical partition, or otherwise a new primary partition should be created including the new logical partition. Extended partitions should not be shown as distinct entities in the interface.

If there are already four primary partitions, however, and you do anything that would require creating a new one (such as clicking the “+” button), an error alert should appear explaining the problem and letting you choose whether to “Leave all partitions as they are” (the default) or delete one of the primary partitions (fixing [bug 86202](#)). If one of the primary partitions is an extended partition (but not contiguous with the partition you want to add), the radio button for deleting that partition should be of the form “Delete {number} partitions ({comma separated list of logical partitions})). Whenever “Leave all partitions as they are” is selected, the “Delete” button should be disabled.



*Erratum: Primary text should be ‘Sorry, adding another partition to this disk isn’t possible as long as it has four “primary partitions”.’*

## Boot loader

The “Boot loader:” menu should contain:

- for each disk:
  - an “MBR ({name of disk})” item, if there is an MBR
  - an item for each Ubuntu partition on that disk
- a separator
- an item for each of the other partitions, if there are any, and another separator
- “None (not recommended)” (fixing [bug 690926](#)).

If there is an MBR, the default should be the MBR for the first permanent disk (fixing [bug 153615](#)).

Next to the menu should be an icon-only button, with accessible label “Show this partition”, that navigates the partition chart to the disk and selects the partition (if any) that is currently chosen for the boot loader. Whenever the partition chart is already showing the correct disk and (if you have chosen to install it on a partition) the chosen partition is selected, *or* you have chosen not to install a boot loader at all, the button should be disabled.

## LVM

### Cheat sheet

RAID 0 is a simple and fast method of aggregating multiple block devices into one by alternating blocks among the disks. What you get out of it is effectively a single partition whose size is the sum of all the components. But it still roughly behaves as a simple traditional partition.

LVM is more a Swiss-army-knife approach. You feed LVM a load of physical volumes (partitions), and it lets you create a *logical volume group* on top without having to care very much about which disks they happen to live on. If for example you later need to replace a disk, you can say to LVM “please move all my data off this disk I’m about to remove”, and then swap in a new one.

There are [restrictions on the name of a logical volume](#).

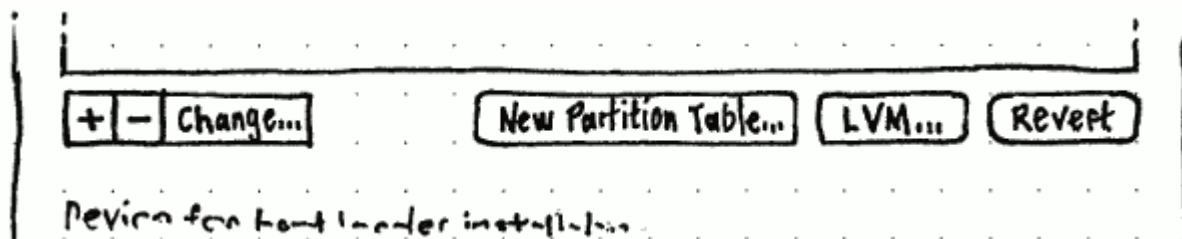
- [43453](#): live cd partitioner doesn't understand lvm properly
- [Screenshots: Alternate installer guided LVM](#)

### Based on the old advanced partitioner

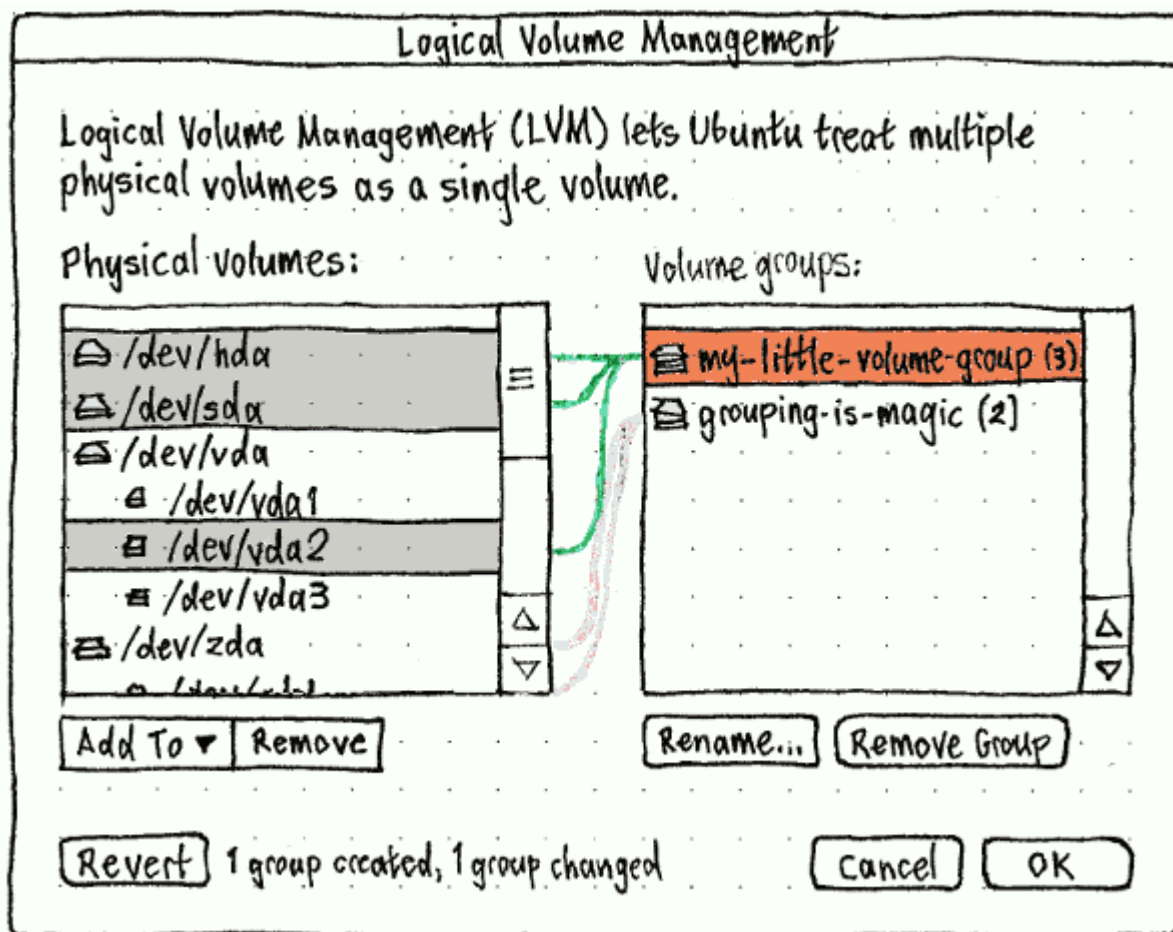
In the basic partitioning process, LVM should (for now) not be mentioned at all.

In the advanced partitioning screen, any volume that is an LVM volume should have “LVM” in its “Type” column (“LUKS+LVM” if it is also LUKS-encrypted).

Below the the table of volumes and partitions, the buttons should be rearranged so that those relating to individual partitions are on the leading side (e.g. left), and those relating to whole disks on the trailing side (e.g. right), including a new “LVM...” button.



Choosing “LVM...” should open a “Logical Volume Management” dialog.



*For clarity, the following paragraphs are written as though changes to volume groups are instant. In reality, changes should not take effect until installation begins.*

The “Physical volumes:” pane should list the physical disks as top level items. For any physical disk that is not, as a whole, currently part of a volume group, that disk’s partitions should be listed indented underneath the disk.

