
INTERNET2
2024
COMMUNITY
exchange
LIGHTNING
STRIKES THE
CLOUD

Lightning Round Rules

10 Minutes – Kind of Strictly Enforced

Countdown Notifications at 3 and 1 min remaining

Questions are not allowed during presentations, if we don’t have time at the end, please follow up with the speaker during networking time

Click to add the title text

Amazon Lightsail for Research

Scott Friedman, Ph.D., Amazon

Lightning Strikes the Cloud at SLU

Shruthi Sreenivasa Murthy, St. Louis University

Unlocking Research Potential on Google Cloud

Ezequiel Gioia, University of Central Florida

Automated Transcription for Social Science Researchers

Alan Walsh, Indiana University

PART ONE

Amazon Lightsail for Research

Scott Friedman, Ph.D.

Amazon

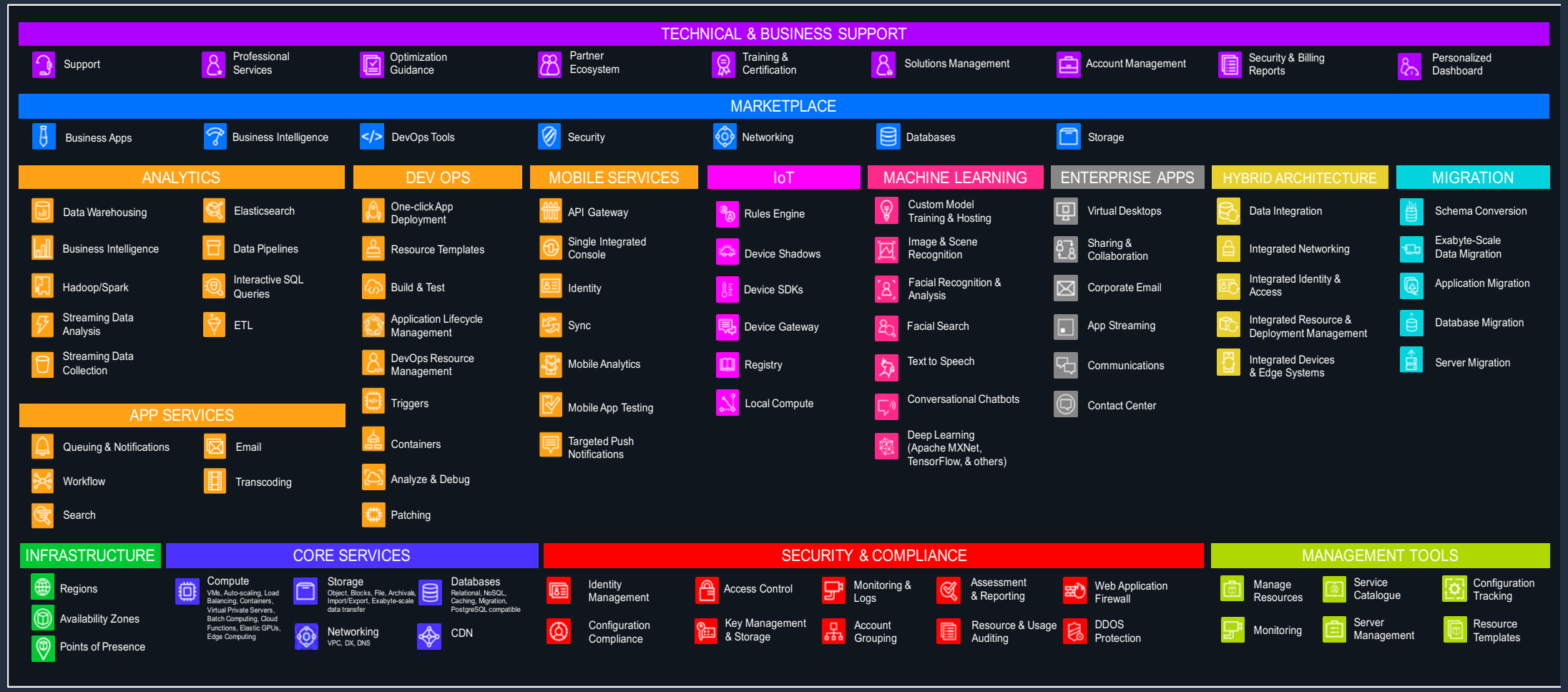
Amazon Lightsail for Research

Scott Friedman, Ph.D. (he/him)

Higher Education Research
scofri@amazon.com

Research computing is not just HPC

AWS Functionality is broad and deep



Maybe too deep?

…and that’s not even all of it

Lightsail for Research

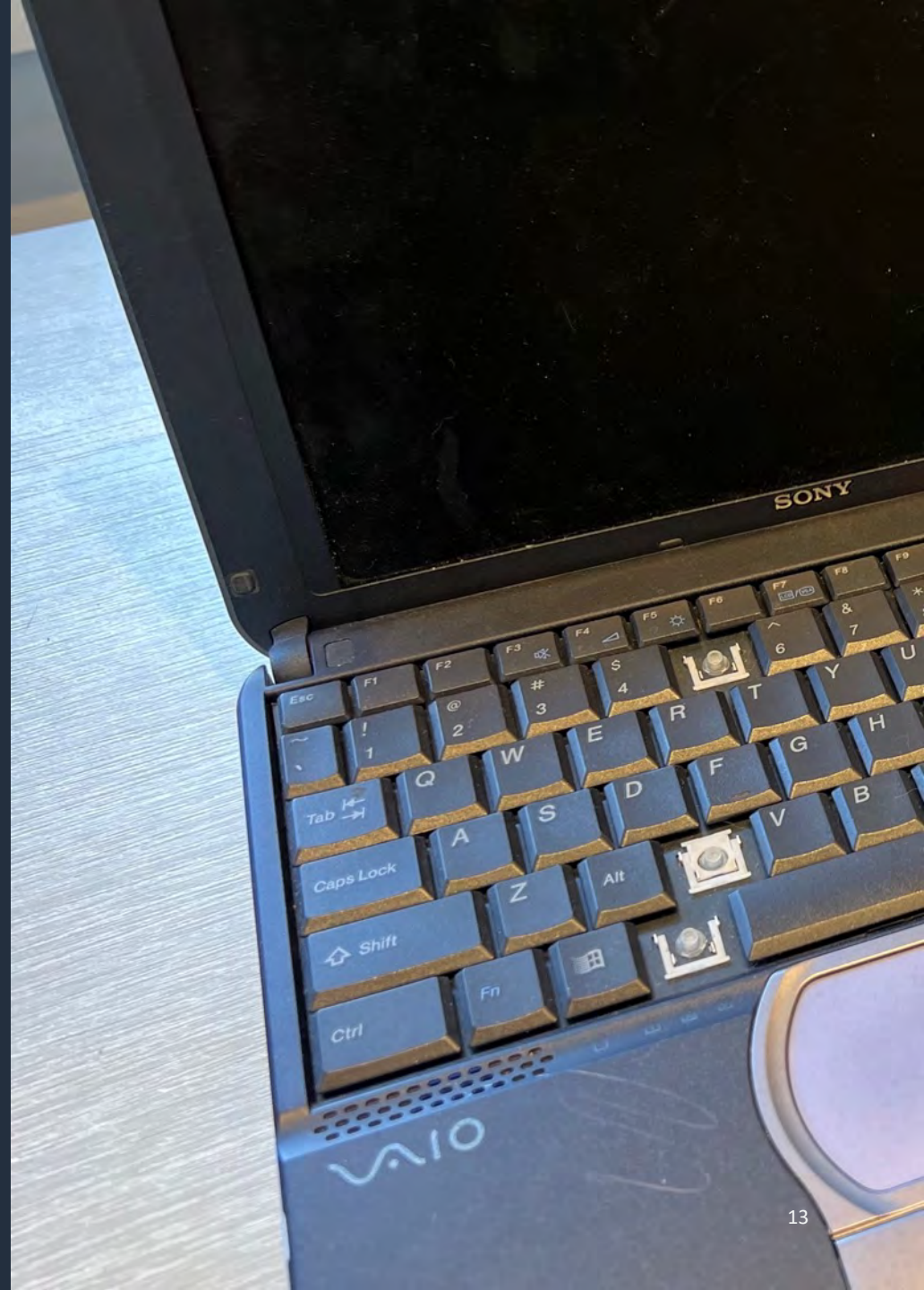
Key Features

- Lightsail for Research is an AWS service
- There is nothing to install
- Requires no cloud or IT skills to get started
- Simple to explain, understand, and use
- Offers bundled pricing, makes spending clear up front
- Has built-in cost controls, saving money

Researchers

Research lives on laptops…

- Papers & proposals written
- Data stored & visualized
- Analyses performed
- Collaboration platform



Researchers

Research lives on laptops…

- Papers & proposals written
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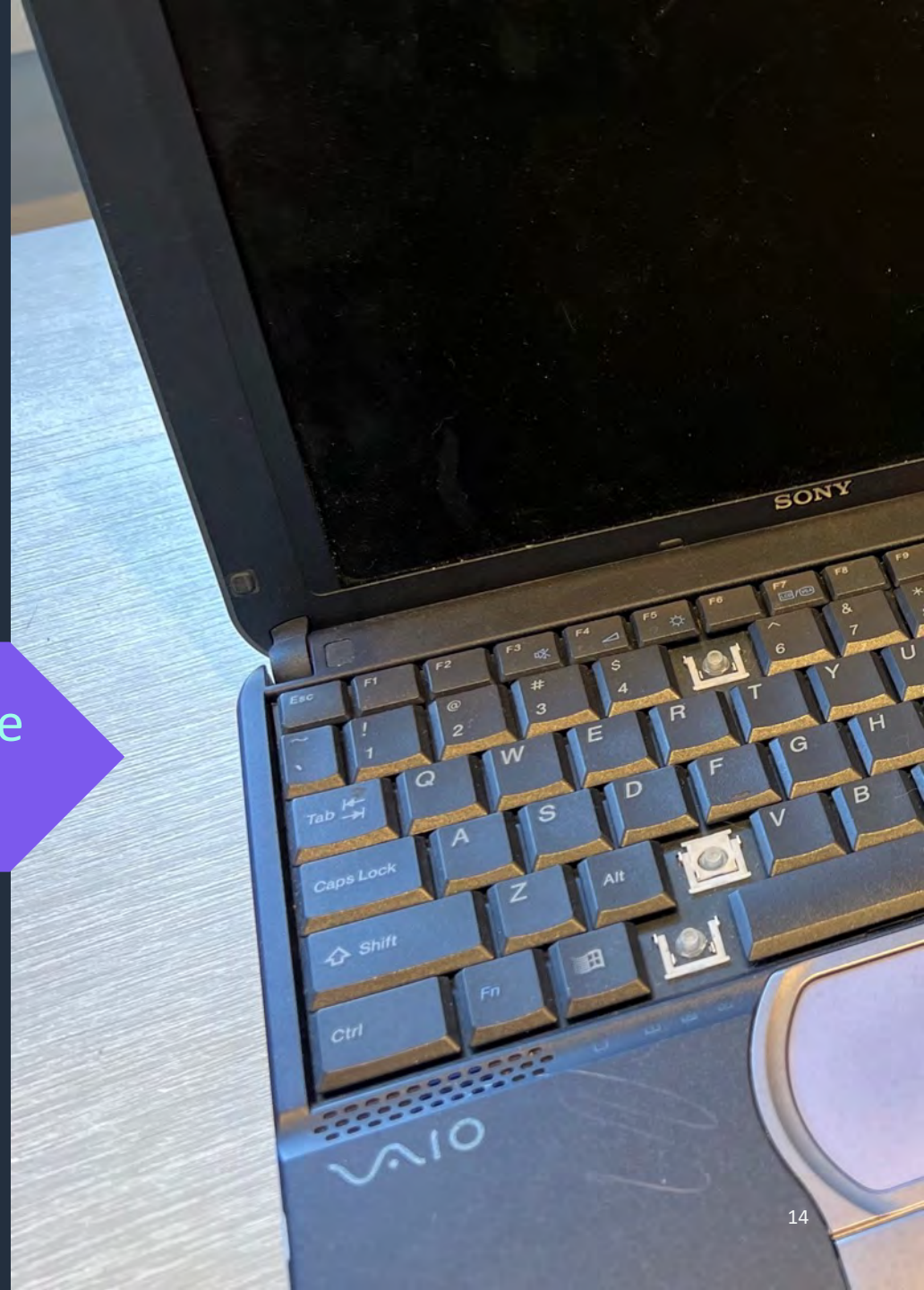
More and more demanding!



Researchers

Modern research needs more…

- Compute: speed/cores/GPU
- Memory: limited problem size
- Time: long running/multiple analyses

Researchers

Most researchers exist in an IT abyss…

Little research IT support and enablement

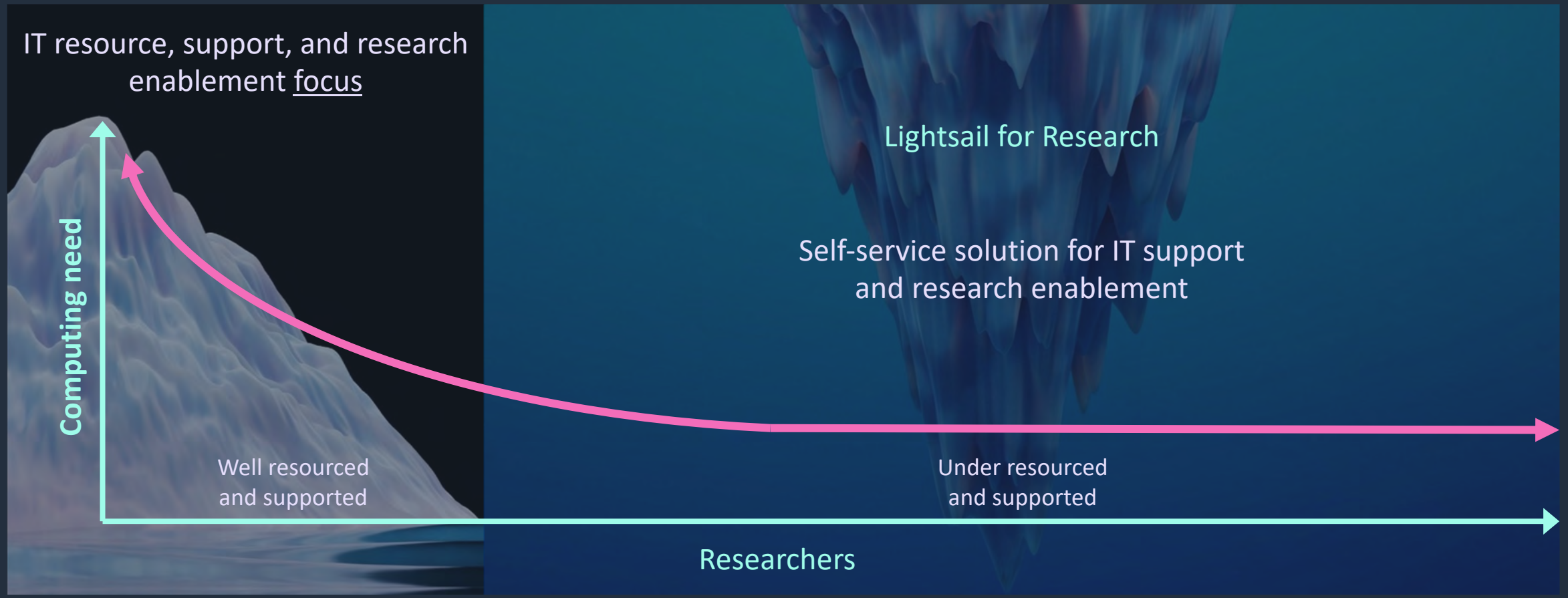
Want…

to focus on their research

simple access to resources

They are budget conscious

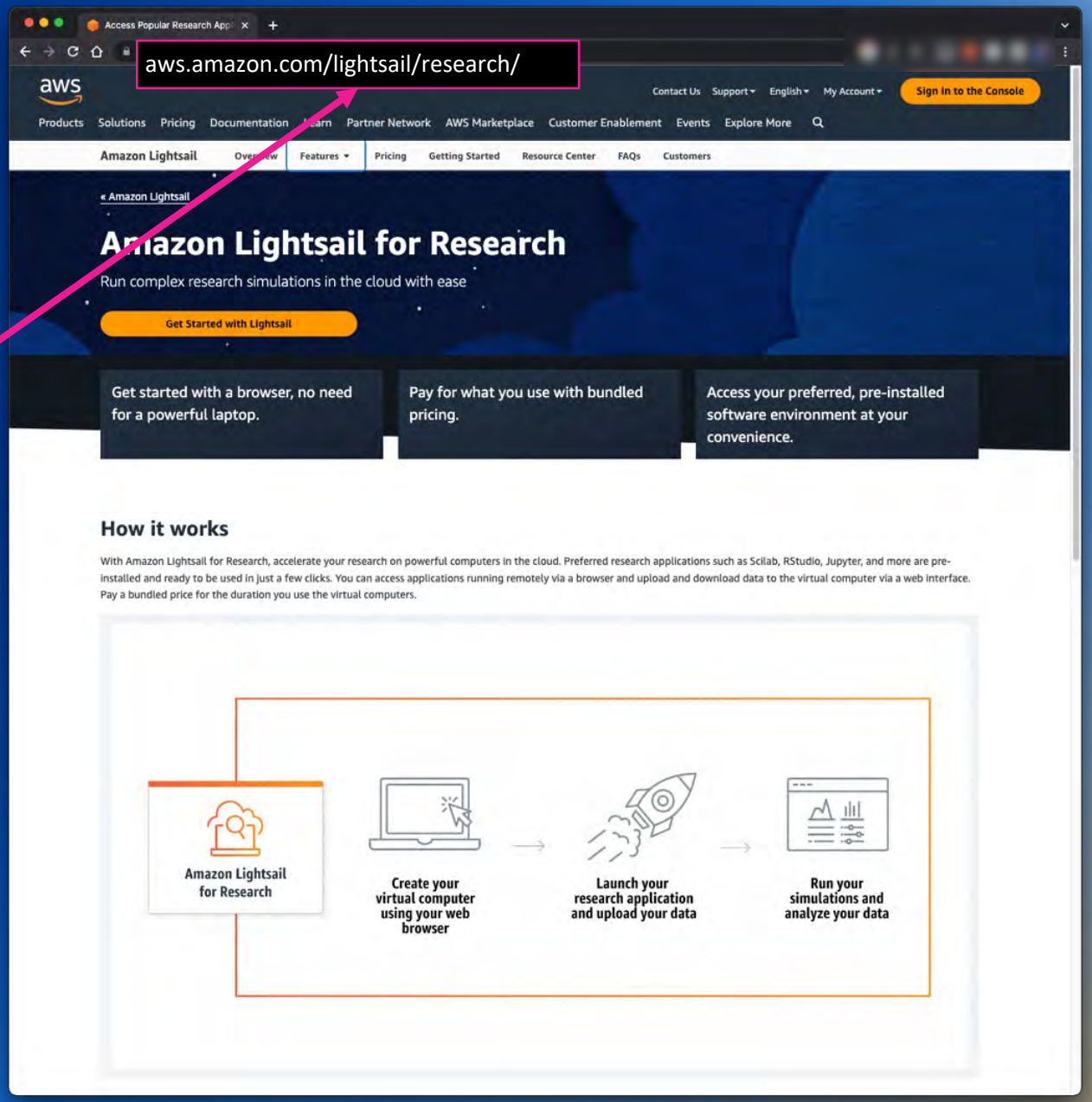
Central and Research IT



NOTE: You will need an AWS account to follow along with the following steps.

