Cloud and Mobile Programming

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Outline

- Cloud Computing
- Mobile Web Apps
- HTML Mobile Web Apps
- JavaScript
- WebKit Browser Engine
- Amazon Cloud
- Amazon Virtual Server
- Demo Mobile Web App

Cloud Computing

- A widely accepted assumption by app developer:

  Cloud computing is growing and will be the primary way to build the service infrastructure for apps

- Cloud computing offers many possibilities, like developing mobile apps, which can be used by millions of users

Cloud Computing

- Using cloud, there is no need to use traditional server-side languages such as Java or C# to build the cloud element of app development
- Node server allows running JavaScript on the server side. As a result a single language can be used for all the development

Mobile Web Apps

- Mobile Web apps can be divided to two types:
  - Web apps: websites that run in a web browser on a mobile device. They can be bookmarked on the device home screen and given icons and loading screens
  - Hybrid native apps: apps that run a web browser inside itself and uses HTML5 to implement user interface. A wrapper system is used to create a native wrapper, which creates a WebView control and provides access to device capabilities such as the camera via JavaScript API

Mobile Web Apps Pros

- The huge advantage if mobile web apps is that they are ultimately just websites, so they do not have to be submitted to any app stores for approval
- They can be updated frequently and they can be accessed from almost all smartphones
- Hybrid native apps have the advantage of being proper apps that are listed in the app stores. They can use device full potential and they can be extended with native code

Mobile Web Apps Pros

- Cross-platform: the app is automatically cross-platform and needs to be developed only once. Adjusting the app with different browser is comparatively minor compared to the huge effort to port an entire app from one platform language to another
- Standards compliant: HTML as a technology choice is a safe bet and it is quickly becoming the primary means of building user interfaces on any device, including mobile devices

HTML5 Mobile Web Apps

- Lower-cost rapid development: developing apps with HTML5, CSS and JavaScript allows building and iterating very quickly
- Low-friction deployment: apps can be launched immediately without waiting for a third-party approval process. We have complete control over content, user base and commercial activities.
- Easy to learn: mainly good knowledge of web languages is required. No need to learn a new language such as Android, Swift, etc.

JavaScript

- Is emerging as the next high industry language
- It can be used not only for websites but also for mobile apps and for server code
- Is one of the few languages that can cover the entire technology stack
- It has certain weaknesses like unfortunate syntax inherited from the C language. But it also supports advanced functional and object-oriented programming styles

JavaScript

- Allows building complex apps with relatively few lines of codes
- Can be easily debugged using a web browser. This leads to a huge increase in software development productivity
- Data structures, can be easily defined using JSON, which allows defining literal JavaScript objects as a list of key/value pairs, like:
- {"Apple":1.99, "Cherry":4.90, "Banana":1.35, "Orange":0.90}

WebKit Browser Engine

- The built-in web browsers on the iPhone and Android use the open-source WebKit browser engine to display HTML
- The WebKit project (http://www.webkit.org/) was launched in 2005 by Apple and has developers from many companies including Google.
- The WebKit projects is descended from the KHTML project, which was one of the early Linux web browser engines, renewed for its small and clean code base.

WebKit Browser Engine

- WebKit -based browsers can be used on both desktop and mobile devices. Safari browser uses WebKit as its HTMl engine. Safari is also available for Windows. On Linux the easiest option is Chrome, which also uses WebKit.
- Since mobile apps will run on the WebKit engine on both desktop and mobile devices, the development process becomes easy even though we still need to test the apps in the real environment.

Amazon Cloud

- Mobile apps can be delivered from a public URL and accessed anywhere.
- One way to do this is to deploy the mobile application to Amazon cloud.
- The Amazon cloud or Amazon Web Services(AWS) is a collection of on-demand services for building websites and apps that can scale up to meet very high demands.

Amazon Cloud

- The Elastic Compute Cloud (EC2) provides virtual servers as instances.
- These server instances can be very tiny virtual machines or large dedicated servers.
- The exciting thing about this is that we don’t have to spend money buying servers up front. We may have a great idea for a mobile app, backed by an online service, but we don’t know in advance how quickly we’ll get users to sign up.