If there are no volume groups, the “Volume groups:” pane should contain the horizontally and vertically centered text “(None)”. Otherwise it should list the volume groups, each followed in brackets by the number of physical volumes in that volume group.

A colored escalator-like line should connect the vertical center of the row for each physical volume that is part of a volume group, to the vertical center of the row for the volume group it is a part of. This line should move as either pane scrolls, resting at the top or bottom of a pane whenever the relevant device scrolls off the top or bottom of the pane. The lines should be colored by volume group, equidistant along the spectrum from blue to red. For example, if there is one volume group, its lines should be blue; two groups, blue and red; three groups, blue, yellow, and red; four groups, blue, lime, peach, and red; and so on. For visibility, the lines for any selected volumes or volume groups should be layered above the lines for any unselected ones.

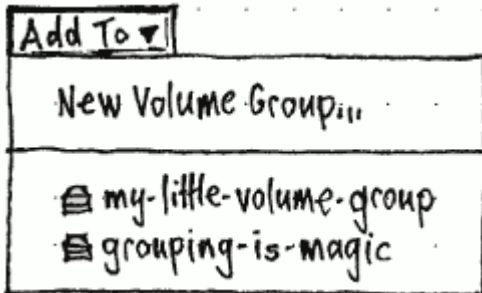
Whenever you change the selection in the “Physical volumes:” pane, the selection in the “Volume groups:” pane should automatically change to those volume groups that the selected volumes belong to (if any). Conversely, whenever you change the selection in the “Volume groups:” pane, the selection in the “Physical volumes:” pane should automatically change to those physical volumes that comprise the selected volume

groups.

The “Add To” menubutton should be enabled whenever at least one physical volume is selected. The “Remove” button should be enabled whenever at least one physical volume that is part of a volume group is selected. The “Rename...” and “Remove Group” buttons should be enabled whenever at least one volume group is selected.

“Revert” should leave the dialog open, but restore it to reflecting the LVM state before the dialog was opened.

### Creating a volume group



If you select one or more physical volumes and choose “Add To” → “New Volume Group...”, the “Volume groups:” pane should scroll to the bottom to reveal a new item, containing a focused text field for you to enter the name of the volume group, confirmed either by pressing Enter or by changing focus. Pressing Esc should cancel the group creation. If you leave the field empty, the group should get a default name.

### Renaming a volume group

If you either select a group and choose “Rename...”, or double-click on the group, the pane should scroll to reveal it entirely if necessary, and its name should turn into a text field for renaming it. Pressing Esc or leaving the field empty should cancel the rename.

### General behavior when naming a group

While typing a group name, any character that is not in the legal set of characters for a group name should instantly appear as a hyphen “-” instead.

Whenever the current contents of a name field is a reserved name — such as “.”, or the name of an existing device — the field contents should be the error color (e.g. red), and exiting should revert to the default/previous name.

### Adding a physical volume to an existing volume group

If you select one or more physical volumes and choose “Add To” → an existing volume group — or drag the volume(s) onto a volume group in the “Volume groups:” pane — the pane should scroll to reveal that group entirely, before the bracketed number next to the group name increases to reflect the new volumes in the group.

### Removing a physical volume from a volume group

If you select one or more physical volumes and choose “Remove”, they should be removed from the volume group(s) they are part of.



## Dismantling a volume group

If you select one or more volume groups and choose “Remove Group”, they should be removed.

## Based on the new advanced partitioner

At the bottom of the disk/device menu should be a separator, then an “LVM...” item. Choosing this item should open the “Logical Volume Management” dialog specified above.

## LUKS disk encryption

### Cheat sheet

LUKS (aka cryptsetup, dm-crypt, full-disk encryption) takes one component (disk, partition, LVM logical volume, or assembled RAID device) and creates one encrypted device from it. For example, /dev/sda might become /dev/crypt1. This encrypted device acts like a partition: it can be used as a mountpoint, or as a component of an LVM or RAID array, but cannot be partitioned itself. The /boot mountpoint/filesystem should not be encrypted.

Ubuntu should not let you use LUKS without also using LVM.

### From the old advanced partitioner

In the partition table, any LUKS-encrypted device should have “LUKS” in its “Type” column, or “LUKS+LVM” if it is also an LVM volume.

The “Add Partition” and “Change Partition” dialogs should each have a checkbox, “Encrypt this partition (LUKS)”. Whenever that checkbox is checked for a partition that is not currently encrypted, fields to “Choose a security key:” and “Confirm security key:” should appear below, with a warning about data loss. Similarly, whenever that checkbox is checked for a partition that *is* currently encrypted, a checkbox to “Change the security key” and fields to enter the “New security key:” and “Confirm security key” should appear below.

The "Add Partition" dialog box contains the following fields and options:

- Size:** A text input field with the value "51375" and a unit dropdown set to "MB".
- Location:** Two radio button options: "Beginning of this space" (selected) and "End of this space".
- Use as:** A dropdown menu showing "Ext4 journaling file system".
- Mount point:** A dropdown menu showing "/".
- Encrypt this partition (LUKS):** An unchecked checkbox.
- Buttons:** "Cancel" and "Add".

The "Change Partition" dialog box contains the following fields and options:

- New size:** A text input field with the value "21473" and a unit dropdown set to "MB".
- Use as:** A dropdown menu showing "Ext4 journaling file system".
- Format the partition:** An unchecked checkbox.
- Mount point:** A dropdown menu showing "/".
- Encrypt this partition (LUKS):** An unchecked checkbox.
- Buttons:** "Cancel" and "Change".



**Add Partition**

Size:  MB

Location: ☒ Beginning of this space  
☐ End of this space

Use as:

Mount point:

☒ Encrypt this partition (LUKS)

Choose a security key:

Confirm security key:

**Warning:** If you lose this key, all data will be lost. If you need to, write down the key and keep it in a safe place.

For more security: ☐ Overwrite following empty space

**Change Partition**

New size:  MB

Use as:

☐ Format the partition

Mount point:

☒ Encrypt this partition (LUKS)

☐ Change the security key

New security key:

Confirm security key:

**Warning:** If you lose this key, all data will be lost. If you need to, write down the key and keep it in a safe place.

For more security: ☐ Overwrite following empty space

*Erratum: "Overwrite following empty space" should instead be "Overwrite the available space first".*

*Erratum: In "Change Partition", when "Format the partition" is unchecked, "Encrypt the partition" and "Change the security key" should both be disabled.*