1

Enter the URL above into the new browser tab.



1

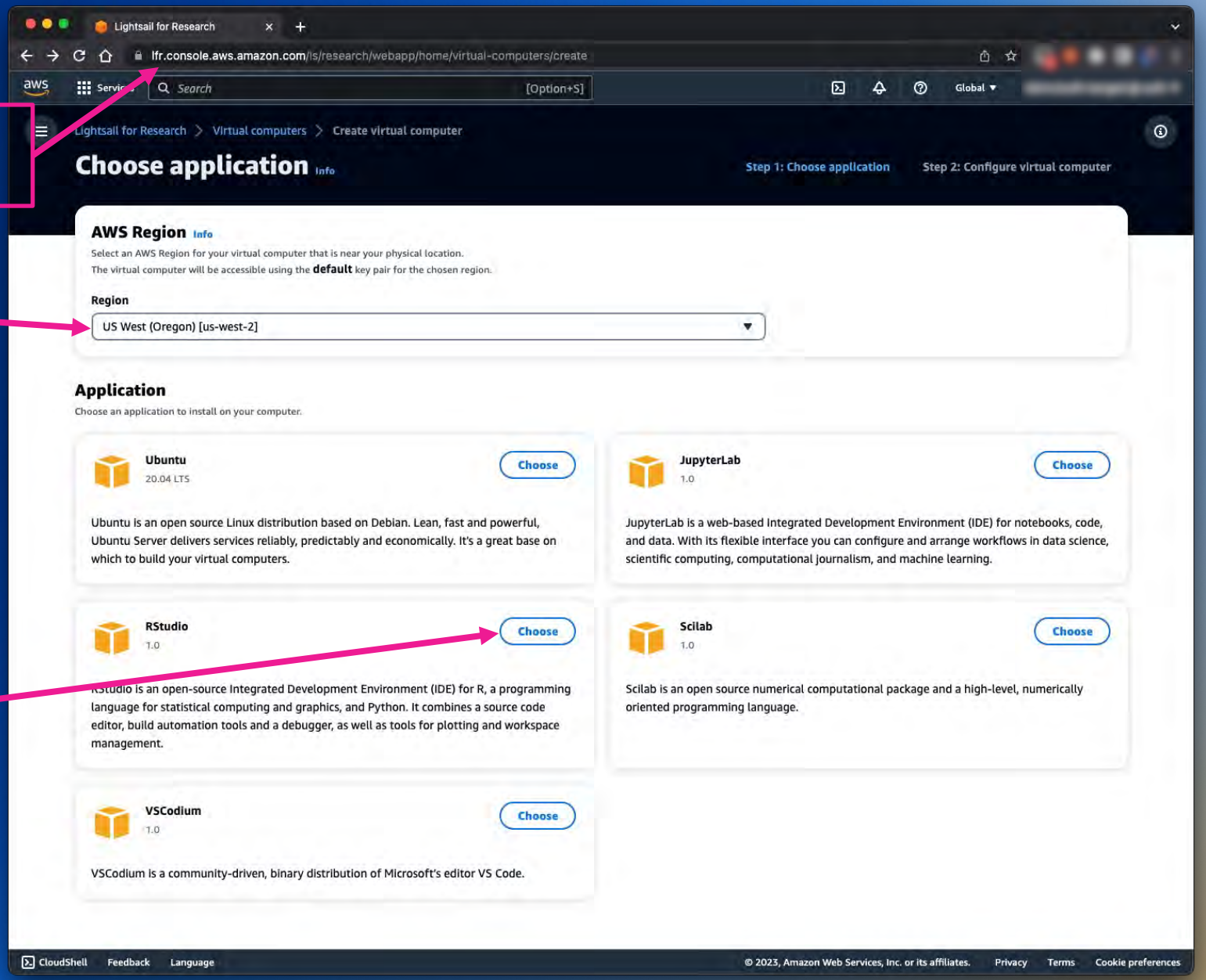
In your browser navigate to lfr.console.aws.amazon.com

2

Select a region close to you.

3

Choose an application bundle to continue



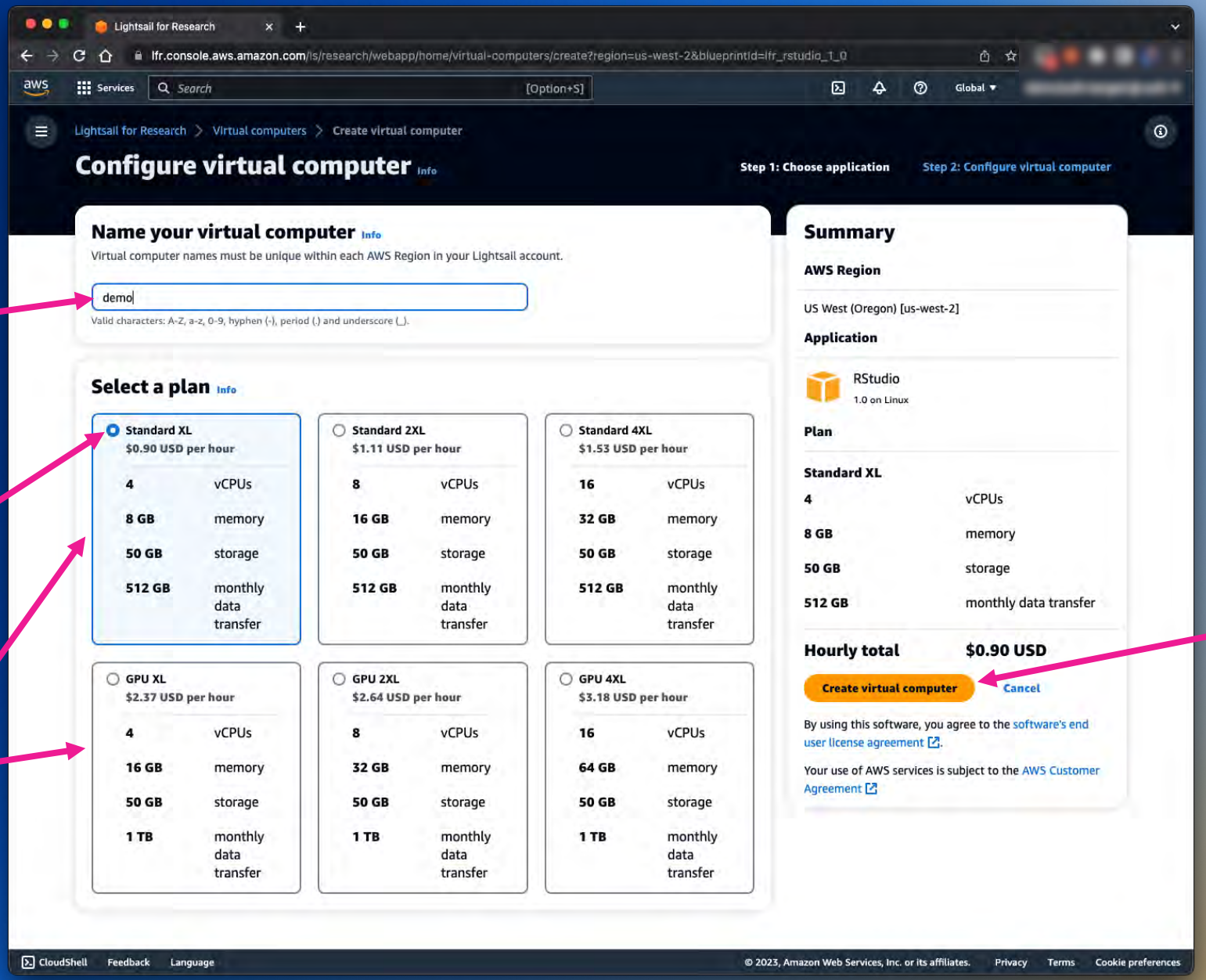
1

Enter a name for your virtual computer.

2

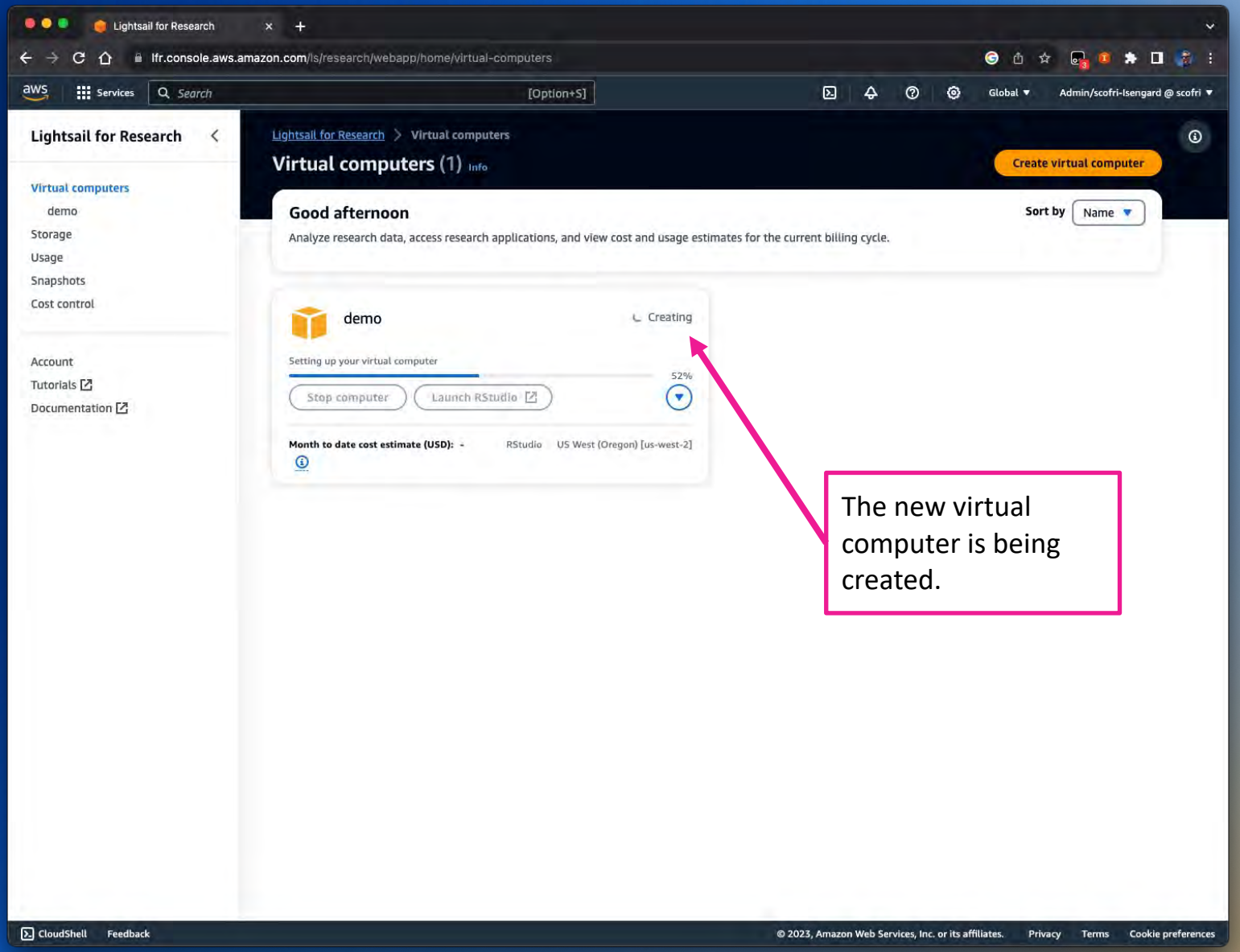
Choose a plan that matches your needs. You can change it later if you need to.

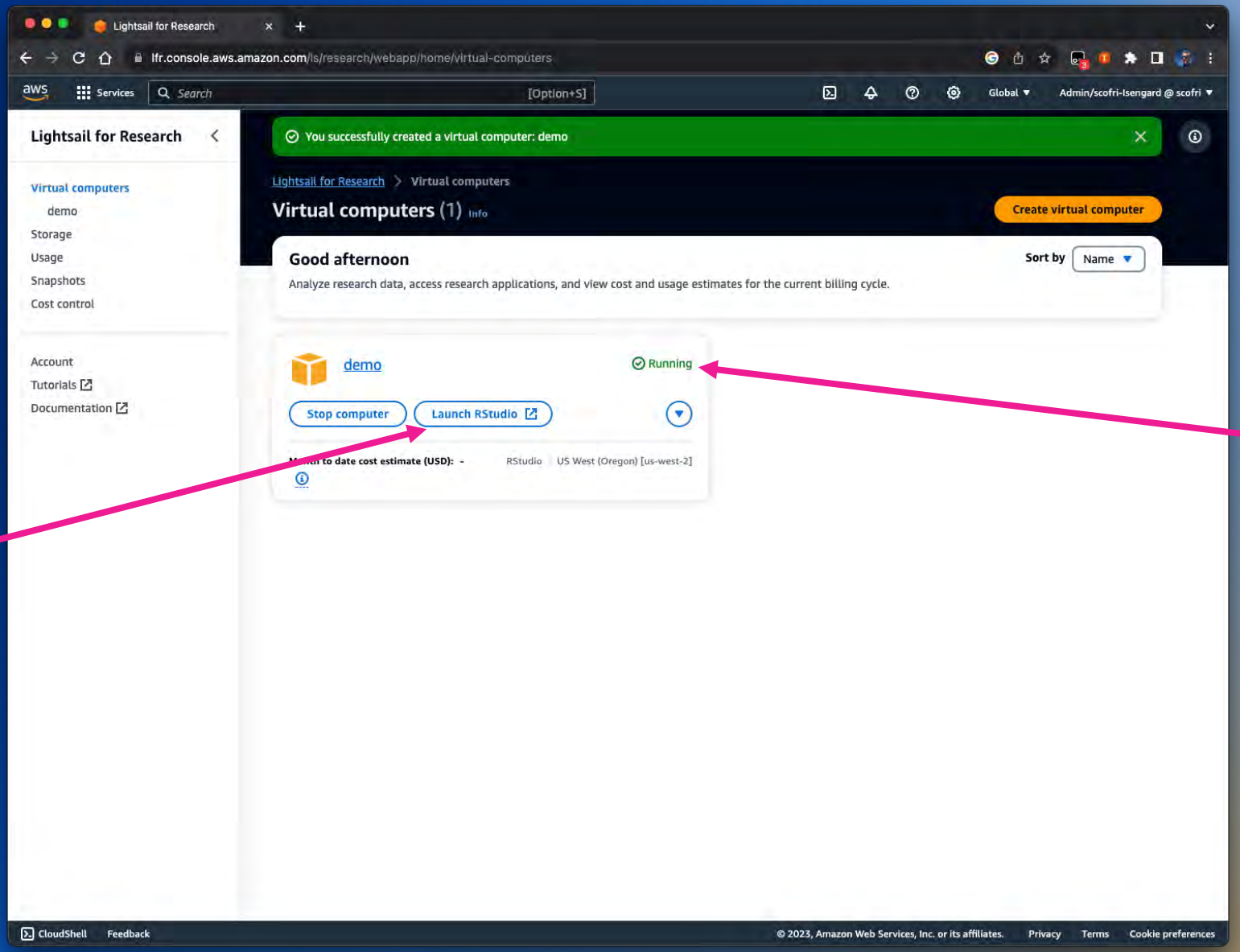
You can choose between CPU or CPU+GPU virtual computers.



3

When ready choose *Create virtual computer*.



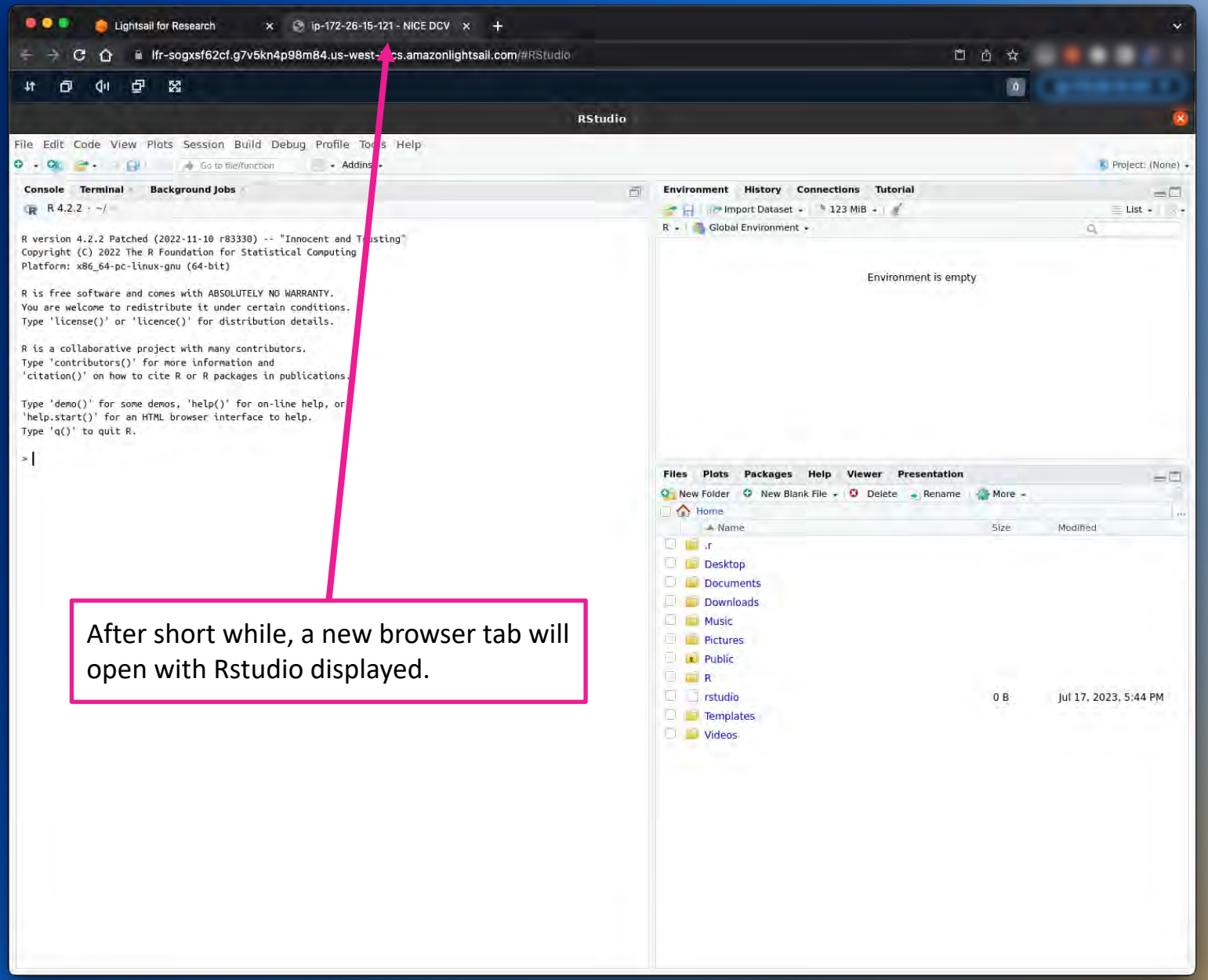


1

After a short while your virtual computer will change its status to *running*.