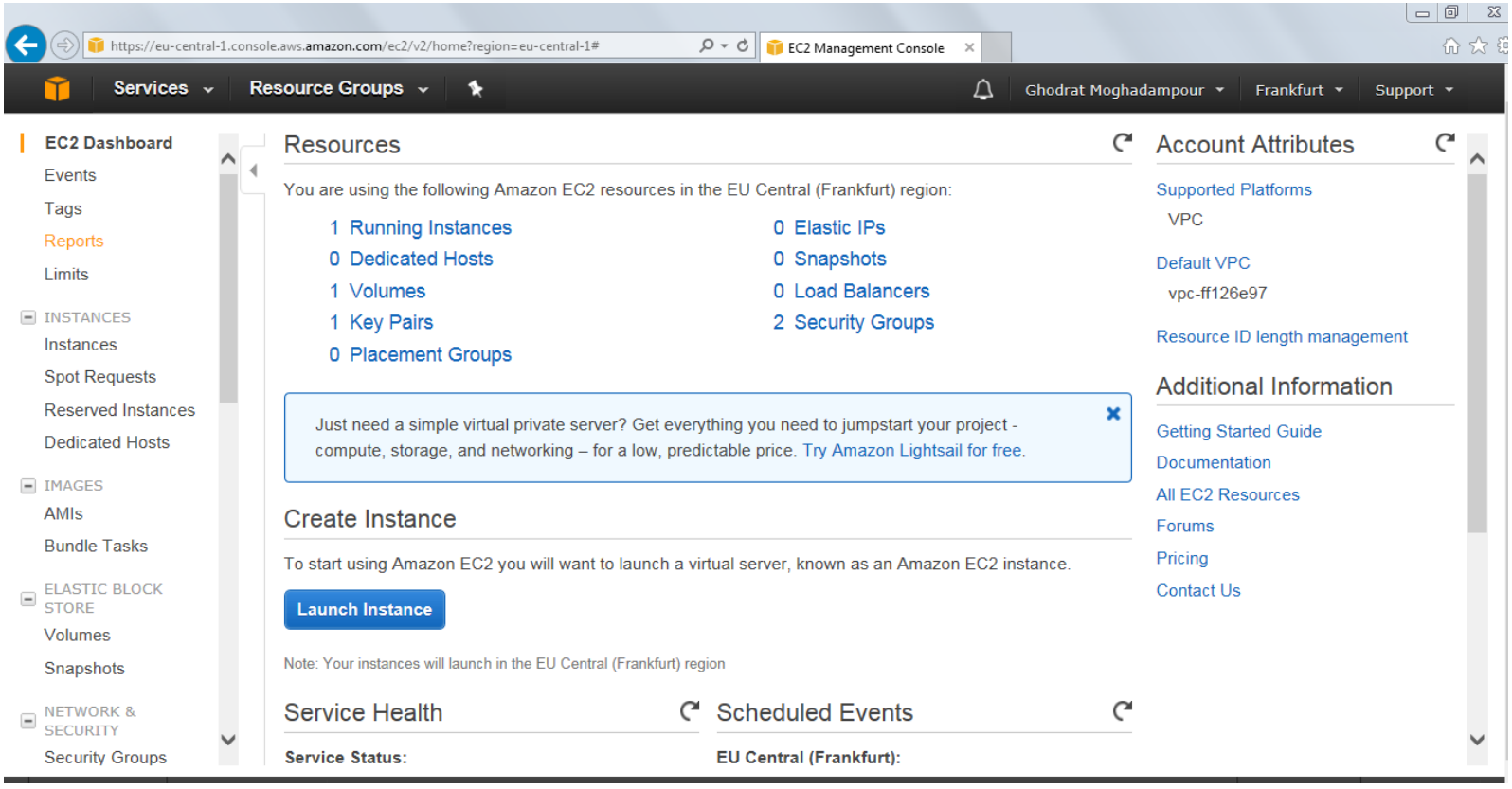
Amazon Cloud

- Amazon's EC2 service lets us start with small services and pay for them as we use them.
- Each instance is created from a prebuilt copy, known as an Amazon Machine Image (AMI).
- We can create our own AMIs and instead of installing a new operating system each time, we can simply reuse a preconfigures copy that already has the right software installed.