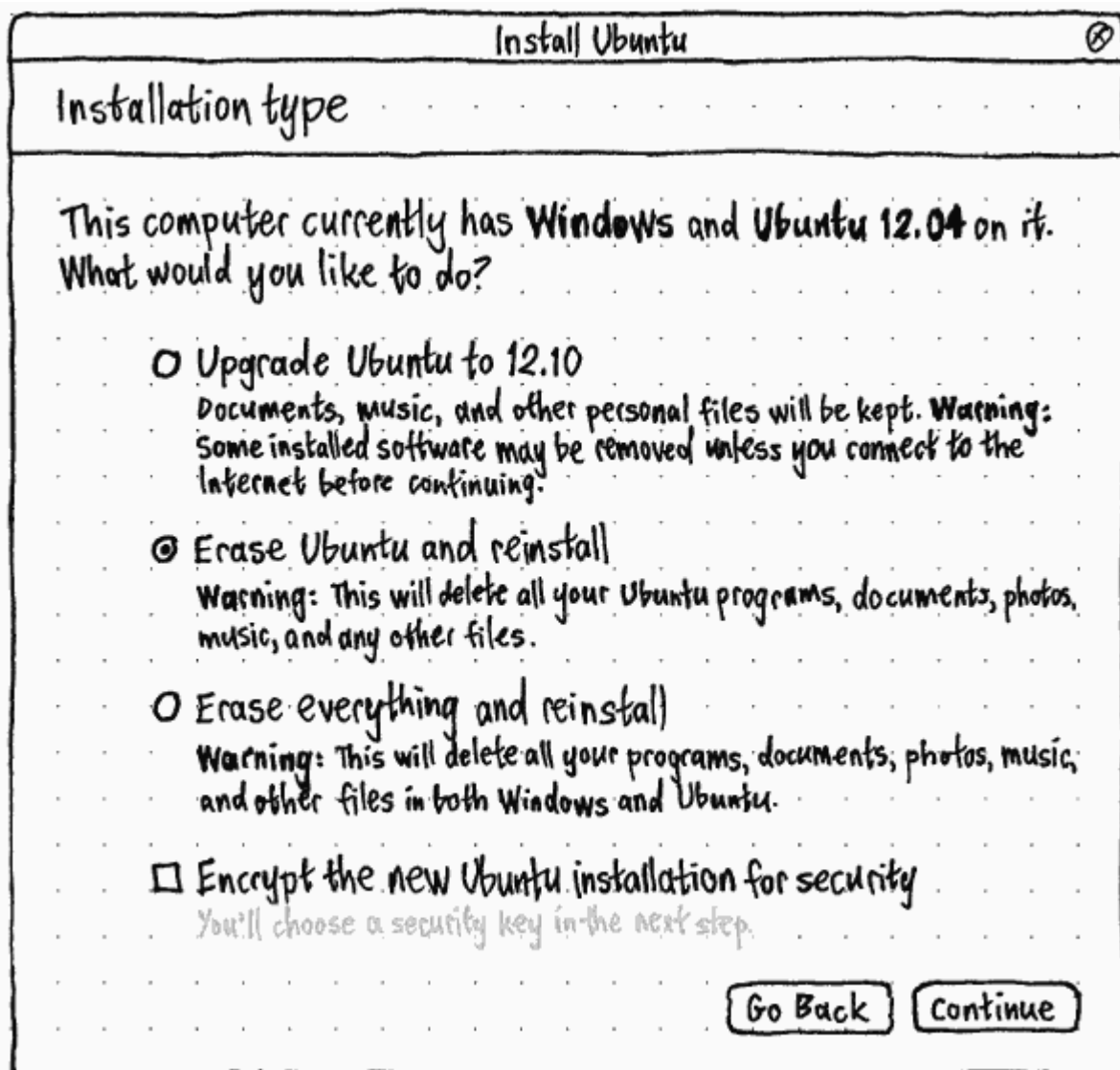
"Encrypt this partition" should be enabled whenever it is possible to change the encryption of the partition. (In the case of an existing partition, for example, it should be enabled only when "Format the partition" is checked.)

"Change the security key" should be enabled whenever it is possible to change the key, *i.e.* when the partition is already encrypted or it does not actually exist yet. The key fields, and the following warning, should be enabled whenever the previous checkbox is checked. And "Overwrite the available space first" should be enabled when creating a new encrypted device in a larger space, enlarging an existing encrypted device without filling the larger space, or when the partition does not actually exist yet.

## From the new advanced partitioner

TBD

## From the "Installation type" screen



Erratum: "in the next step" should be "in just a moment".

Whenever "Encrypt the new Ubuntu installation for security" is checked, the caption "You'll choose a security key in just a moment." should be enabled.

"Choose a security key" is a [keyboard-requiring step](#), so that typing the security key works as expected ([bug 1047384](#)).

## Choose a security key

Disk encryption protects your files in case you lose your computer. It requires you to enter a security key each time the computer starts up.

Any files outside of Ubuntu will not be encrypted.

Choose a security key:  Weak

Confirm the security key:

**WARNING:** If you lose this security key, all data will be lost. If you need to, write down your key and keep it in a safe place elsewhere.

For more security: ☐ Overwrite empty disk space  
The installation may take much longer.

Go Back Continue

Erratum: "Overwrite empty disk space" should instead be "Overwrite the available space first".

## RAID setup

([bug 44609](#))

### Cheat sheet

The types of RAID we should offer are, in order: 0; and 1, 5, 6, and 10.

RAID 10 = a RAID 0 comprised of two RAID 1s of two partitions each. RAID 4 is a bad version of RAID 5. RAID 6 is like RAID 5, but allows two concurrent disk failures rather than one, in exchange for being slower. And RAID 0 isn't really RAID at all, but a close alternative to LVM ([bug 43453](#)), though it is possible to run one on top of the other. Other mdadm configurations such as LINEAR and MULTIPATH are different enough in kind that they should be designed and implemented separately.

RAID 0 and 1 require at least two partitions and/or entire disks. RAID 5 requires at least three partitions

and/or entire disks. RAID 6 requires at least four partitions and/or entire disks.

If a RAID device uses a partition rather than an entire disk, no other partitions for the same device can be on the same disk.

A RAID device has a filesystem type, a mount point, and a size, like a normal partition does.

The effective size of a RAID 0 device is the total of the partitions/disks that form it. The effective size of other RAID levels is, roughly, the minimum size of all the partitions/disks used in the device.

Giving useful advice about which RAID level to choose involves communicating about (a) read speed, (b) write speed (both as a rough multiple of normal), (c) space efficiency (exact math), (d) probability of failure, and (e) time to rebuild from failure.

Once set up, a RAID device can itself be partitioned.

[Screenshots: current advanced partitioner](#)

## RAID levels compared

	Minimum devices	Space availability	Read speed	Write speed	Fault tolerance	Notes
<b>RAID 0</b>	2	100%	1*	n*	None	Not recommended — use LVM instead
<b>RAID 1</b>	2	1/n	n*	1 * slowest drive	n-1	Recommended for high reliability
<b>RAID 5</b>	3	67%	(n-1)*	(n-1)*	1	Compromise
<b>RAID 6</b>	4	1-2/n	(n-2)*	(n-2)*	2	Compromise
<b>RAID 10</b>	4	50%	~2*	~2*	n/2-2	Good mix of reliability + performance
<b>LVM</b>	1	100%	?	?	none	

## Use cases

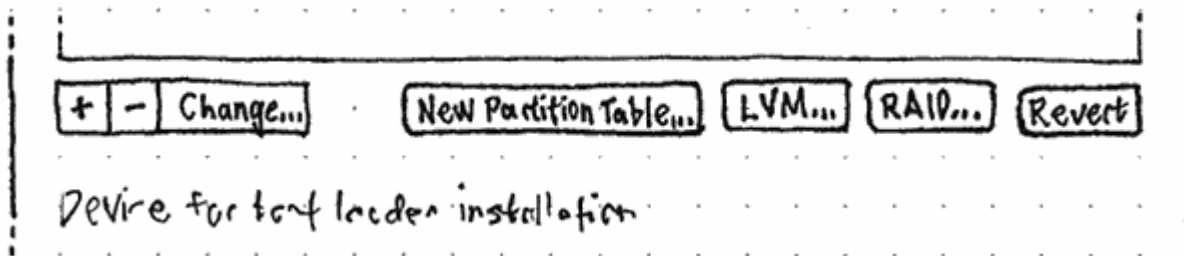
- You want to use multiple devices in an encrypted RAID array, but the bootloader needs to be on a small unencrypted partition, so you want to partition all those devices in exactly the same way. The result will be two RAID arrays, one unencrypted and one encrypted, sharing the same set of disks.
- Edubuntu installs the system on a RAID 1 array, then thin clients connect to it.