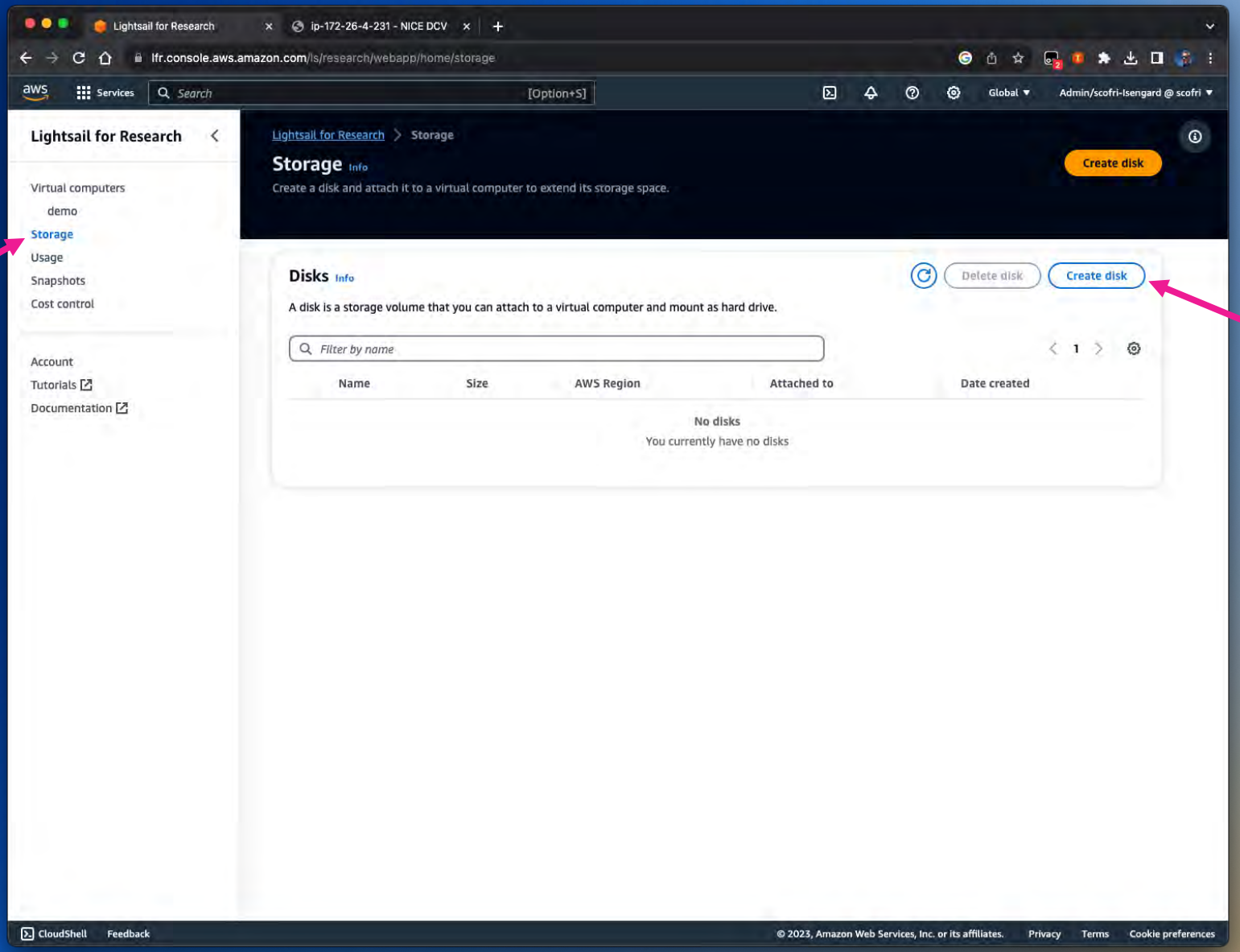
2

Choose *Launch Rstudio*.



1

Choose *Storage* to create a data disk.



2

Choose *Create disk*.

1

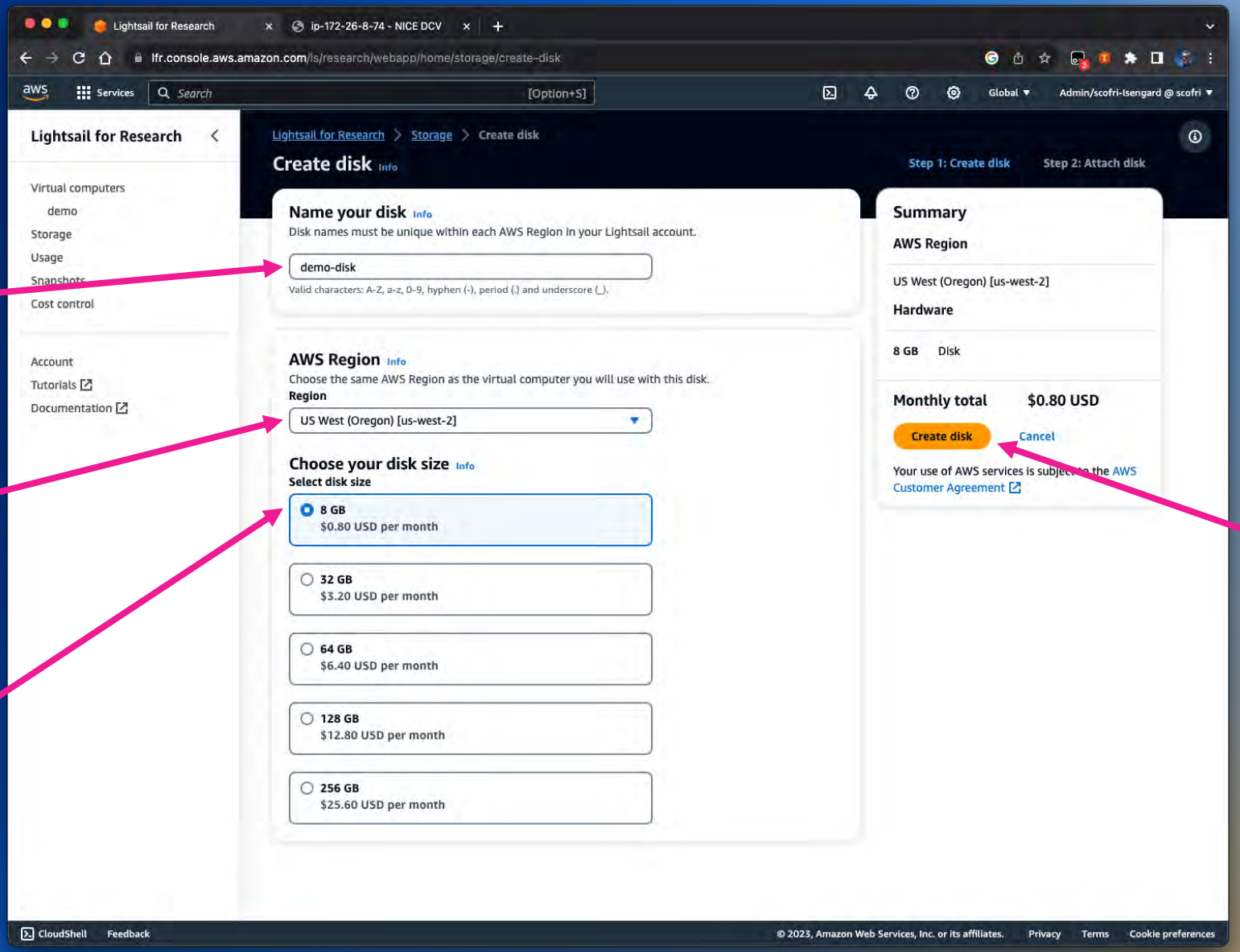
Enter a name for your new disk.

2

A region geographically will be selected for you by default. (it should be the same as earlier)

3

Choose a size for you disk.

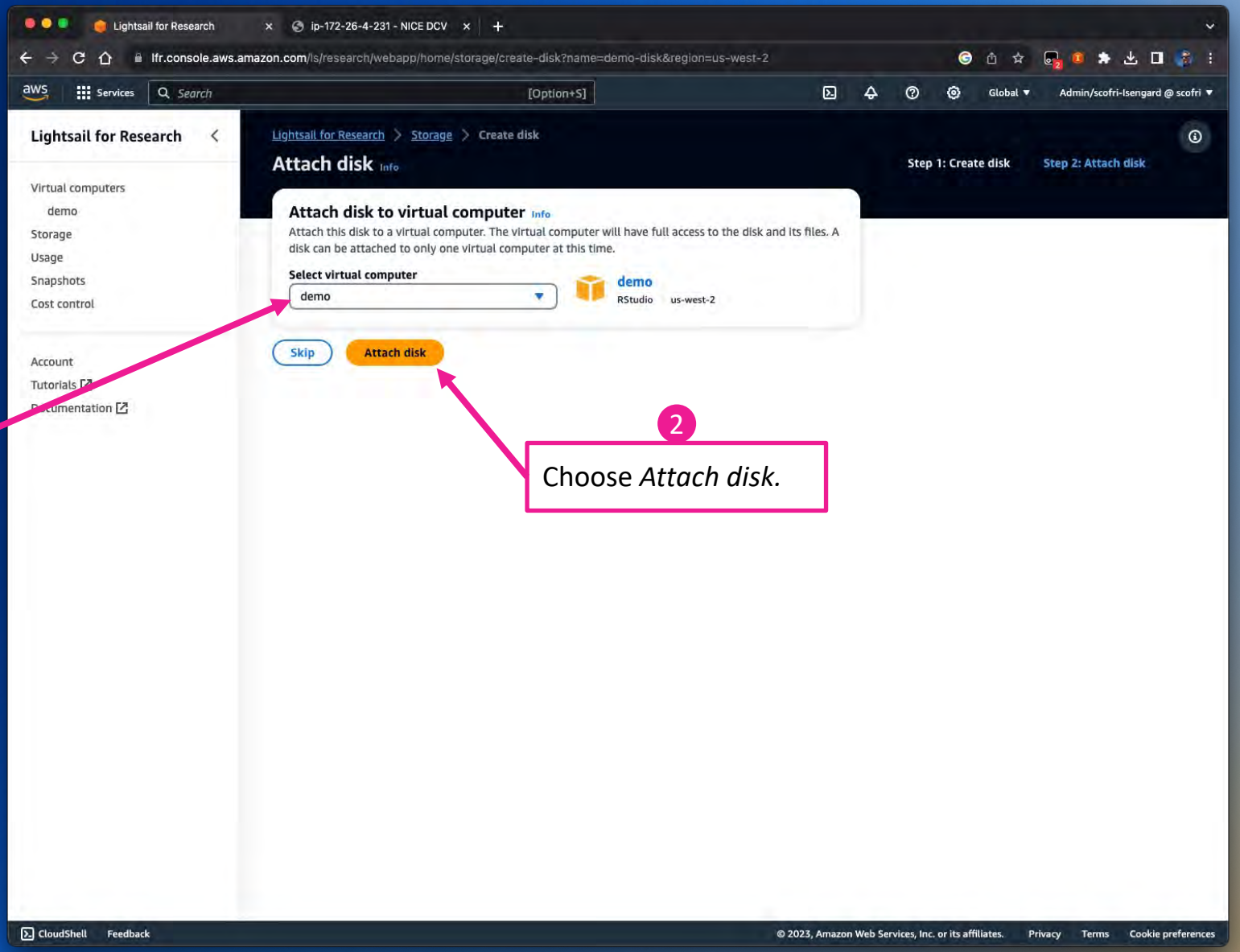


4

Choose *Create disk*.

1

Select the virtual computer the new disk will be attached to.

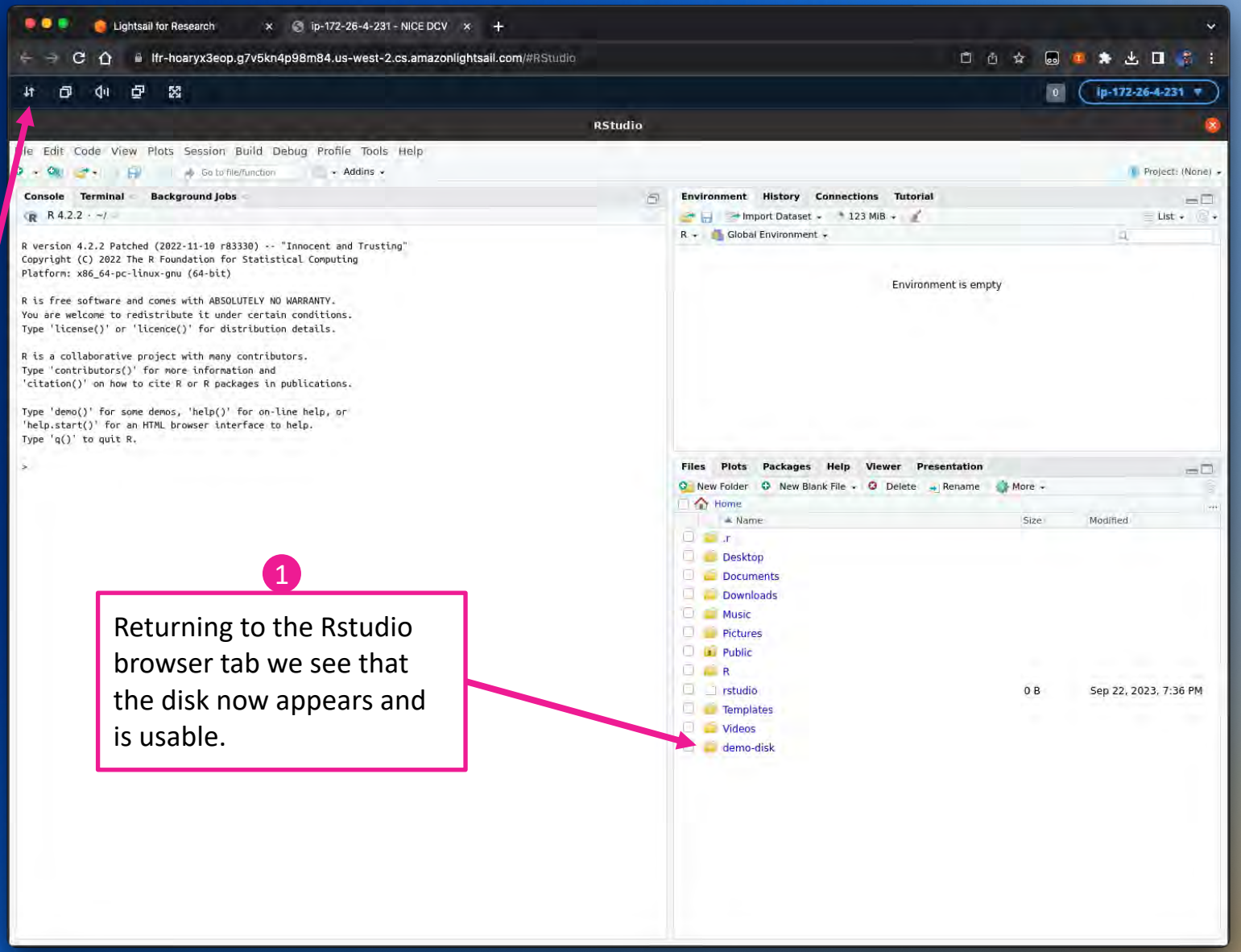


2

Choose *Attach disk.*

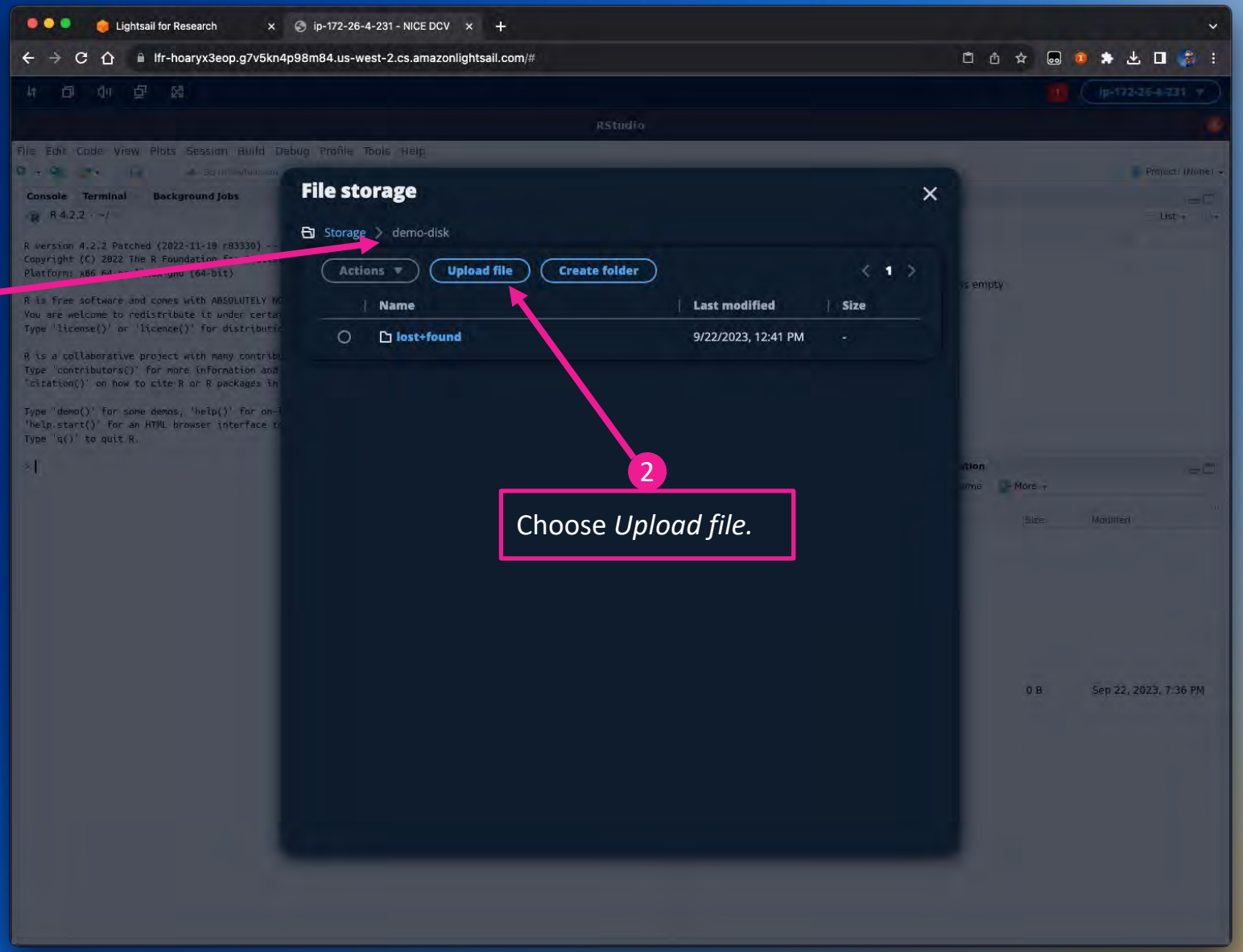
2

To upload some data to our virtual computer choose the *double arrow* icon.