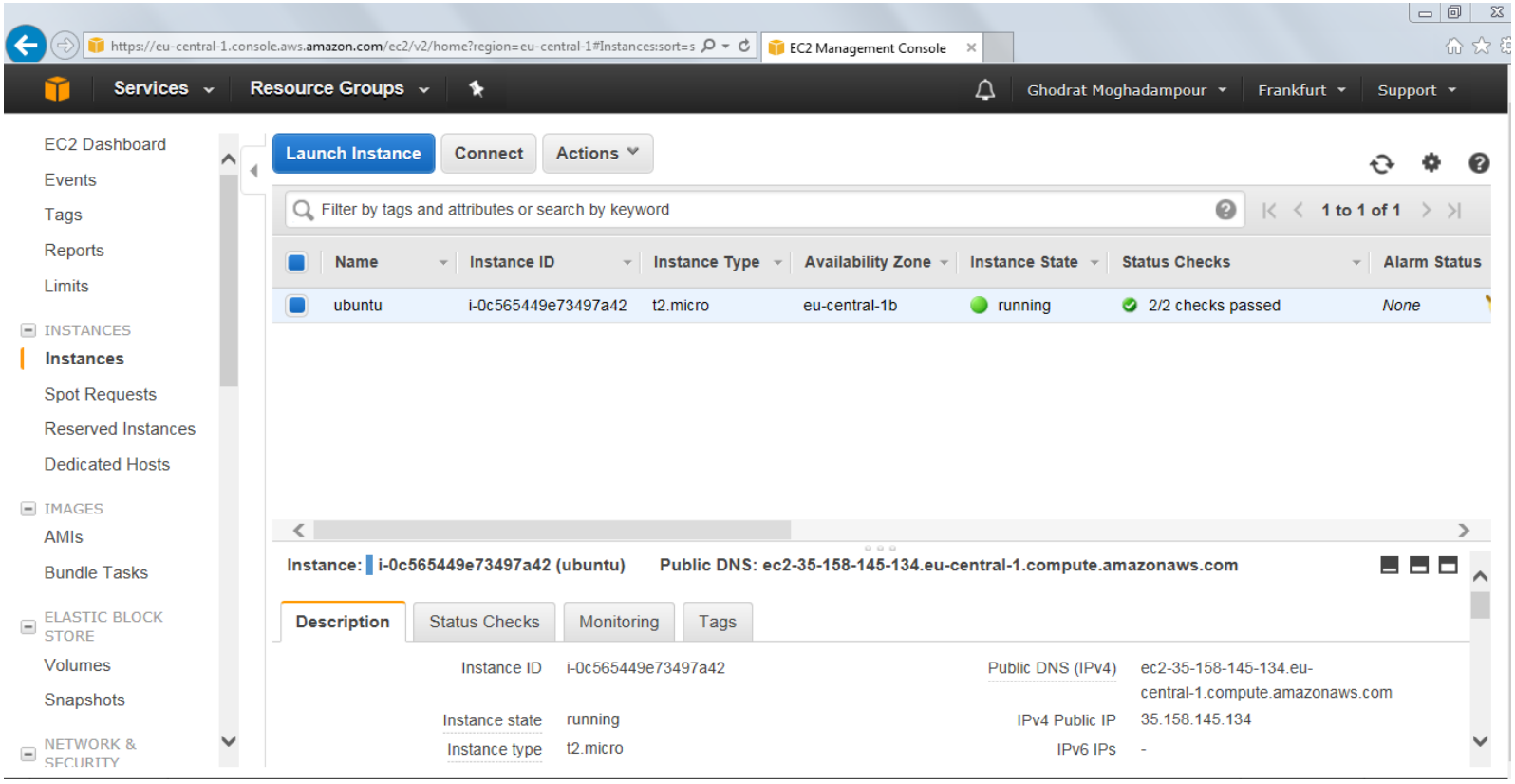
Amazon Cloud

- The AWS cloud is not provided as a single global service, but in a few AWS regions.
- These correspond to geographic regions, where Amazon has set up data centers to provide the physical infrastructure for the AWS cloud.