<https://wiki.ubuntu.com/Ubiquity/SoftwareRaid>

## Based on the old advanced partitioner

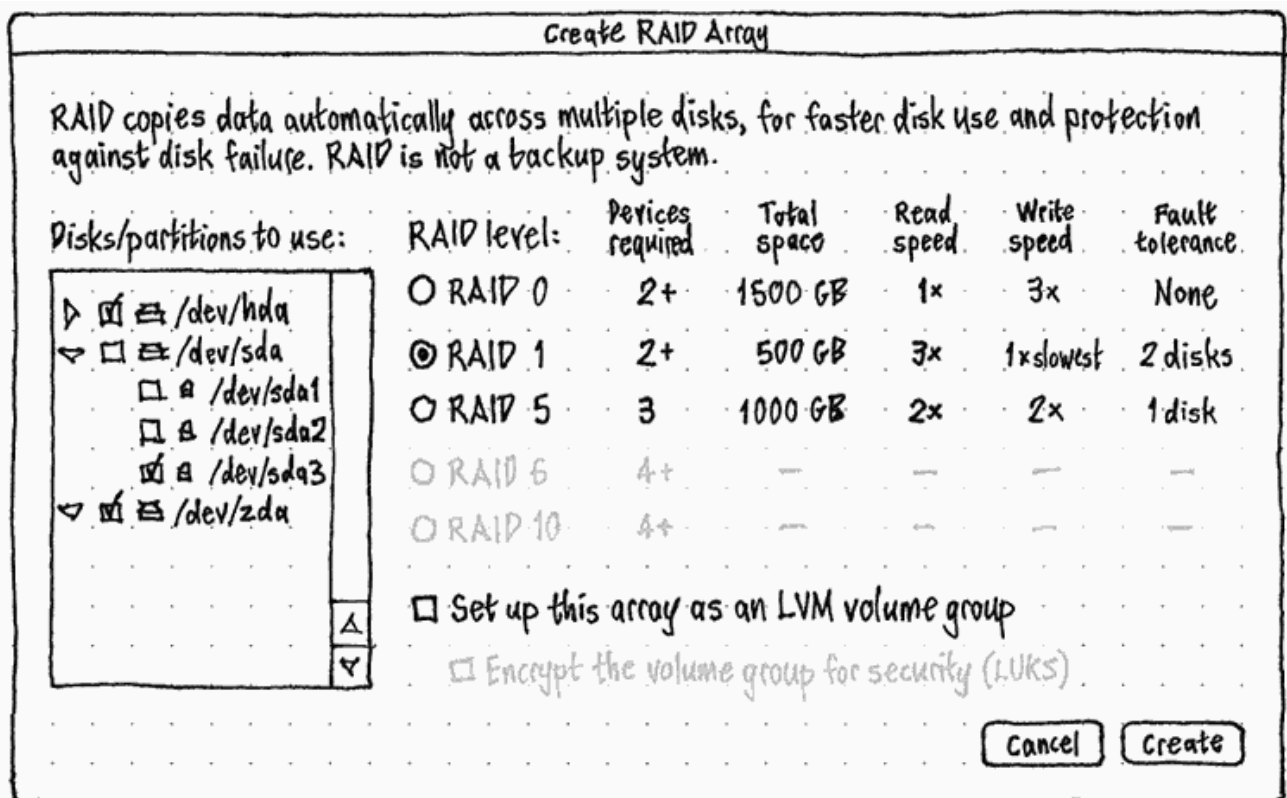
In the partition table, a RAID array should appear as a single item, with "(RAID)" in its "Mount point" cell, for example "md0 (RAID)".

Below the the table, a new "RAID..." button should be present between "LVM..." and "Revert".



## Creating a new RAID array

If you choose "RAID..." without having an existing RAID array currently selected, a "Create RAID Array" dialog should open.



The "Disks/partitions to use:" list should display a checkbox tree of all disks, and all partitions in those disks, for you to choose which ones to use in the array.

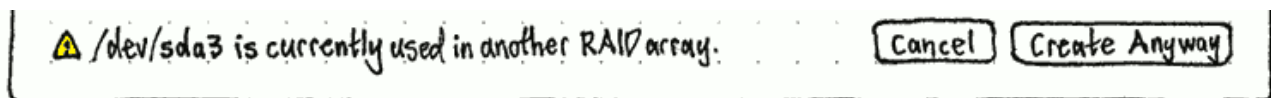
If you check a whole disk, any partitions inside it should become both disabled and unchecked. If you uncheck a whole disk, any partitions inside it should return to their previous state.

As you check or uncheck disks and/or partitions, the adjacent "RAID level:" table should update live to reflect which levels are possible with the number of devices those disks or partitions are on — and for

each possible level, what the total space, read speed, write speed, and fault tolerance will be. Sizes should be of the form "500 GB" or "1.2 TB", with a space between the number and the unit. Speeds should be of the form "2x" or "1x slowest", using the Unicode multiplication symbol. "RAID level:" should use the normal interface font, but the headings for the "Devices required", "Total space" etc columns should use the small font size at bold weight.

"Encrypt the volume group for security (LUKS)" should be enabled whenever "Set up this array as an LVM volume group" is checked. "Create" should be enabled whenever one of the possible RAID levels is selected.

Whenever at least one of the disks or partitions you have checked are already part of a RAID array, the first of these should be cited in a warning in the bottom leading corner of the dialog, and "Create" should instead read "Create Anyway".



When you choose "Create" or "Create Anyway", the "Create RAID Array" dialog should close and the "Add Partition" dialog should open, except that its title should be "Add RAID Array". It should let you choose the filesystem and mountpoint for the array, with the "Size:" and "Location:" controls being disabled.

### Adding/removing devices in an existing RAID array, and changing RAID level

If you choose "RAID..." with an existing RAID array currently selected, a 'RAID Array "{array mountpoint}"' dialog should open. This should be the same as the "Create RAID Array" dialog (with the same warning if you add a disk or partition already being used by another array), except that:

- "Create" should be "Change".
- A "Dismantle Array" should be present at the bottom trailing corner.
- Whenever any pending changes would result in the contents of the array being lost, the "Dismantle Array" button should be replaced by a warning in that corner: "All data on this RAID array will be lost.", and the "Change" button should be "Change Anyway".



### Changing other properties of an existing RAID array

If you choose "Change..." with a RAID array selected, the usual "Change Partition" dialog should appear, except that its title should be "Change RAID Array". As usual, it should let you change the filesystem and/or mountpoint, format the array, and add or remove LUKS encryption. Only the "New size:" field should be disabled.