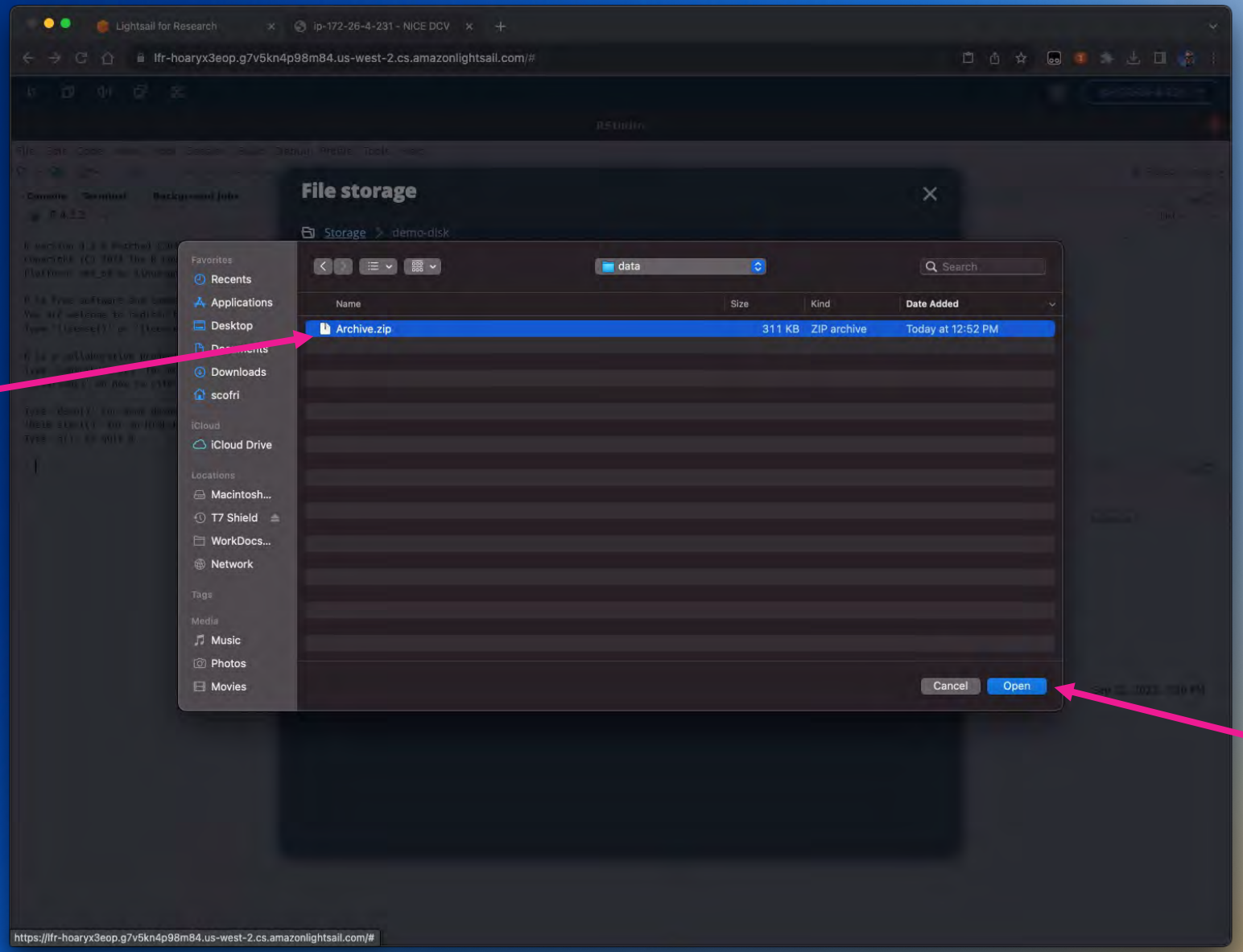
1

Returning to the Rstudio browser tab we see that the disk now appears and is usable.



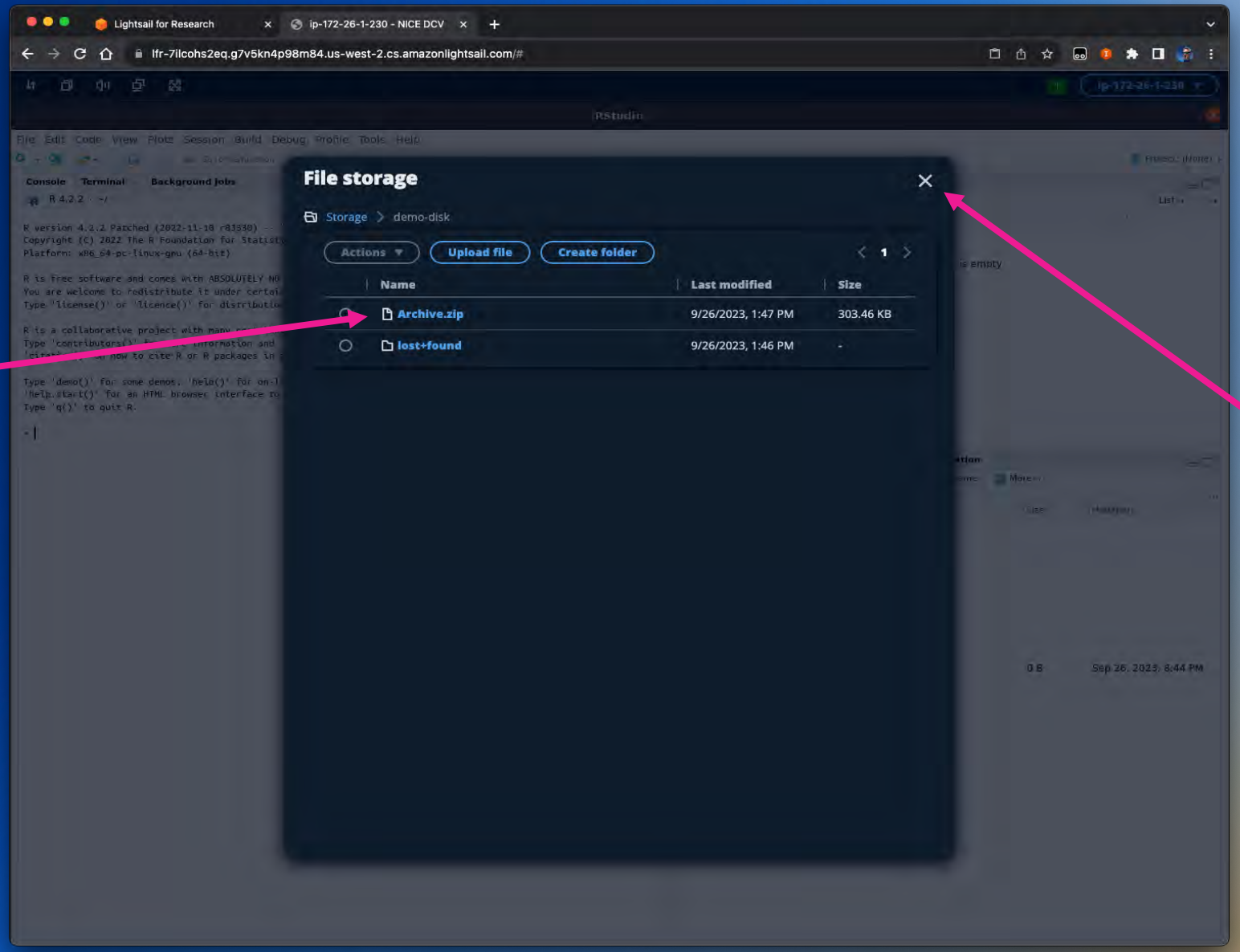
1

On your local computer navigate to and select the file you want to upload.



2

When ready, choose *Open*.

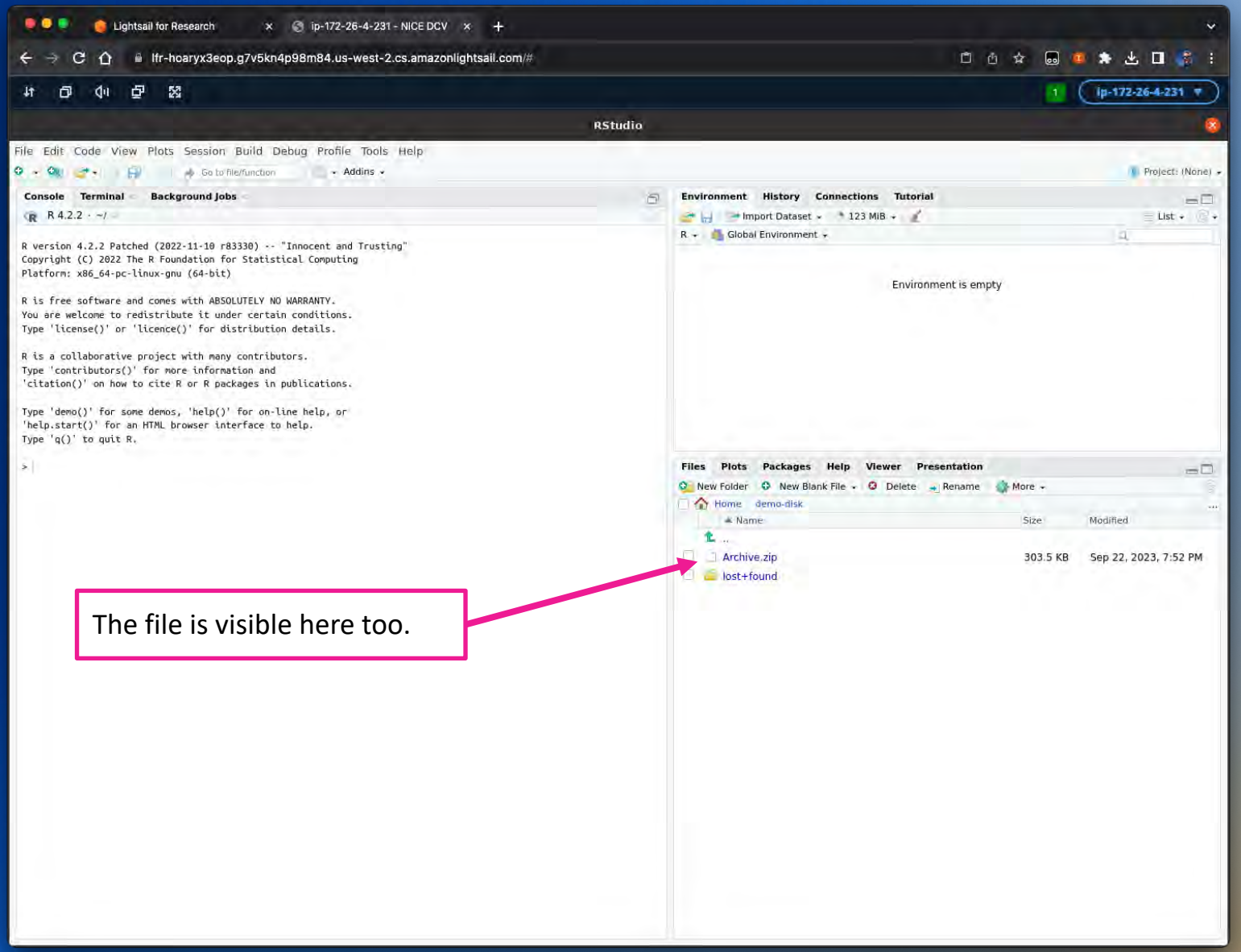


1

The file is now uploaded to the virtual computer.

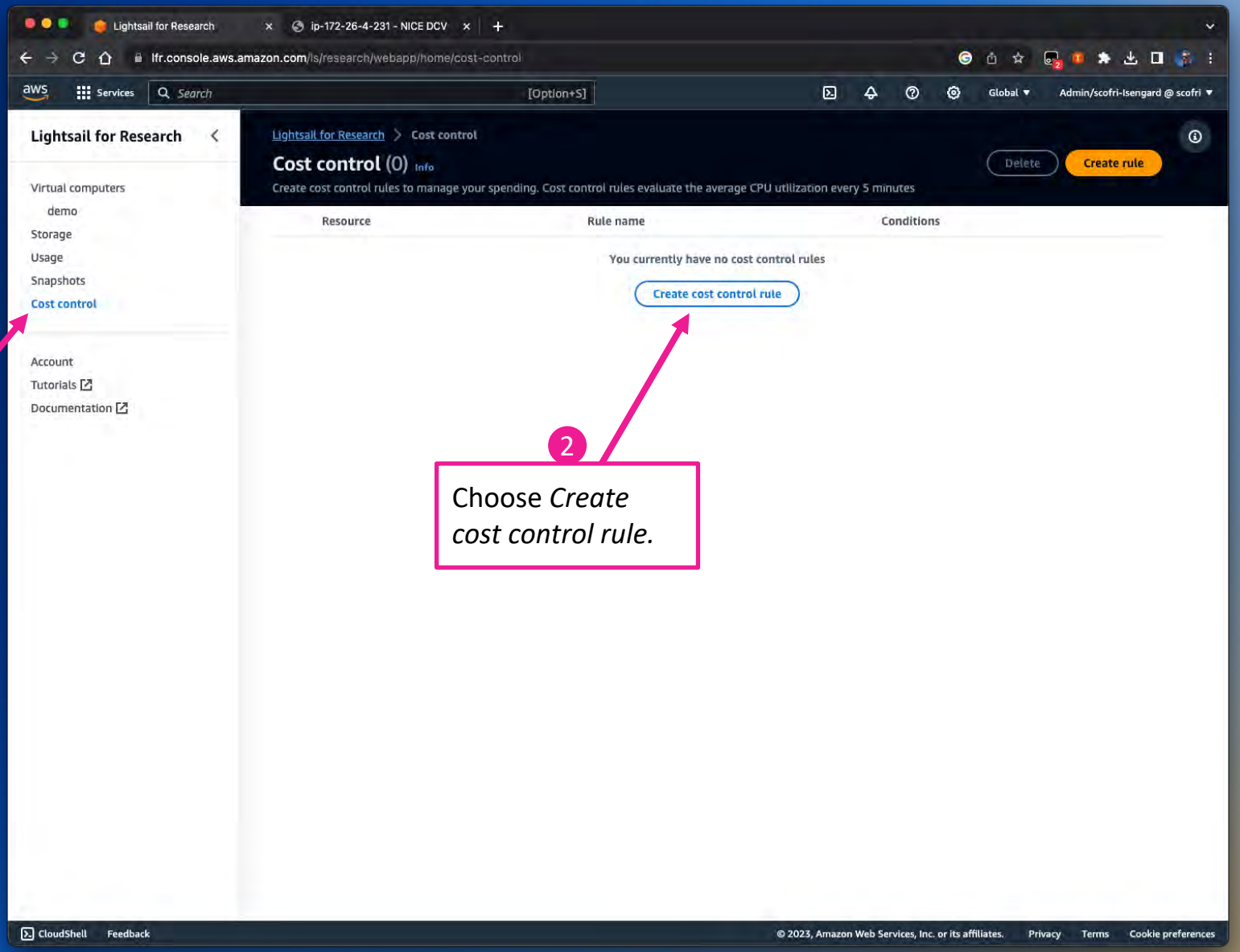
2

When finished, click on the X to close the window.



1

Choose *Cost control* to add a rule to your virtual computer.