- There are cost differences between the regions and in general, we should pick the region that is

Amazon Cloud



Amazon Virtual Servers



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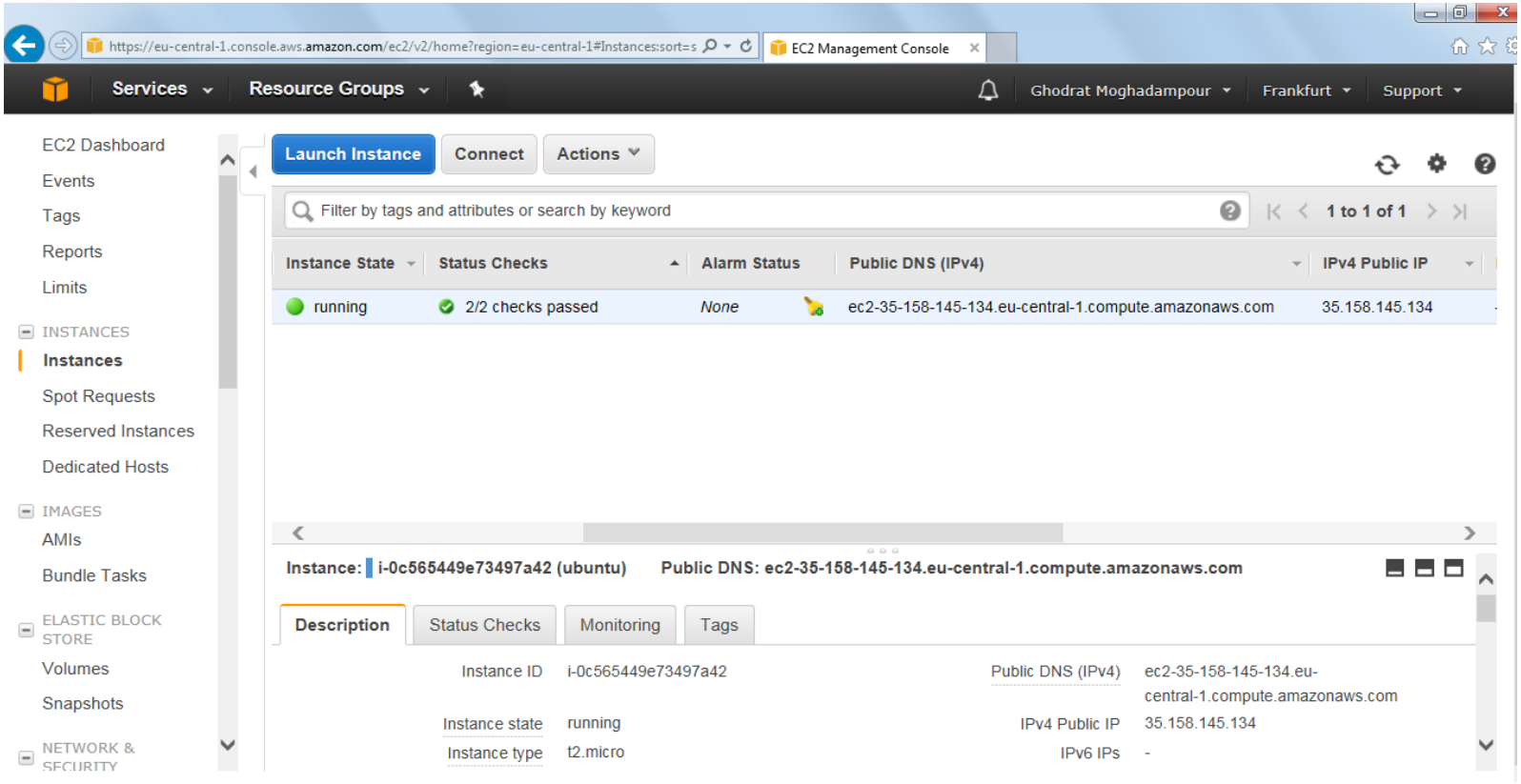