### Based on the new advanced partitioner

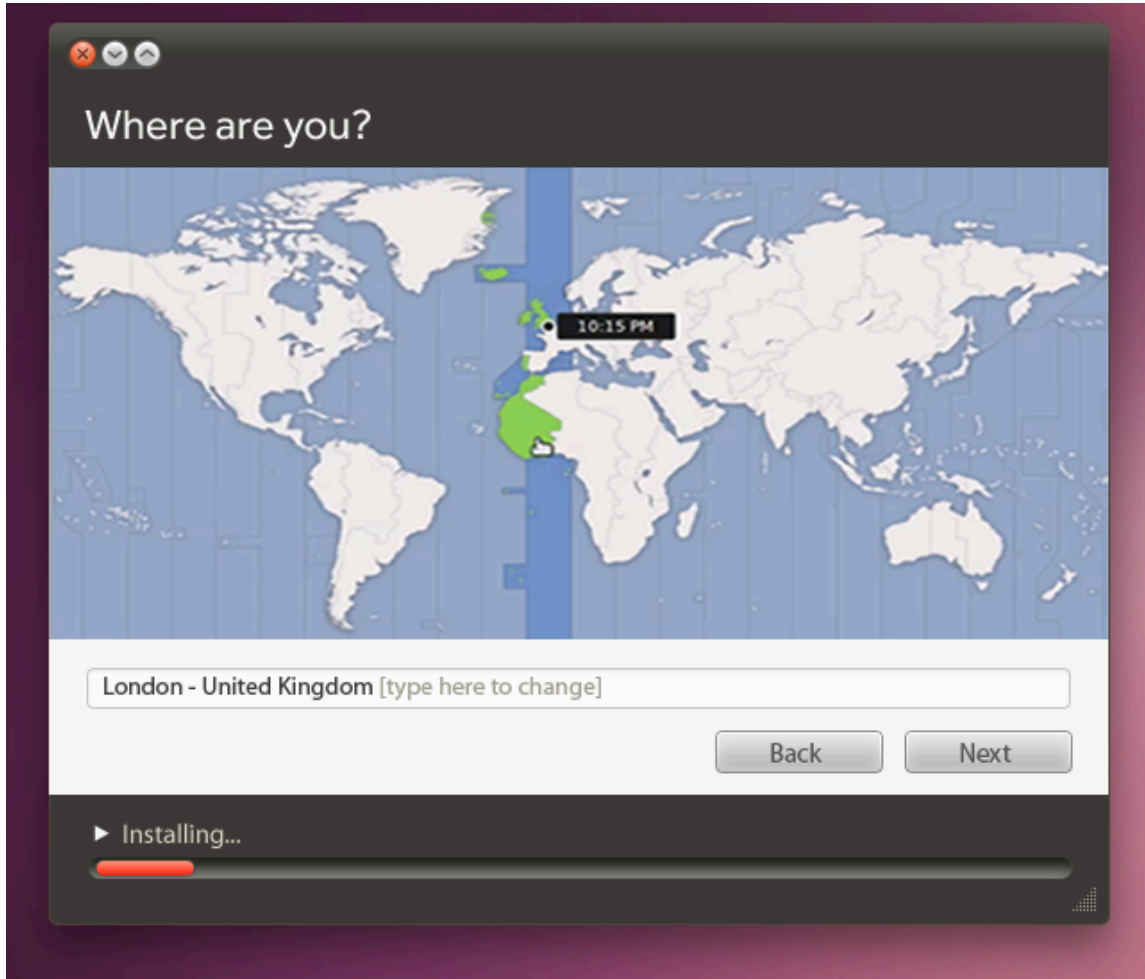
*TBD*

At the end of the "File system" menu should be a "RAID partition" option. Whenever that option is selected, the "Mount as:" combo box should be replaced by a "RAID device:" element. If no RAID devices have been set up yet, this element should be the text "None yet", and a "Set Up..." button. If any RAID devices *have*

been set up, the element should be a menu listing them.

## “Where are you?”

This is a [keyboard-requiring step](#), because you may need to type a location ([bug 630990](#)).



The time zone map used at this step should be the same as [the “Time & Date” panel in System Settings](#).

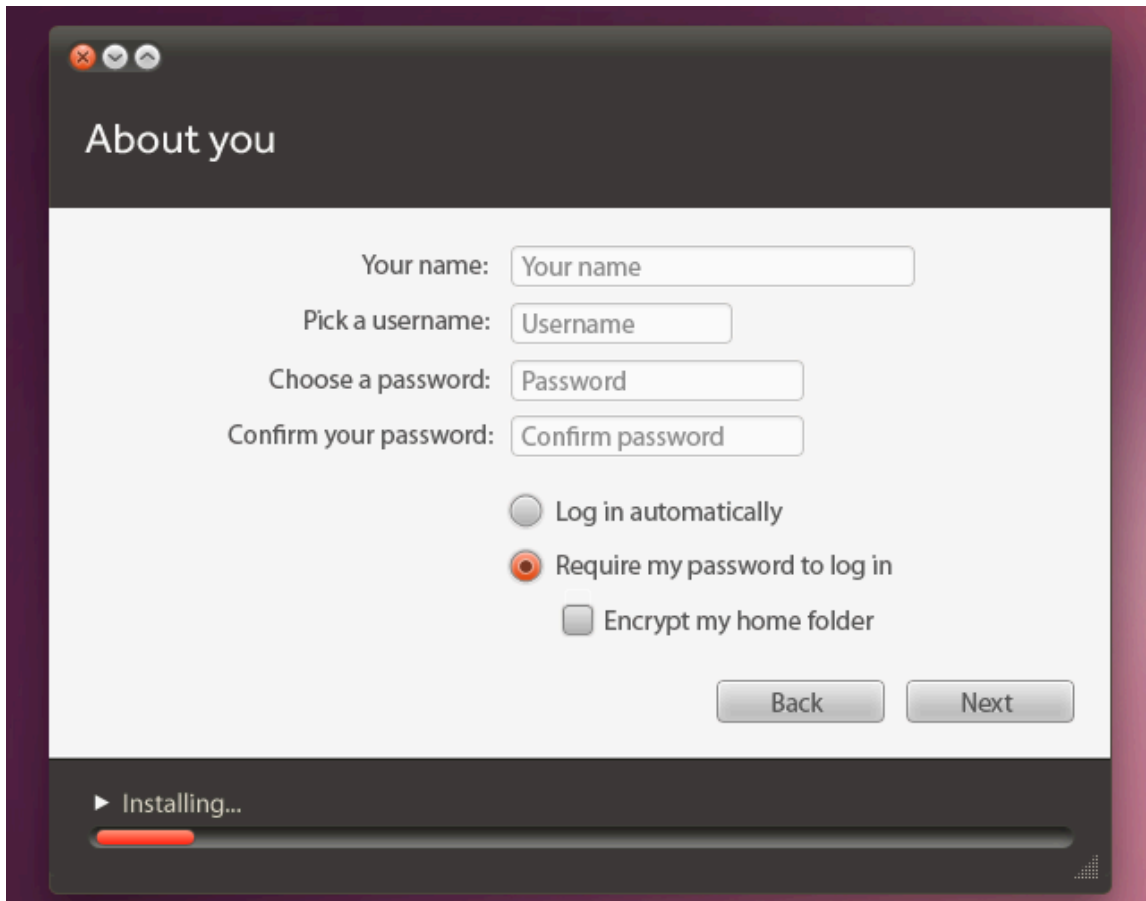
If you have connected to the Internet, Ubuntu should detect your location and set the default time zone accordingly. If not, or if this does not work, the default time zone should be UTC.

The location field should autocomplete to places in [the time zone database](#), plus [the GeoNames database](#) if you are connected to the Internet or if a partial GeoNames database is included in the OS image. Selecting a GeoNames location should act like a mouse click at the respective latitude and longitude, calling `convert_latitude_to_x` and `convert_longitude_to_y`. If only one result is returned, it will immediately be selected. The language may be used in the initial implementation to provide localized results.

*To ensure quick retrieval, Sphinx will be used.*

## “Who are you?”

This is a [keyboard-requiring step](#) ([bug 511956](#)).



*Errata:*

- *"About you" should be "Who are you?"*
- *"Pick a username:" should be "Choose a login name:".*
- *The redundant placeholder labels should not be present.*
- *The "Installing..." progress section should not be present.*

Until you make any changes to the "Choose a login name:" field, it should be constantly auto-populated with a lowercased version of the first 31 alphanumeric characters of the first alphanumeric string in the "What is your name?" field. **Test case:** In the "What is your name?" field enter "Angelina(Jr.)". The "Choose a login name:" field should be auto-populated to "angelina".