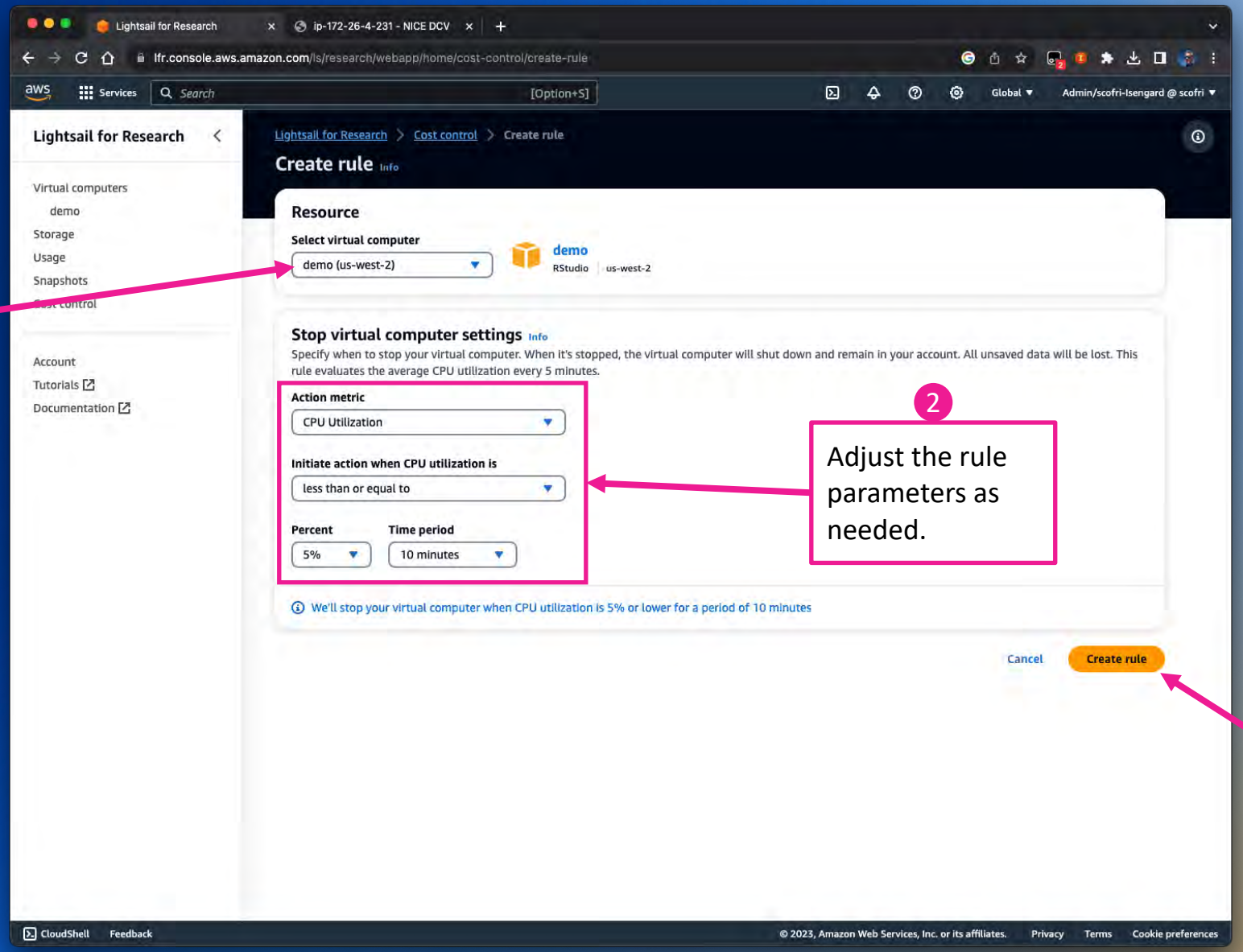


2

Choose *Create cost control rule.*

1

Select the virtual computer you want to apply the rule to.

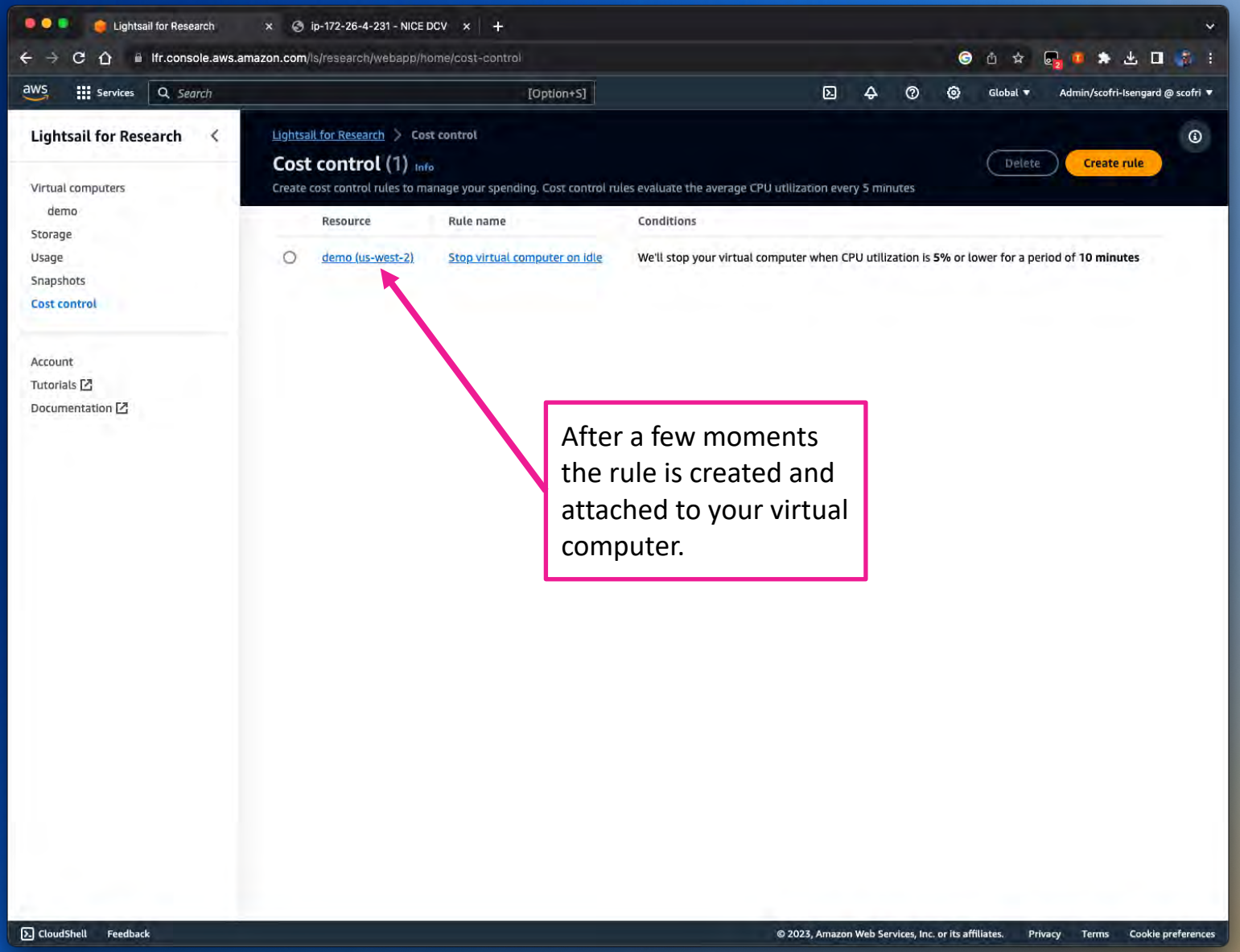


2

Adjust the rule parameters as needed.

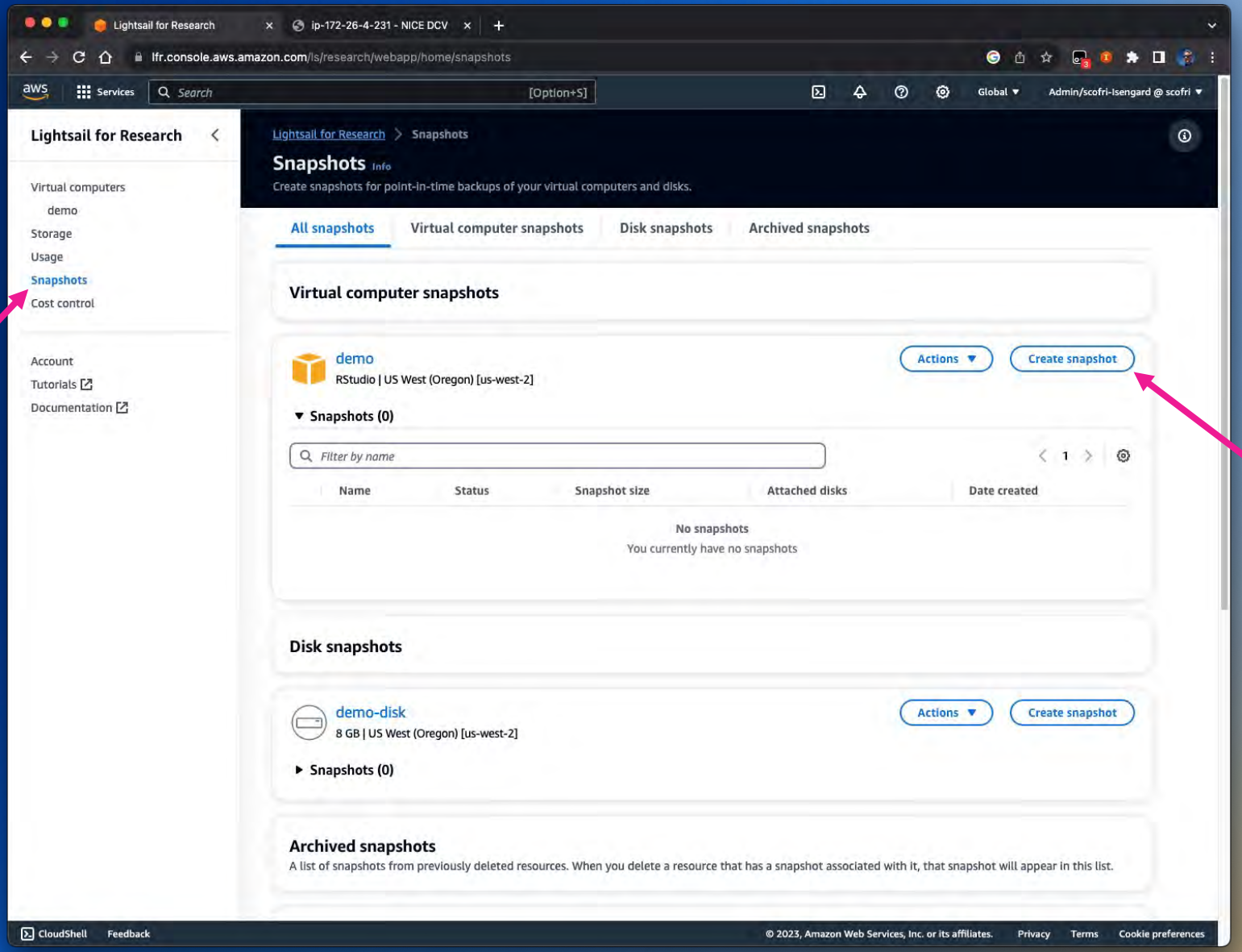
3

Choose *Create rule.*



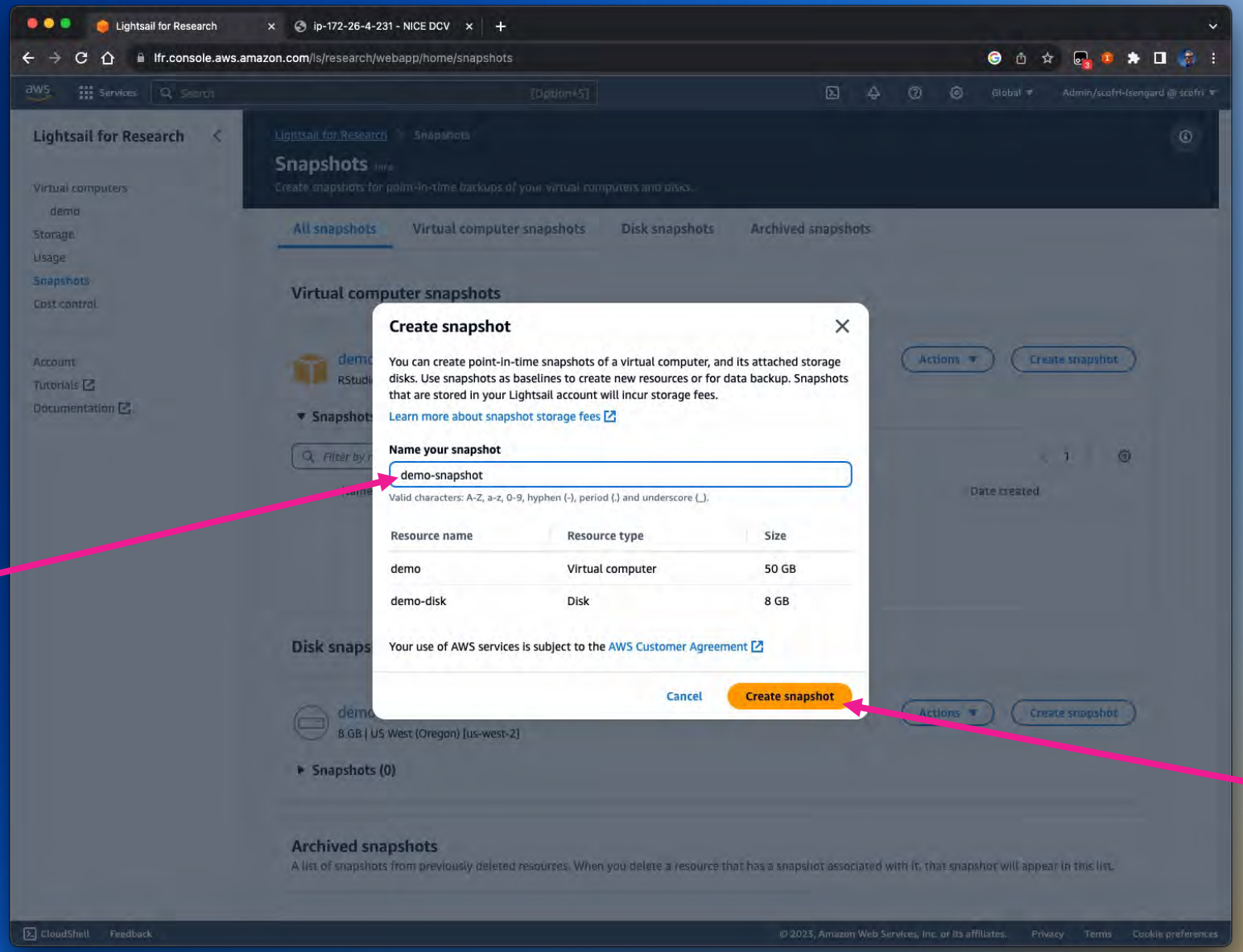
1

Choose *Snapshots* to save the state of your virtual computer.



2

Choose *Create snapshot.*



1

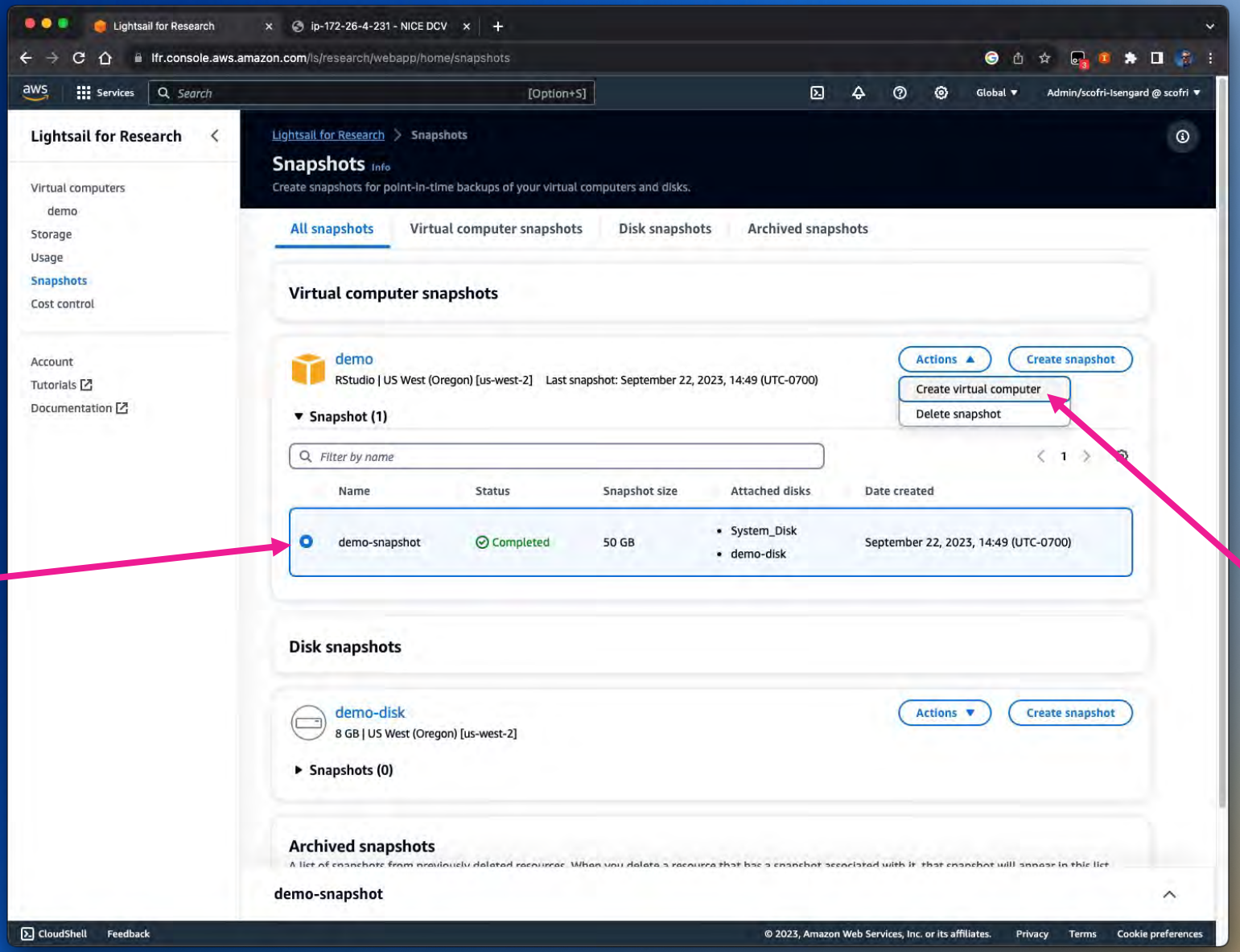
Enter a name for your snapshot.

2

Choose *Create snapshot*.