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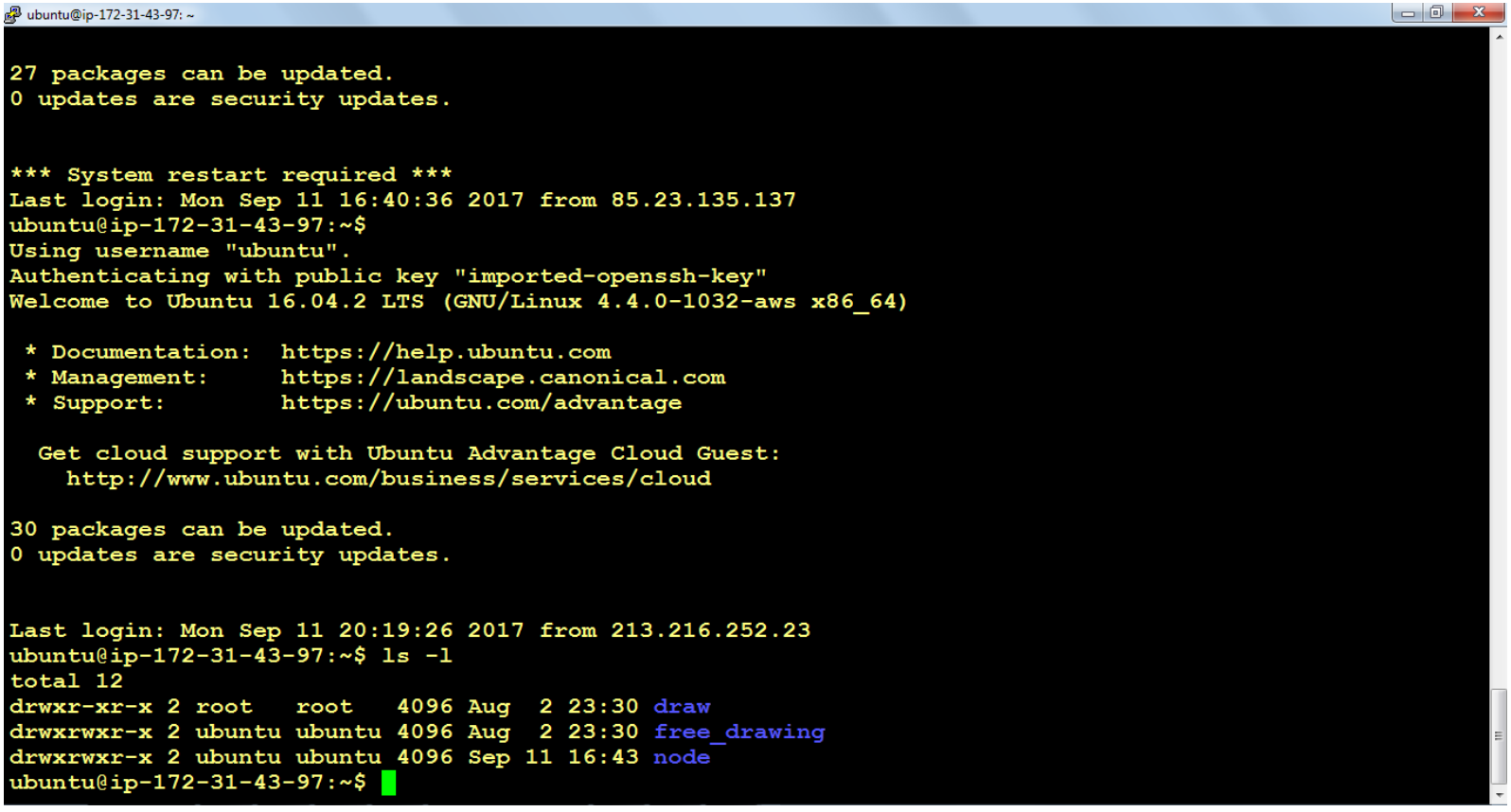