4. Ubuntu informs user of their password strength as they type in the first field



## New account

What is your name?  ✓

Pick a username:  ✓

Choose a password:  ? Strength: weak

Confirm your password:

☒ Log in automatically  
☐ Require my password to log in

5. User continues their password and tabs into the confirmation field. Error checking on this field commences when the confirmation password string is  $\geq 80\%$  the length of the password field contents

## New account

What is your name?  ✓

Pick a username:  ✓

Choose a password:  ? Strength: strong

Confirm your password:  Passwords don't match

☒ Log in automatically  
☐ Require my password to log in

6. User completes form with no errors and Ubuntu enables the "Next" button

## New account

What is your name?  ✓

Pick a username:  ✓

Choose a password:  ? Strength: strong

Confirm your password:  ✓

☒ Log in automatically  
☐ Require my password to log in

7. User selects "Require my password to log in" and Ubuntu reveals the "Encrypt my home directory" option

**New account**

What is your name?  ✓

Pick a username:  ✓

Choose a password:  ? Strength: strong

Confirm your password:  ✓

☐ Log in automatically  
☒ Require my password to log in  
☐ Encrypt my home folder

The controls on the user setup page will be aligned using a table with the first column containing right-aligned labels and the second column containing left-aligned input controls and valid/invalid indicators.

Errors will be shortened so that they fit comfortably alongside their respective input control, in all languages, without causing the window's size or the position of widgets to change. These errors are as follows:

Description: Invalid username

The username you entered is invalid. Note that usernames must start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Description: Reserved username

The username you entered (`${USERNAME}`) is reserved for use by the system. Please select a different one.

Description: Password input error

The two passwords you entered were not the same. Please try again.

Description: Empty password

You entered an empty password, which is not allowed. Please choose a non-empty password.

The 'strength: weak' text will be changed to 'Weak password'.

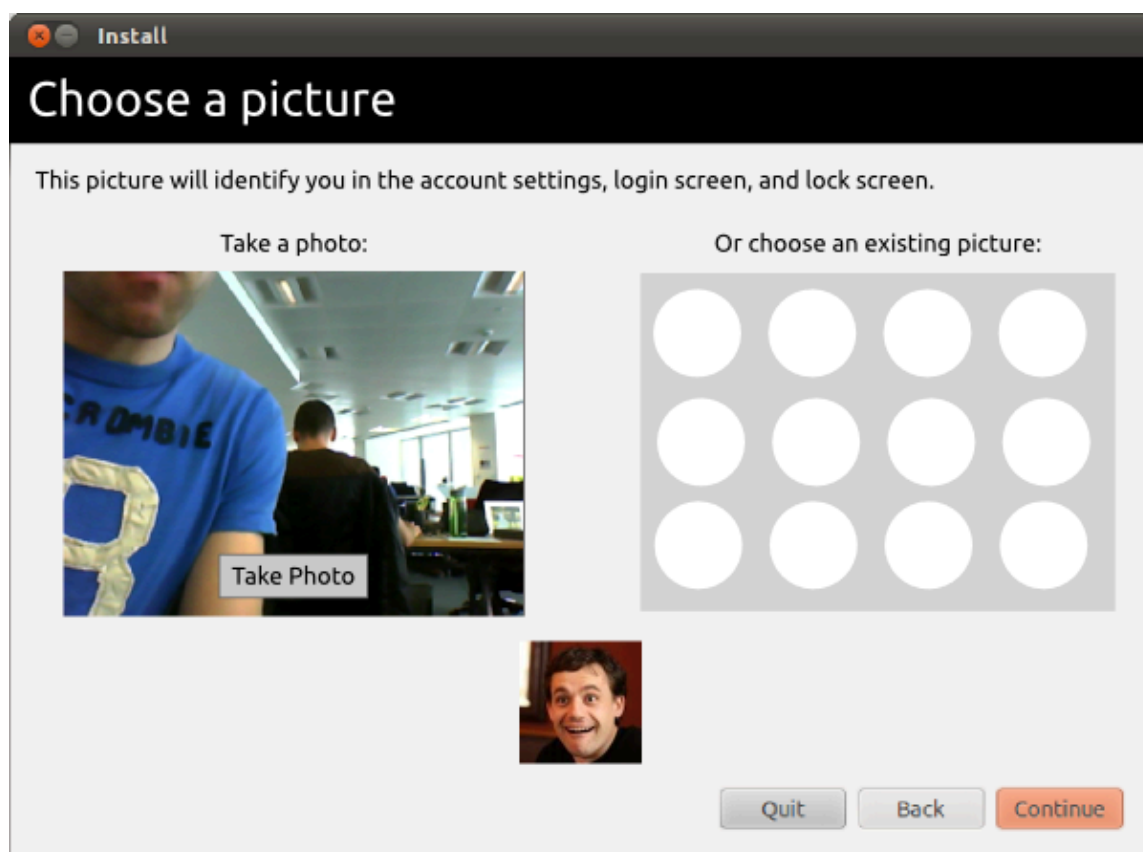
The encrypted home option will be turned into a checkbox that will be positioned underneath the 'require password' option and aligned at the start of 'Require'.


The hostname entry will be dropped, with the hostname automatically set to whatever the default value would have been ('ubuntu-desktop', 'ubuntu-laptop').

## “Choose a picture”

The next step should be “Choose a picture”, with the intro text “This picture will identify you in the account settings, lock screen, and authentication prompts.”

If a webcam is present (as detected using the Python bindings to libcheese), the screen should present two options, “Take a photo:” and “Or choose an existing picture:”. If a webcam is not detected, the screen should show just the gallery of clip art pictures, centered with no label.



By default, the “Take Photo” button should be focused. If you choose “Take a Photo”, that button should be replaced by a small determinate spinner  and the text “Get ready...”. When the spinner fills up after three seconds, the photo should be taken, indicated by a sound effect and the photo smoothly flashing white.

Whenever you select a new picture, either by taking a photo or by clicking a different clip art picture (or pressing Space when it is highlighted), a copy of the selected picture should zoom quickly into the preview square.