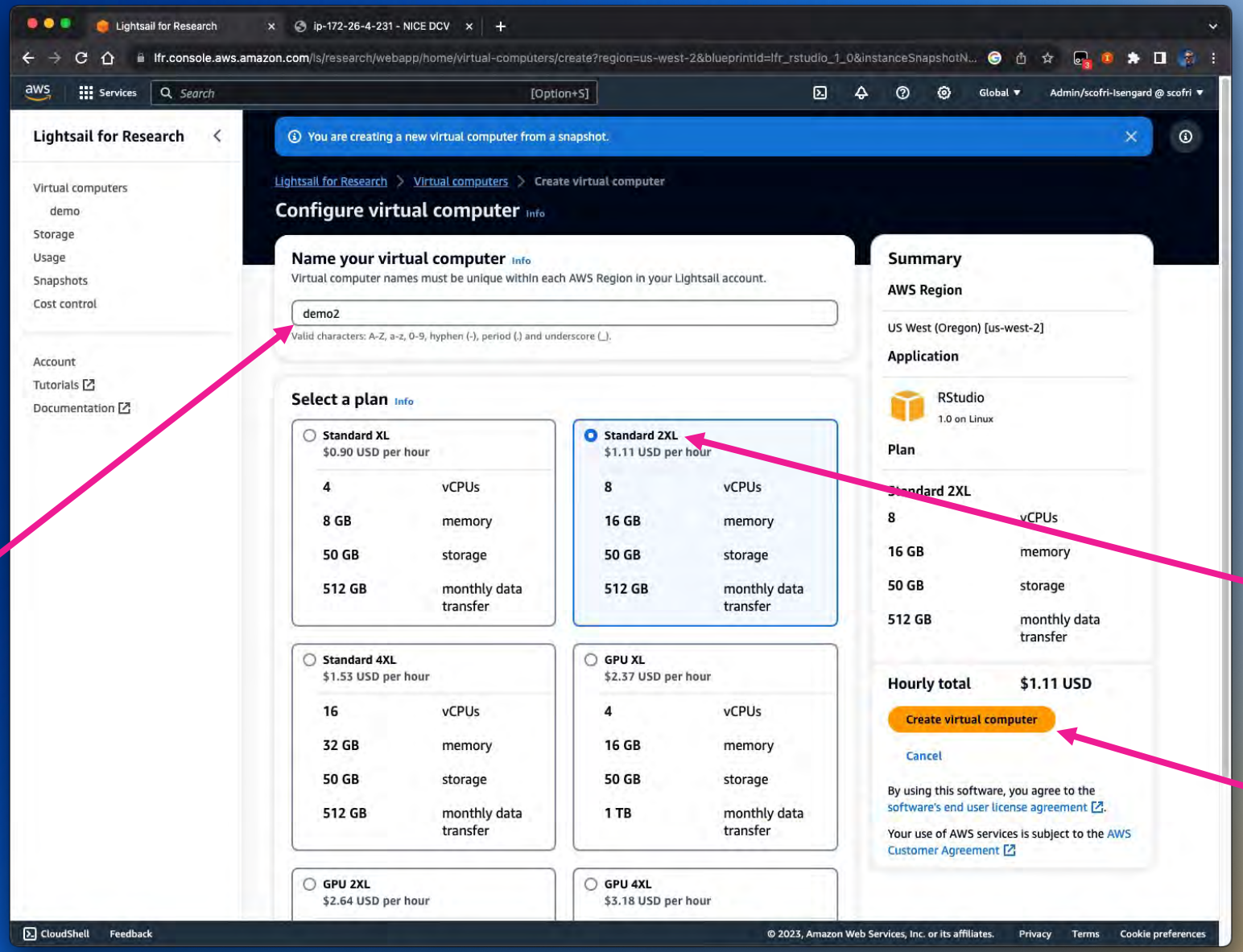
1

Once the snapshot is created, select it.



2

Choose the *Actions* menu and choose *Create virtual computer.*



1

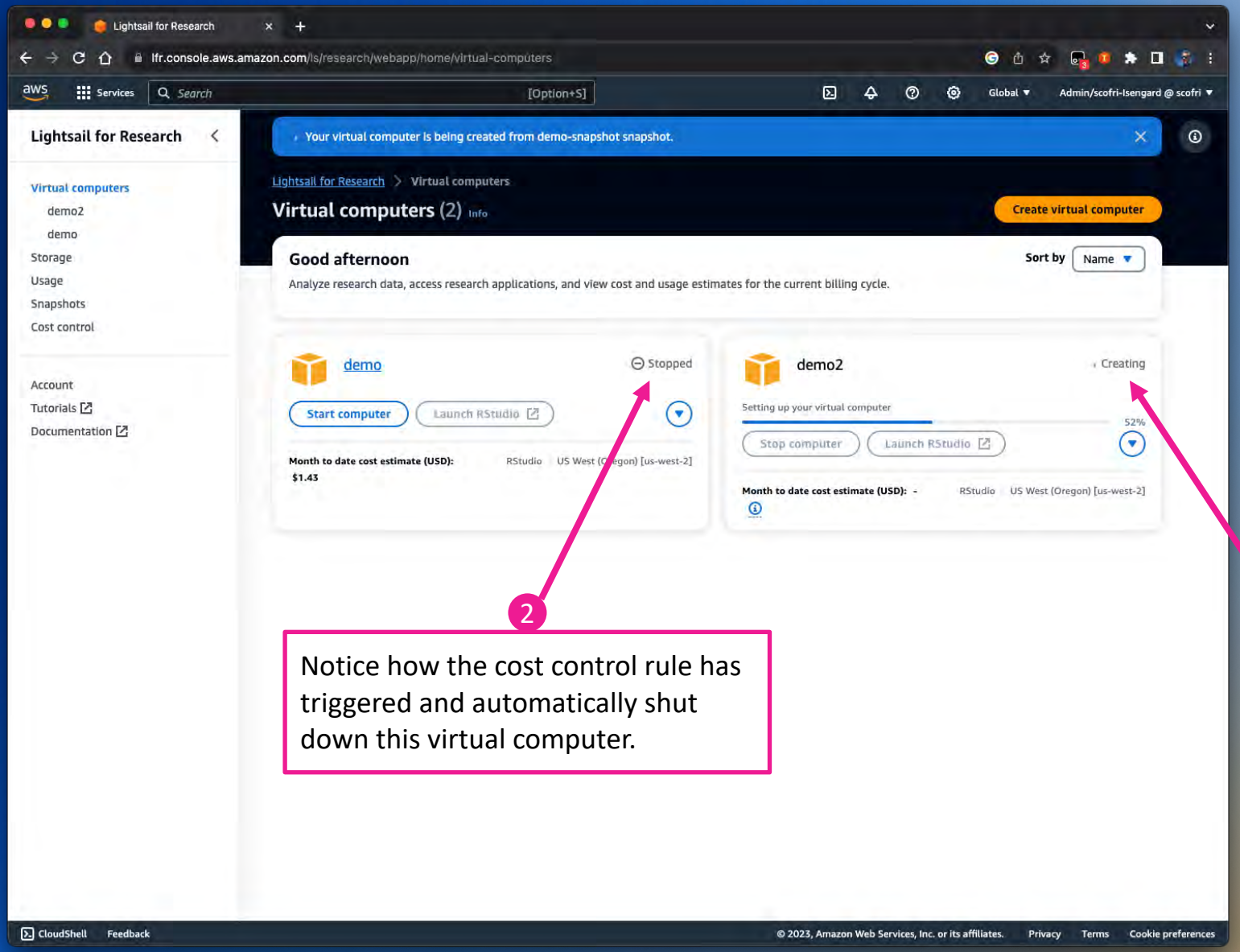
Enter a name for the new virtual computer.

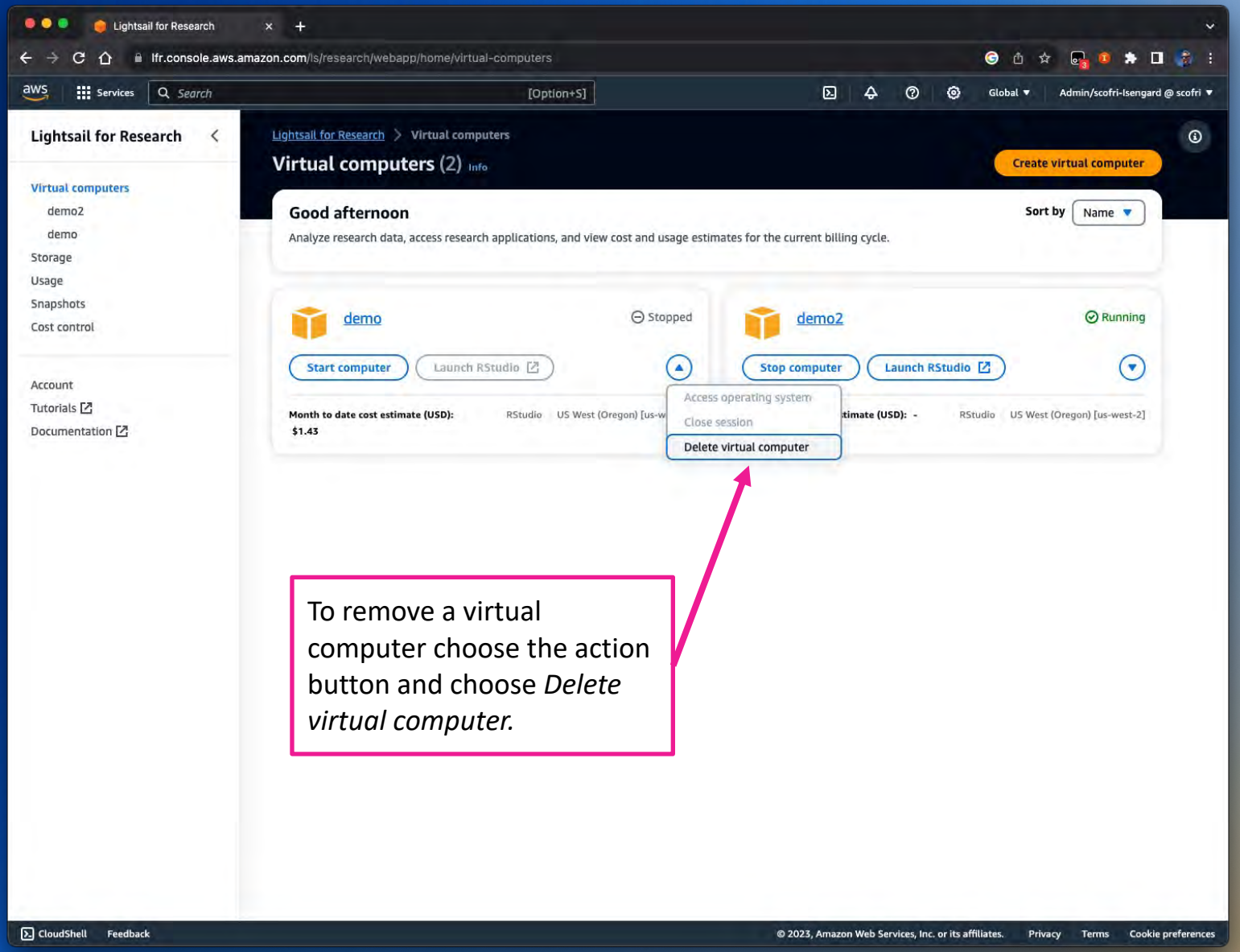
2

This time choose a different backing instance.

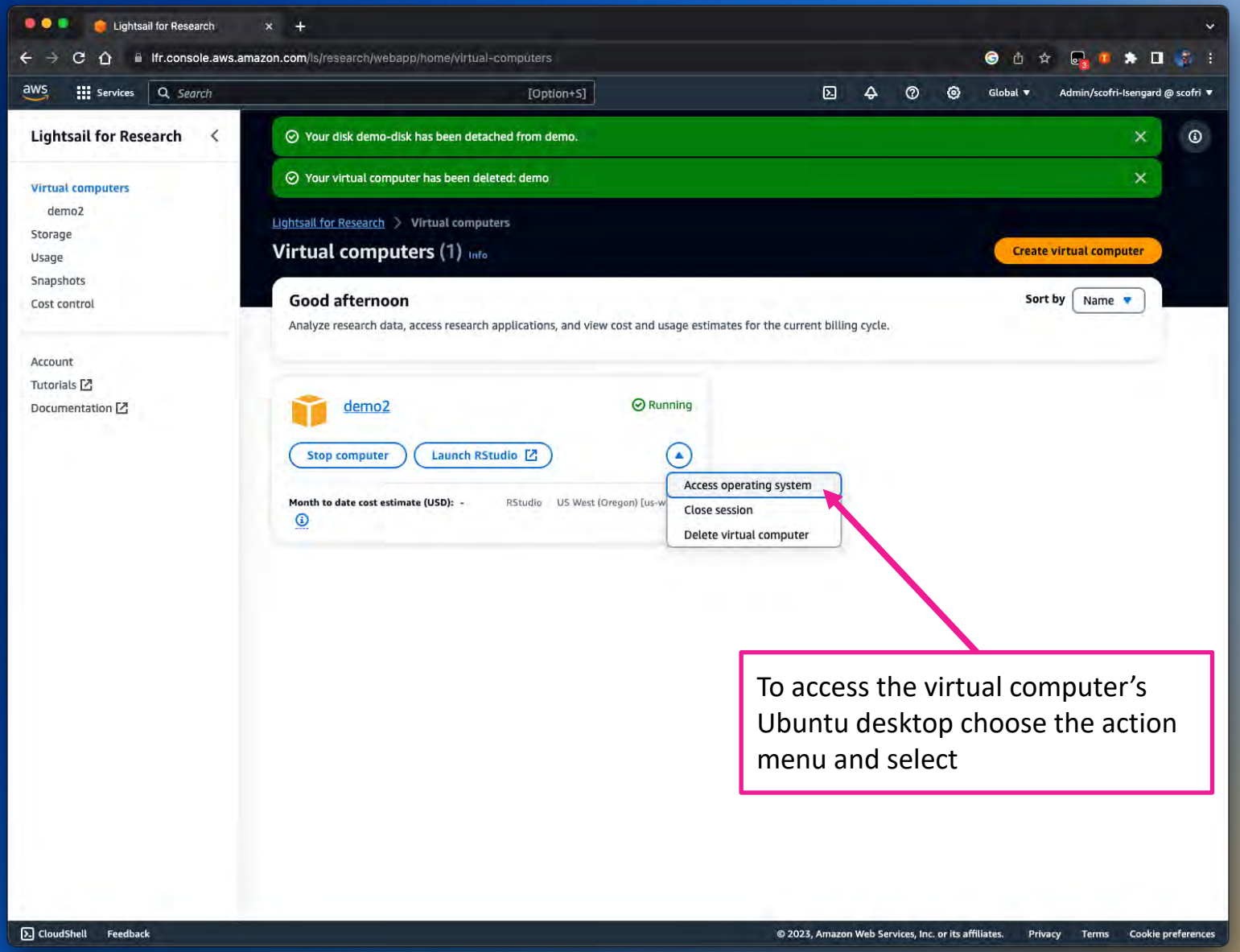
3

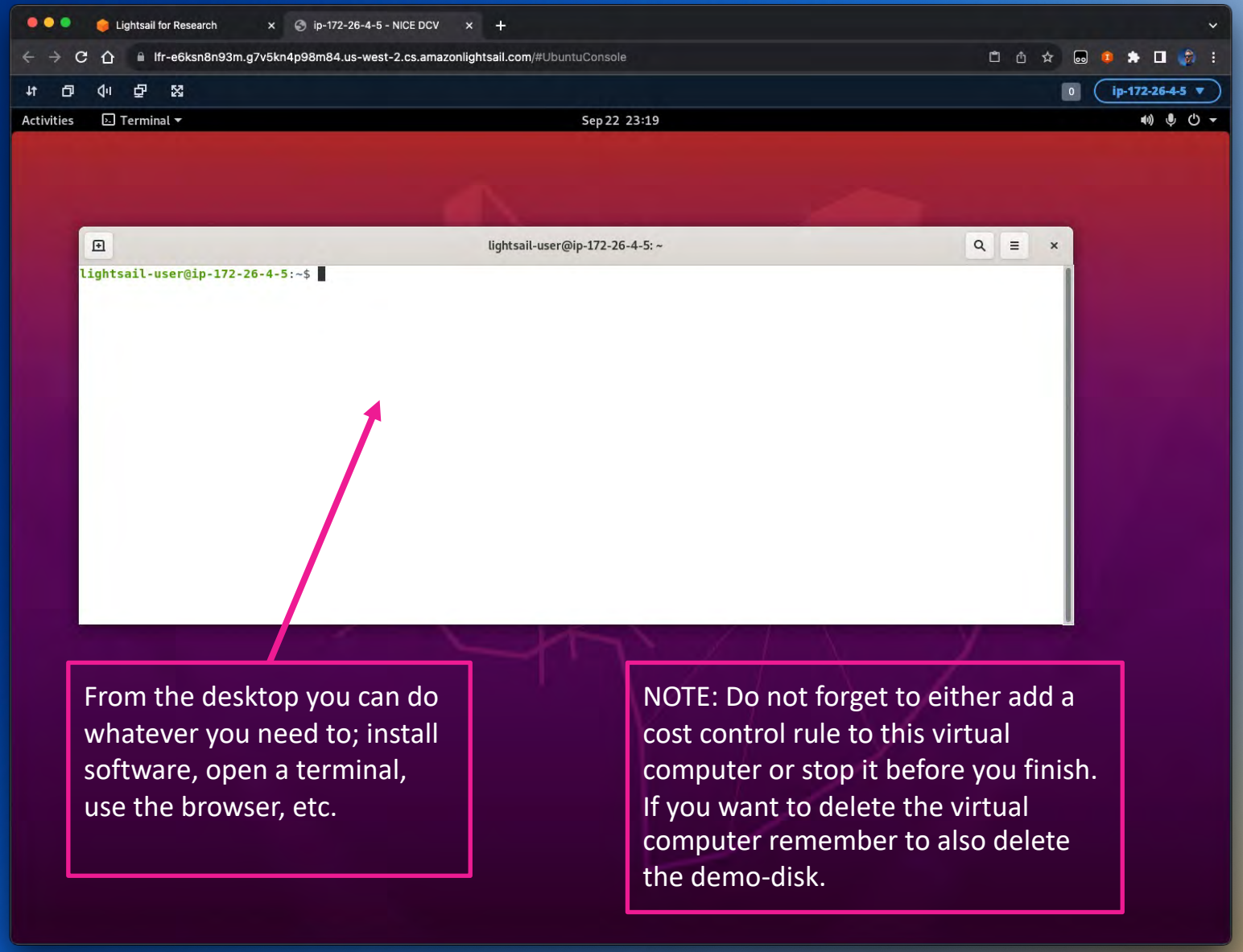
Choose *Create virtual computer.*





To remove a virtual computer choose the action button and choose *Delete virtual computer.*





Thank you!