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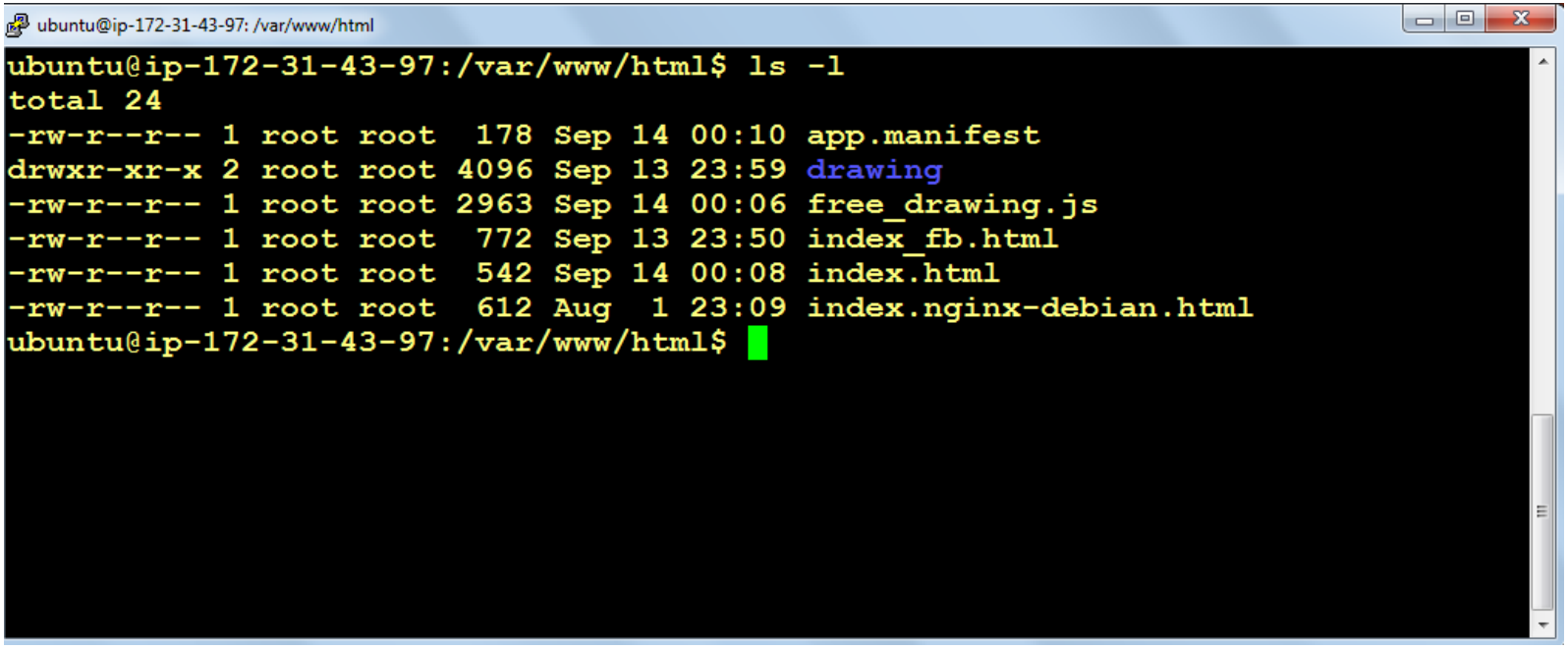

Thank you!

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