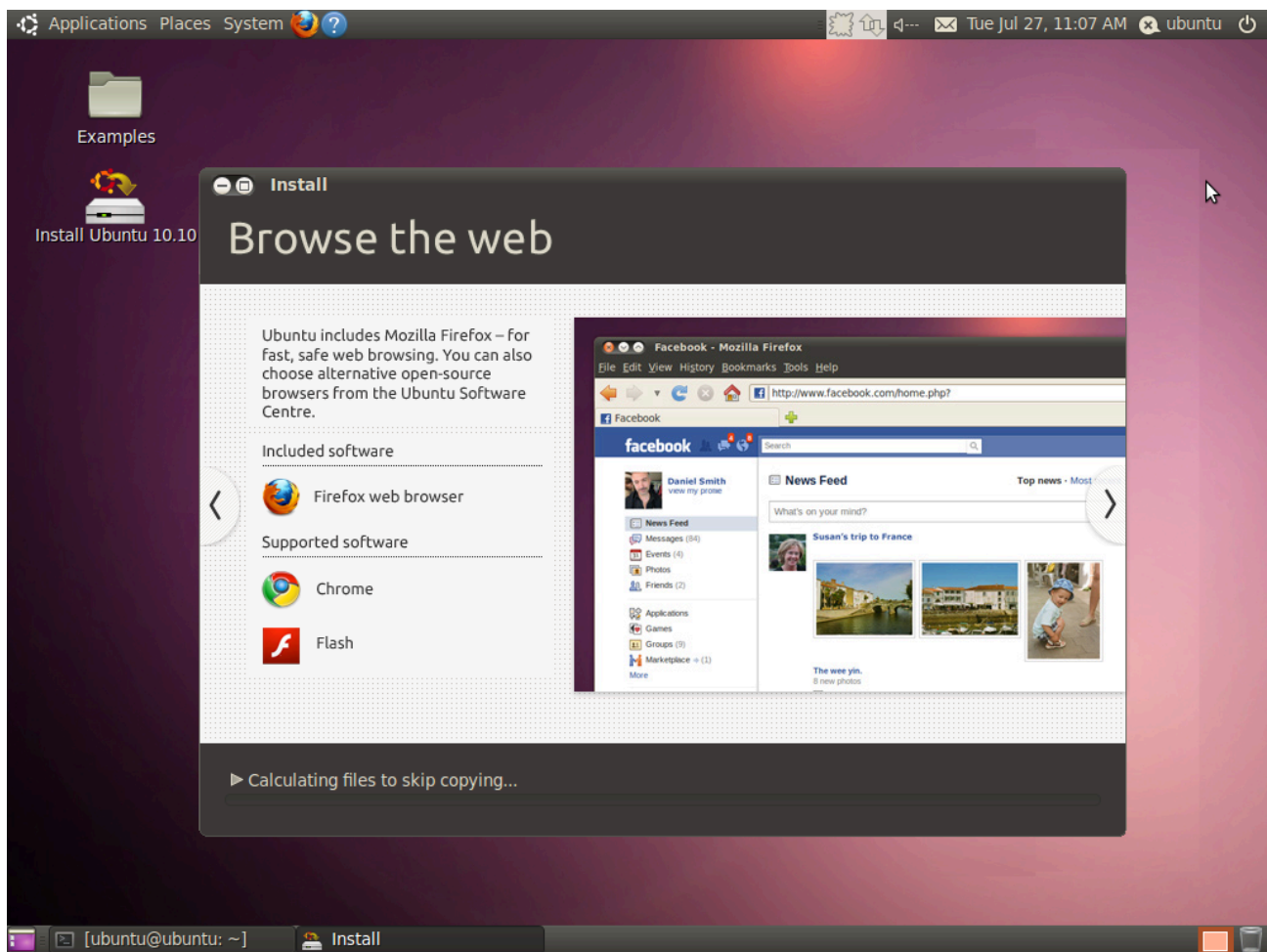
*Future work:*

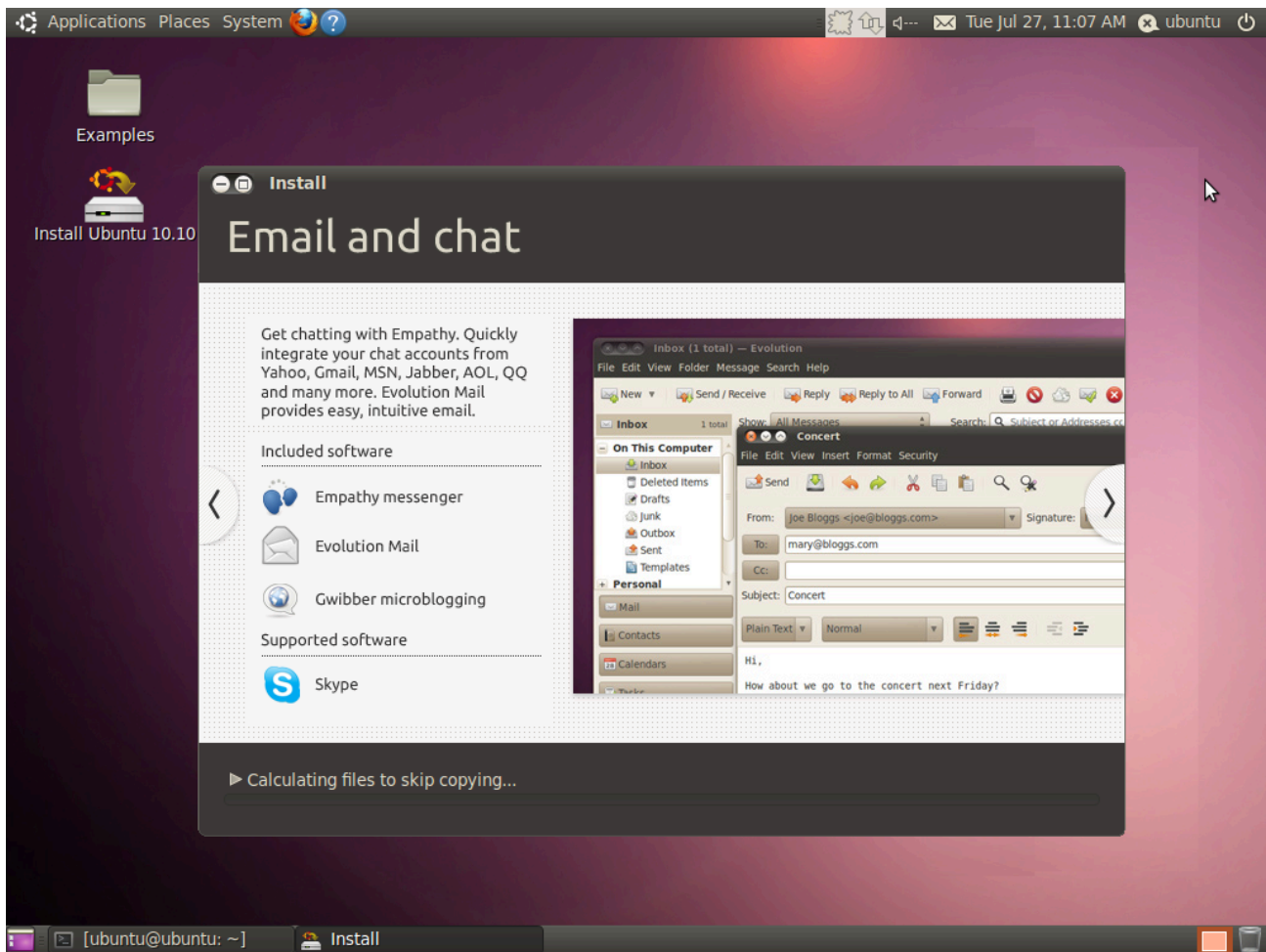
- *Revert to a previous photo.*
- *Crop a photo.*