Scott Friedman

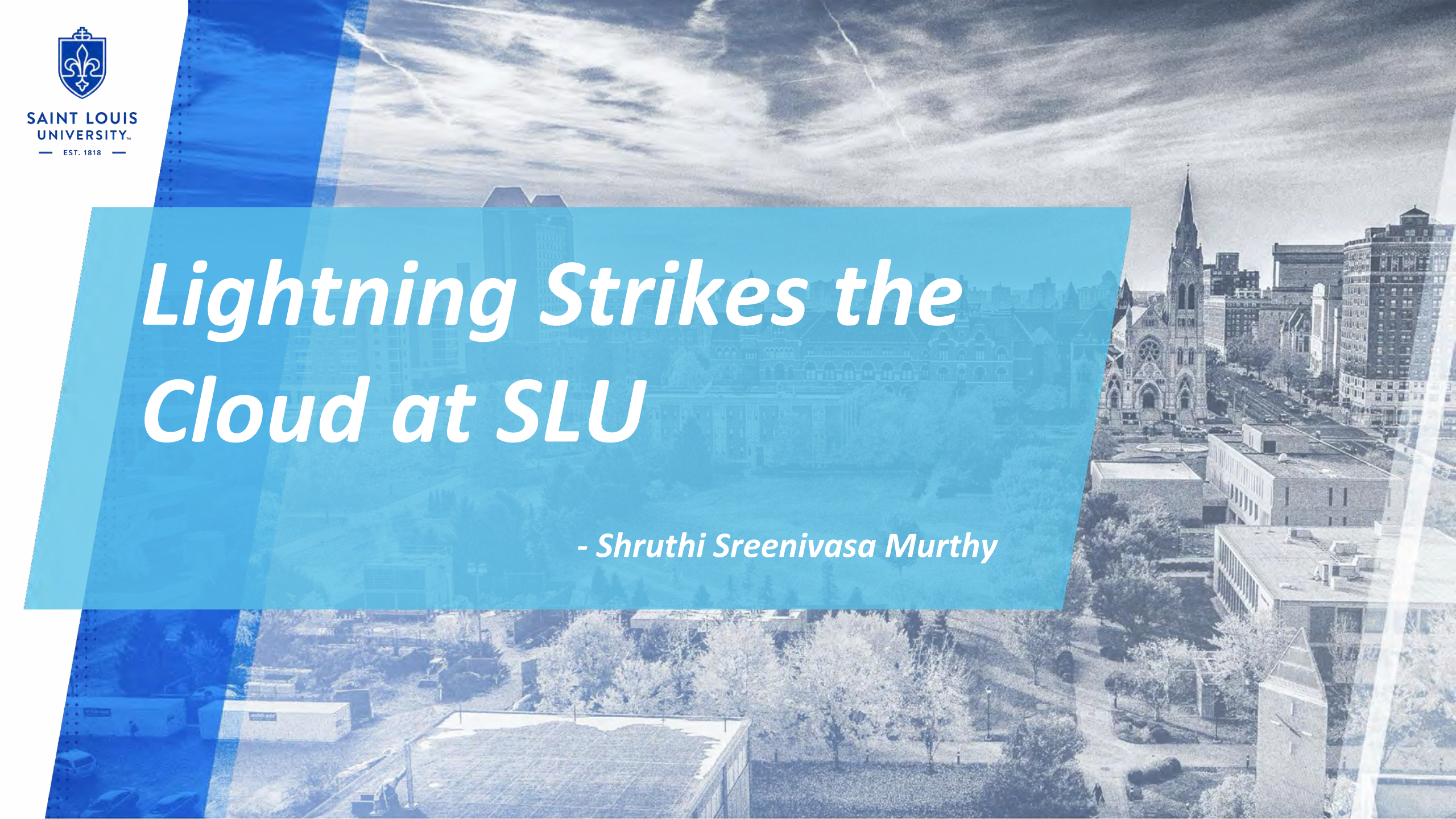
scofri@amazon.com

PART TWO

Lightning Strikes the Cloud at SLU

Shruthi Sreenivasa Murthy

St. Louis University



Lightning Strikes the Cloud at SLU

- Shruthi Sreenivasa Murthy

SCAER turns to RCG

The Sinquefield Center for Applied Economic Research (SCAER) is one of the leading research centers at SLU. The center is a part of the SLU Research Institute and brings together all the researchers at SLU who have a common interest in applied economic research.

Research Computing Group (RCG) is a collaboration between the Office the VP of Research and the Information Technology services at SLU. RCG builds on SLU's ambition to develop and improve computing services, technology, services and support for research.

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EST. 1818

Project Discovery

Researchers at SCAER use large volumes of human mobility data to create useful research files for a wide range of studies in economics, public health, and finance related to patterns of social mobility. The underlying micro datafiles are very large, averaging approximately over 100 terabytes per year. Dataset includes human mobility data for the years 2019 to 2023.

Research Highlights

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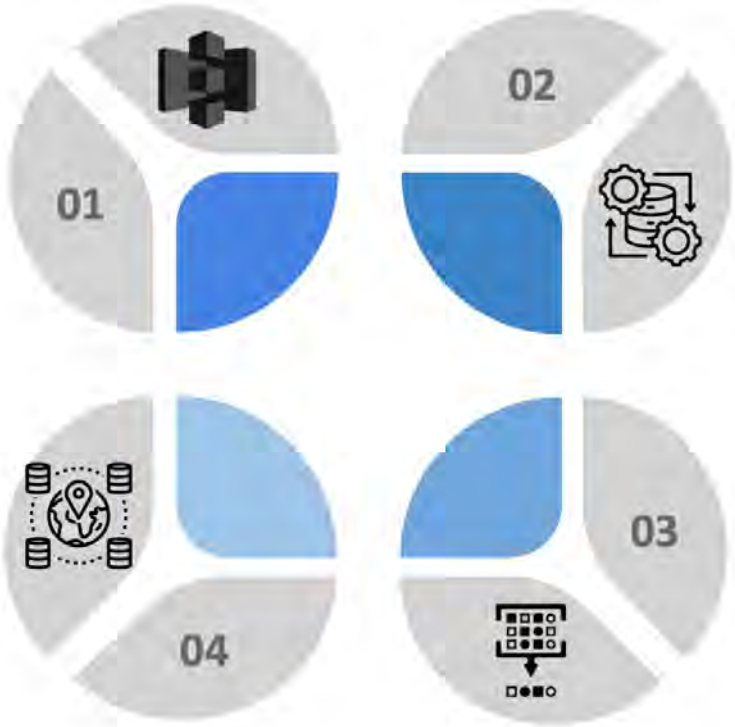
Immediate Imperative - Preprocessing

Pre-Processing Lifecycle

Veraset

Geospatial data is uploaded by Veraset to an S3 bucket in a Scaer AWS account. It is stored in a folder hierarchy organized by year, month, and day. Data is archived in S3 glacier and stored in parquet format.



Processing

Each record is given a time zone based on the geohash mapping contained in the time json file. Date and Time columns are then added based on the mapped time zone.

Geo Data Warehouse

Data that has been processed is then saved in a data warehouse (S3 bucket) that is divided up by a 3-char geohash, a year, a month, and a date. This would facilitate the speedy retrieval of particular files from the glacier and speed up the data input process during the post-processing stage.

Deduplication

Geohash that is mapped to multiple timezones runs the risk of being duplicated. Before writing to the data warehouse, these duplicates are eliminated.

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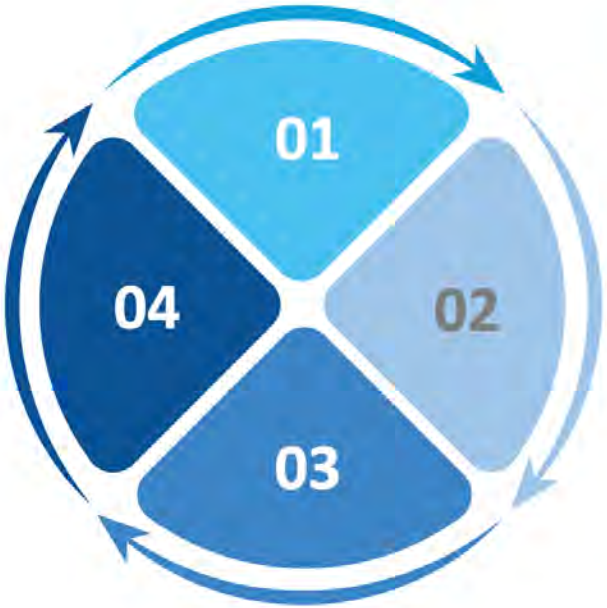
Immediate Imperative - Post Processing

Post Processing



Input Shapefiles
Fetch relevant information from the Geo Data Warehouse based on the researcher's requirements and the input provided in the shapefiles

Single Pass
Utilize the shape files' latitude and longitude to filter the data

Double Pass
Records with matching CAID data from single plass is filtered and extracted

GEO Spatial Analysis
One CSV file comprising all of the extracted data is created, offering a thorough output for additional analysis using programs like Geoda, STATA and ArcGis.

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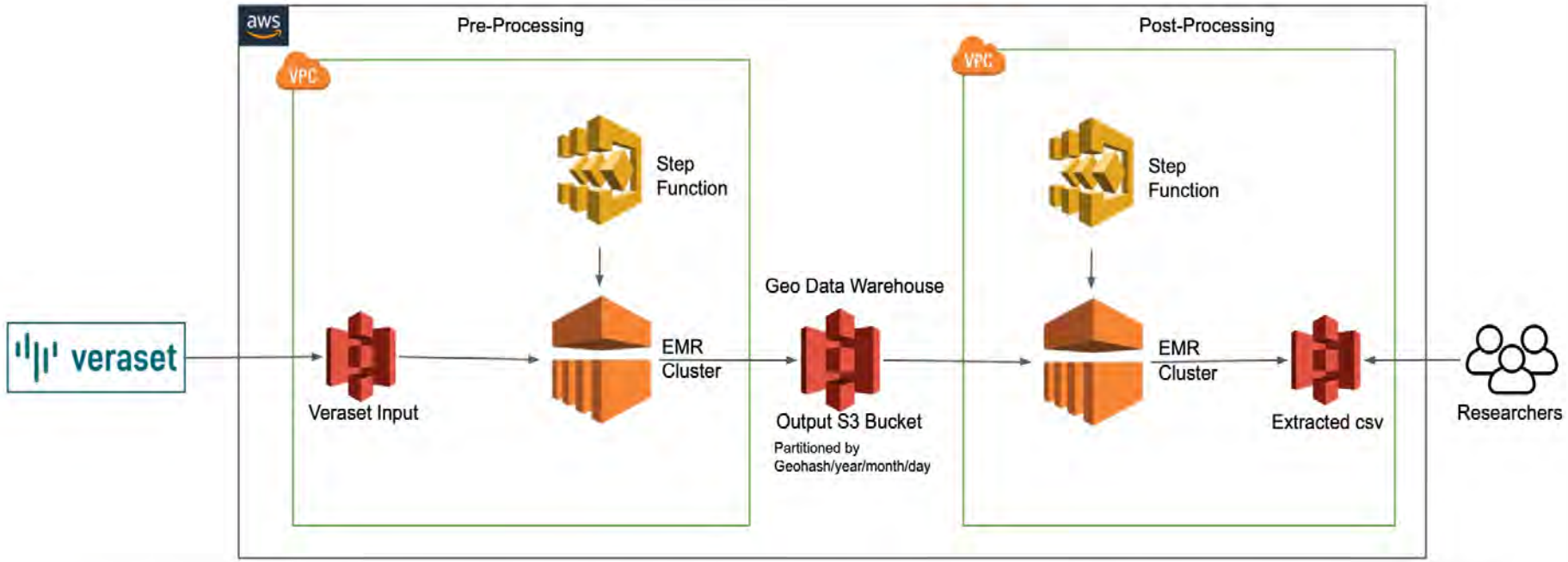
The solution we built



- The preprocessing phase is estimated to take approximately 30 minutes for a dataset of 110GB.
- To optimize cost and streamline the workflow, intermediate steps will be removed.
- EMR cluster will be terminated once the process is completed.
- Same EMR Cluster and Steps can be used for incremental quarterly data.
- Eliminated 95% of manual intervention.
- Improved efficiency of the post-process by organizing the output data in a hierarchical folder structure.

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Putting the data into action

SCAER’s research directly aligns with SLU's broader mission of serving humanity. Some use cases that we extensively use this data for:

- By investigating human mobility patterns during natural disasters, SCAER researchers aim to better understand how communities respond and adapt to such events.
- They are leveraging mobility data to provide a novel perspective on accessibility to dialysis centers for patients with end-stage renal disease (ESRD)
- They are utilizing this human mobility data to study food insecurity, by tracking movement patterns, we can identify regions where populations frequently travel longer distances to access food, indicating potential "food deserts" or areas lacking affordable, nutritious food options.
- Researchers at the TGI have used the mobility spend data to examine the effect of MLB games on spending patterns and visits to various businesses in the St. Louis metro area.

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Q&A

Any questions?

THANK YOU!

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PART THREE

Unlocking Research Potential on Google Cloud

Ezequiel Gioia

University of Central Florida

Unlocking Research Potential on Google Cloud

Internet2 - Community Exchange 2024

Ezequiel Gioia

Systems Architect

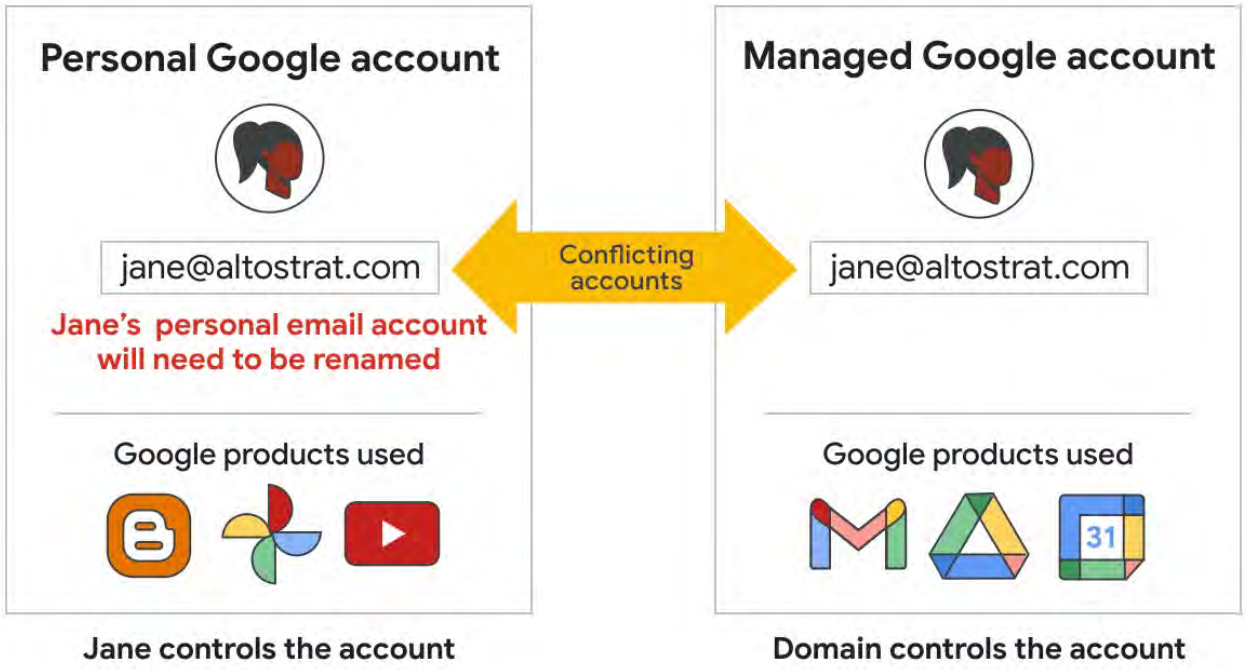
University of Central Florida

INTRODUCTION

- Why another cloud?
- Getting the contract in place
- Choosing a reseller

GCP IMPLEMENTATION AND CHALLENGES

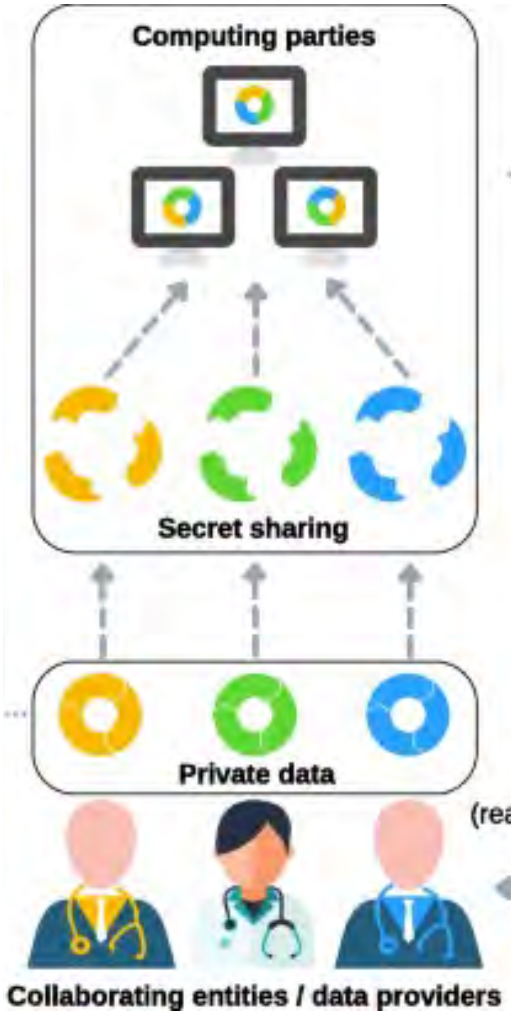
- Accessing Google Cloud without Workspace
- Abandoned projects?
- Conflicting unmanaged users accounts?