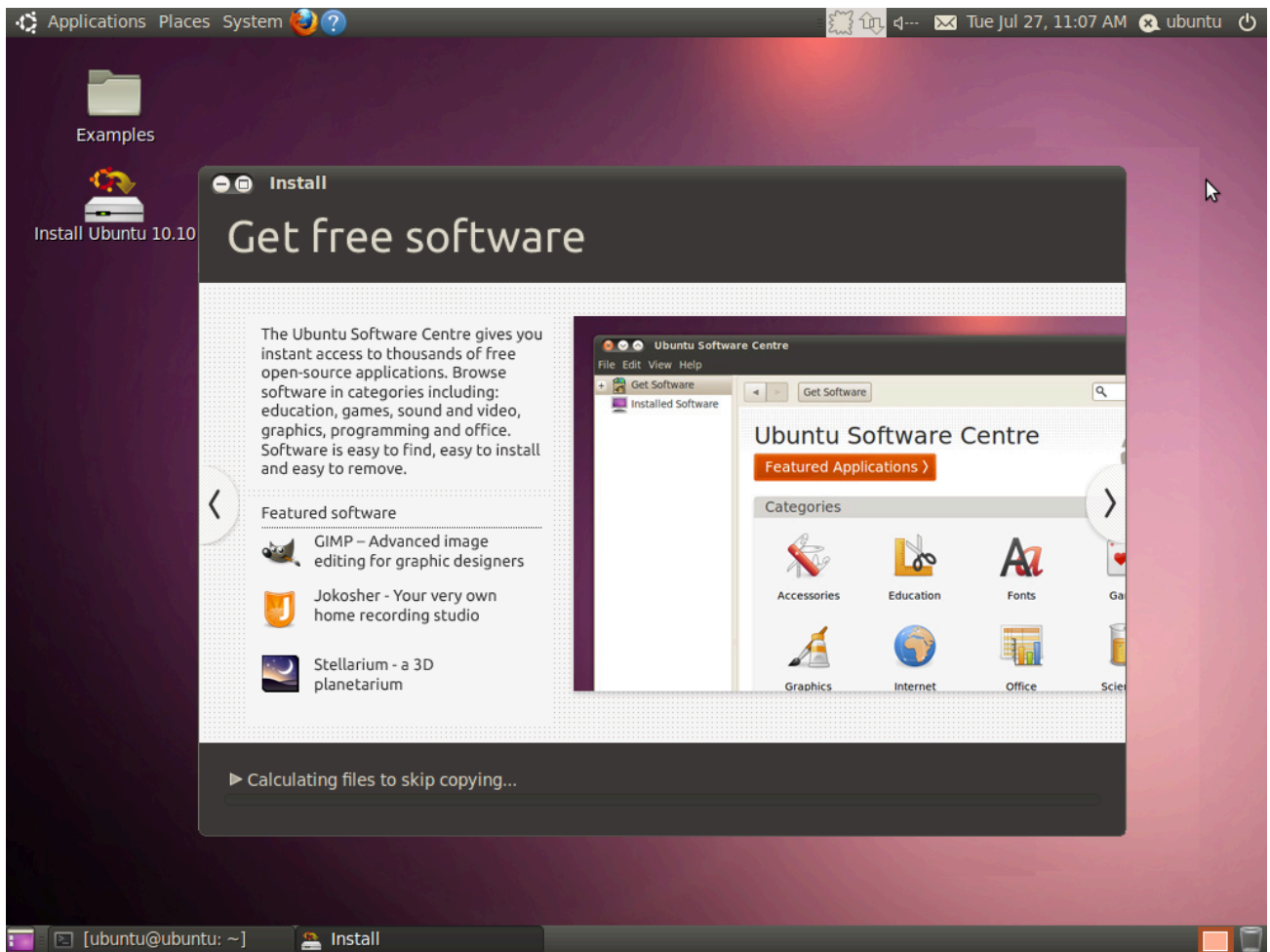
## “Installing”

12. *Ubuntu* presents the slideshow (which can be interrupted and navigated manually by clicking the

next and previous links)



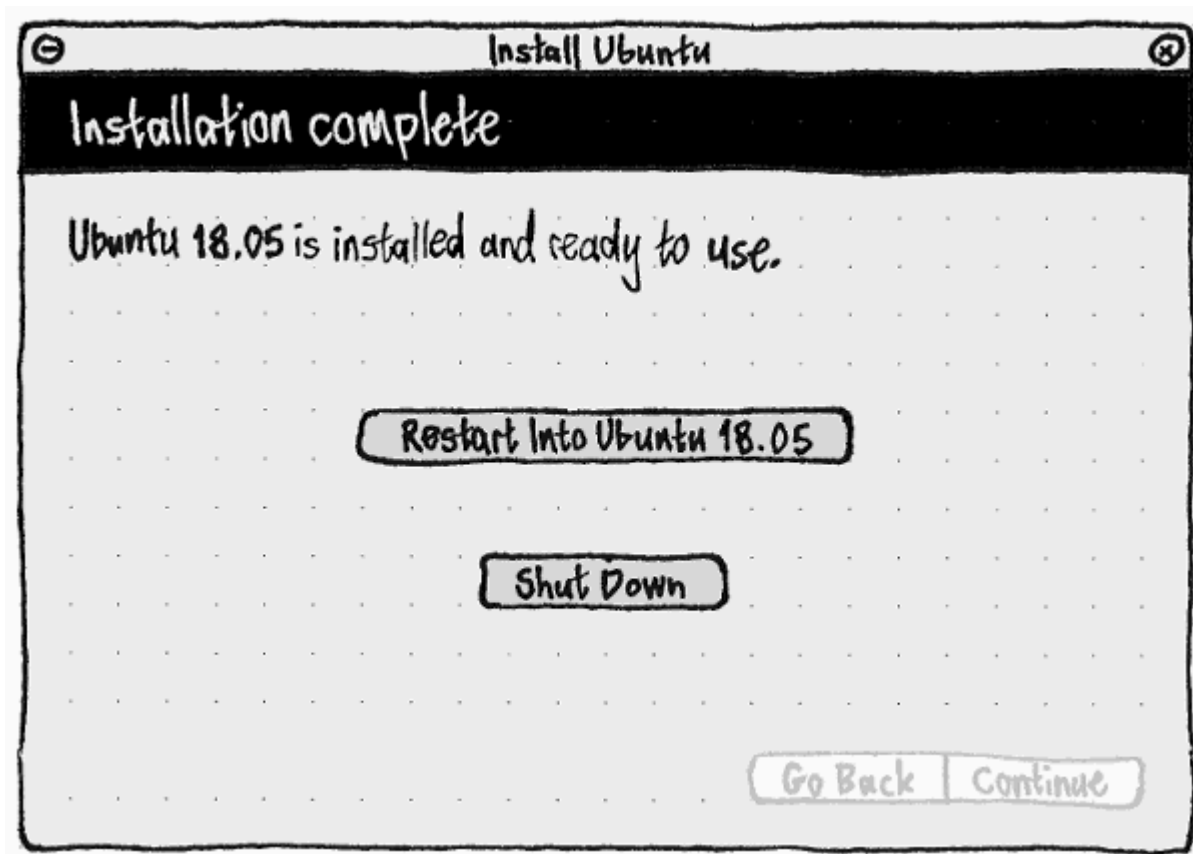




#### Notes:

- All content should be taken from <http://www.ubuntu.com/desktop/features>
- The Software Centre content has been tweaked to fit in with the format - copy in this design overrides copy on the website
- Note the addition of the Google Chrome icon under Browsing the web
- Animation behaviour should be match that of the carousel at the top of <http://www.ubuntu.com/desktop>
- Assets available here: bzt branch lp:~michaelforrest/+junk/installer\_assets

## "Installation complete"



The final screen should give you the choice of restarting into the new system or shutting down the computer ([bug 1324887](#)). (The “Restart Into Ubuntu {version}” button should be bigger, since that’s what people will usually want to do.)

## Implementation details

Are we doing the 'let me help Ubuntu by sharing data with Canonical' checkbox? -Evan Dandrea 6/3/10 6:18 PM

Yes. — Matthew Thomas 2018-02-15 4:31 PM

Are we going to use any transition effects between pages? The same sliding effect as the slideshow? Powerpoint keyboard? ;) -Evan Dandrea 6/3/10 6:18 PM

## Preseeding

casper or ubiquity will scan for other operating systems using os-prober and attempt to find the most recently booted OS that it can import settings from. It will then look at configuration files, plists, or registry locations for the settings for the language, keyboard map, and timezone.

It may also be possible to get the last-connected wireless network and key. If time allows and the design team deems it useful, this will be preseeded as well.

## Installation

An algorithm to calculate installation time remaining in minutes will be written. This should account for

steps beyond file copying by changing the text to 'finishing up' or something equally vague.

The navigation buttons that already exist in the slideshow, but are hidden by default, will be exposed and turned into hyperlinks.

A 'installation details' frame will be added that contains the console widget already used in update-manager.

The progress bar will be made thinner than the current theme setting by using a custom style, set by the `gtk.rc_parse_string` method.