Source: google.com

PROJECT - MPC

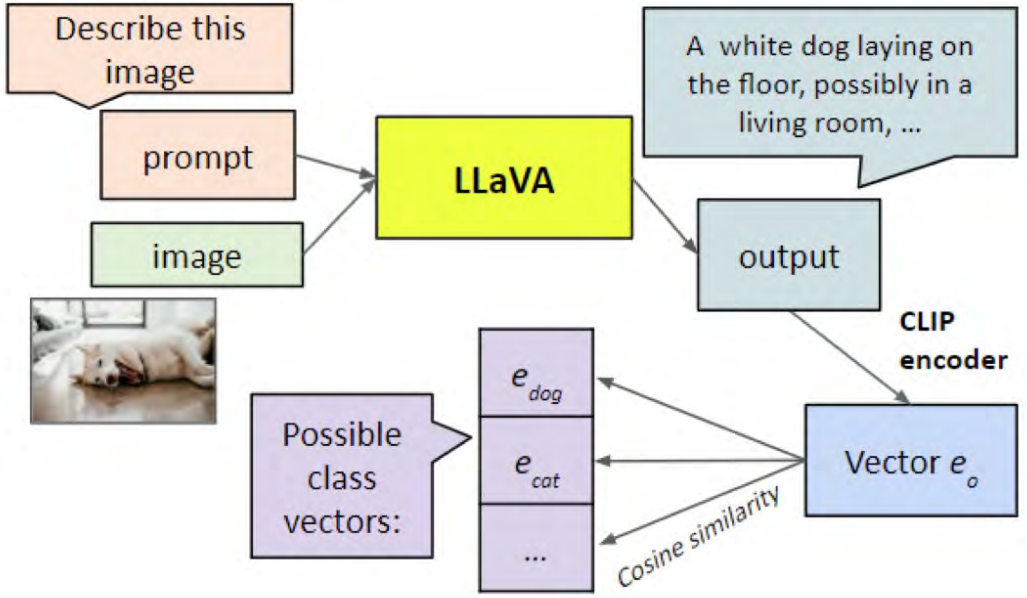
- Multi-party Computation (MPC) for Fairness
- Protocol for Collaborative Analysis
- Data Privacy
- Multi-university project to analyze data without revealing individual responses



Source: biomedcentral.com

PROJECT - Visual-LLM Zero-Shot Classification

- Center for Research in Computer Vision
- Generate a rich set of descriptions and analyses for all aspects of a given image
- Combining a vision encoder and a transformer-based language model
- Using Tensor Processing Units (TPUs)



Source: Matsuura, M., Jung, Y. K., & Lim, S. N. (2018). Visual-LLM zero-shot classification

PROJECT - Computational Radiology for Breas

Dexter Hadley
Assistant Professor of Pathology
https://www.hadleylab.org

- First HIPAA project on Google Cloud
- Mammogram false positives lead to:
  - Patient anxiety
  - Unnecessary biopsies and medical procedures
- Goal: Enhance breast cancer screening through accurate detection
- Deep learning algorithms will be trained on 5 million digital mammograms

FUTURE PLANS AND VISION

- Interconnect
- Logs centralization
- STRIDES, in partnership with the College of Medicine
- Training
- Achieve the same level of support we have on AWS

PART FOUR

Automated Transcription for Social Science Researchers

Alan Walsh

Indiana University

INDIANA UNIVERSITY BLOOMINGTON

Automated Transcription for Social Science Researchers

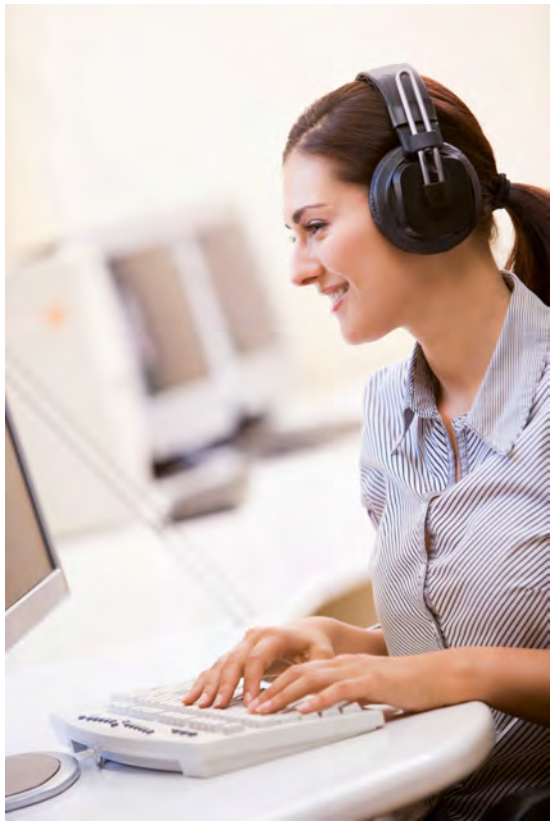
Alan Walsh

A longstanding challenge in social science research

Gathering Qualitative Data

Interviews, focus groups, and more

Audio Recording

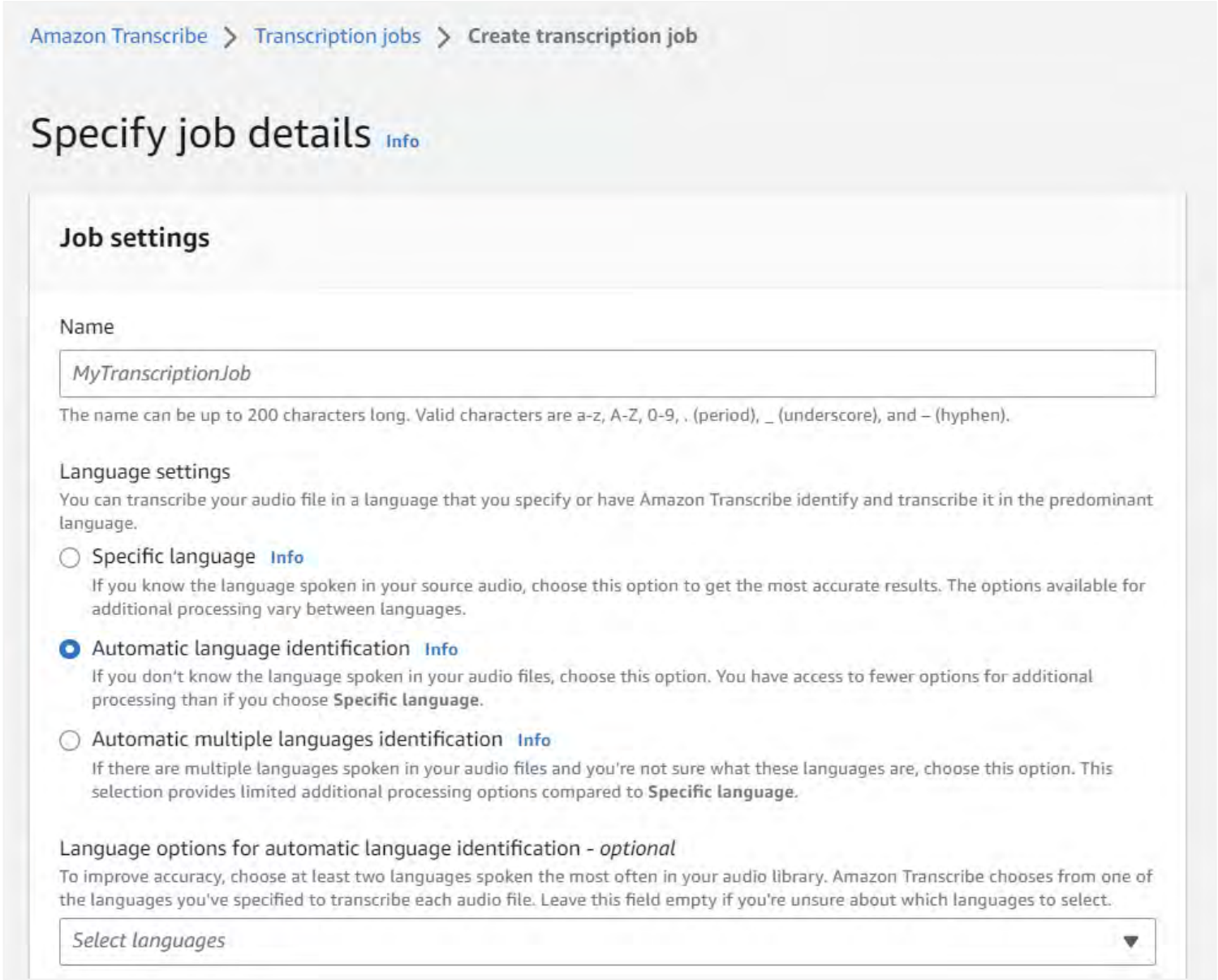


Generating text transcripts for analysis

New technology, new possibilities

Challenges

Quality Cost Languages Security Usability



AWS Web Interface

Create transcription jobs for one file at a time

{"jobName":"BOHP_Broide_Mace_2021-09-17
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:[{"transcript":"This is Danielle Emmerling. I am, it is September 17, 2011. I am conducting an oral
history, uh, for the I U School of Journalism. Could you please tell me your full name, the year you
graduated? And what discipline your degree was in? My name is Mace. Hi, Brody. I graduated in 1947. A
degree in journalism and government. Where was your hometown? And what brought you to I U, my home cat
was brewing in Vermont and I came to I U because I had an opportunity to go to a good journalism
education and at a reasonable rate tuition in those days was very reasonable even for an out stayer, $75
a semester. And I got a scholarship for half of that."}],"speaker_labels":{"channel_label":"ch_
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0","end_time":"0.699"},{"start_time":"0.709","speaker_label":"spk_
0","end_time":"0.879"},{"start_time":"0.889","speaker_label":"spk_
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0","end_time":"3.569"},{"start_time":"3.579","speaker_label":"spk_
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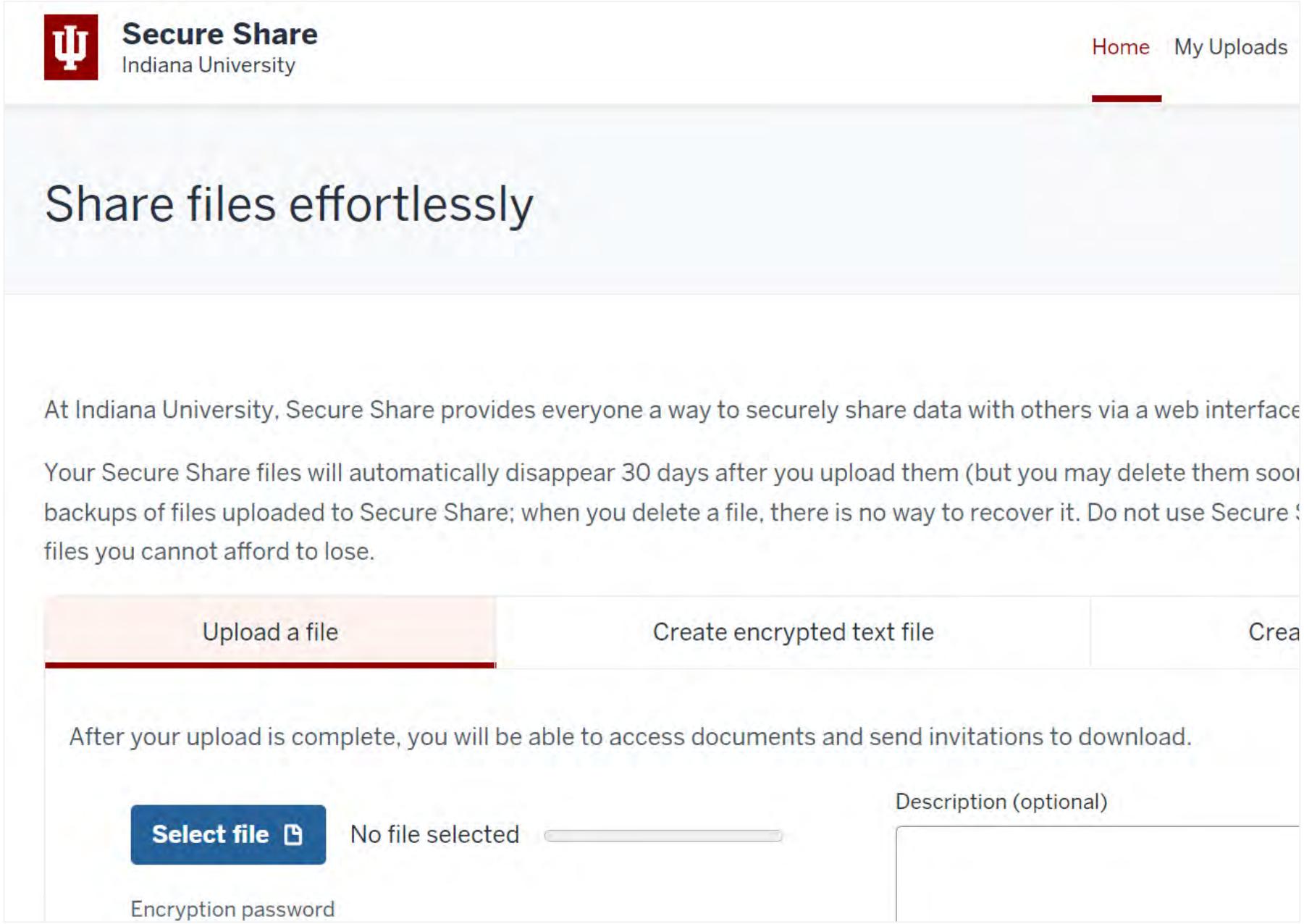
AWS JSON Output

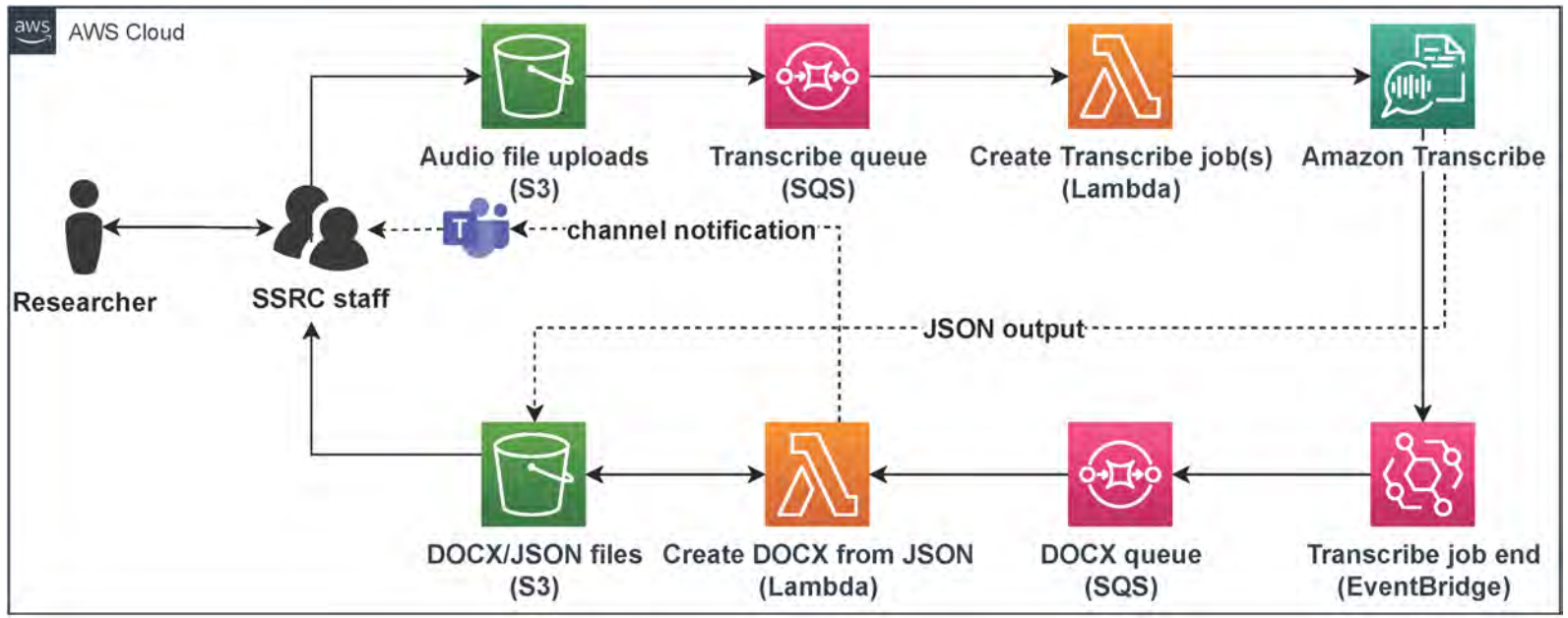
Text, transcripts, speaker identification, and word confidence information

How it works



Secure file transfer

IU Secure Share
Secure Teams


AWS Cloud
Audio file uploads
(S3)
Transcribe queue
(SQS)
Create Transcribe job(s)
(Lambda)
Amazon Transcribe
Researcher
SSRC staff
channel notification
JSON output
DOCX/JSON files
(S3)
Create DOCX from JSON
(Lambda)
DOCX queue
(SQS)
Transcribe job end
(EventBridge)

JSON to DOCX (Word)

AWS Sample Python3 Script for CLI

https://github.com/aws-samples/amazon-transcribe-output-word-document

Removed statistics

Changed formatting

Added MS Teams notification

0:02:14.84	11.6s	Agent	😐	Okay I've got that and [ACTION] I will email you a confirmation is [PII]. Still the email address for you.
0:02:27.24	0.4s	Customer	😐	correct?
0:02:28.14	8.2s	Agent	😐	Okay great so to [OUTCOME] review we've got that card canceled, we're sending it to the [PII] and I've emailed you a confirmation. Is that everything that you needed today?

ATS output

Indiana University Social Science Research Commons

Amazon Transcribe Audio Source

Job Name	GMT20221117-211655_Recording.mp4-b9af90db-9072-48ec-98b4-daa4cd486f0b
Audio Duration	0m 55.58s
Audio Identification	Speaker-separated
Language(s)	en-US
File Format	mp4
Sample Rate	32000 Hz
Job Created	Thu 16 Nov '23 at 22:12:15
Average Confidence	97.92%

Audio Transcription

WORD CONFIDENCE: >= 90% in black, < 90% in yellow highlight

[00:00:02] Speaker 1: OK, we're recording. Um How about you? Read the first paragraph and I'll read the second one.

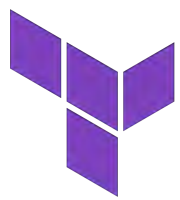
[00:00:13] Speaker 2: OK. Become the best version of yourself at I U. Develop the skills you need for rewarding career. And follow in the footsteps of more than 760,000 I U alumni who are leading organizations innovating the future and making an impact on their communities and the world.

[00:00:33] Speaker 1: Pursue your passion or explore the possibilities from nursing to criminal justice, epidemiology to environmental science, social work to cybersecurity and more than 900 academic programs in between I U gives you the power to study whatever sparks your interest with the support of world class professors and faculty who care about your success.

Word Confidence Scores

Confidence	Count	Percentage
98% - 100%	113	95.76%
90% - 97%	2	1.69%
80% - 89%	0	0.0%
70% - 79%	1	0.85%
60% - 69%	0	0.0%
50% - 59%	1	0.85%
40% - 49%	1	0.85%
30% - 39%	0	0.0%
20% - 29%	0	0.0%
10% - 19%	0	0.0%
0% - 9%	0	0.0%

100% serverless



HashiCorp

Terraform

Automated Transcription Service

Quality: Accuracy, speaker recognition (diarization), time stamps, word confidence scores

Cost: $0.024 per audio minute (plus minimal storage/processing costs and staff time)**; free to IU researchers for the next two years**

Languages: 39 languages/variations (Amazon); additional languages supported by Google Cloud Speech-to-Text

Security: With review and approval of IU Data Stewards (existing contracts and Business Associate Agreements make this possible)

Usability: Automated workflows implemented by UITS RT; researchers submit audio to SSRC; SSRC returns Word transcripts

Thank you!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2024
COMMUNITY
exchange
THANKS!