Finding Time through User Research

Johanna (Hannah) Cohoon, Sinthia Kabir,
Tamanna Motahar, Jason Wiese

University of Utah

KAHLERT SCHOOL OF COMPUTING

THE UNIVERSITY OF UTAH

Thanks to

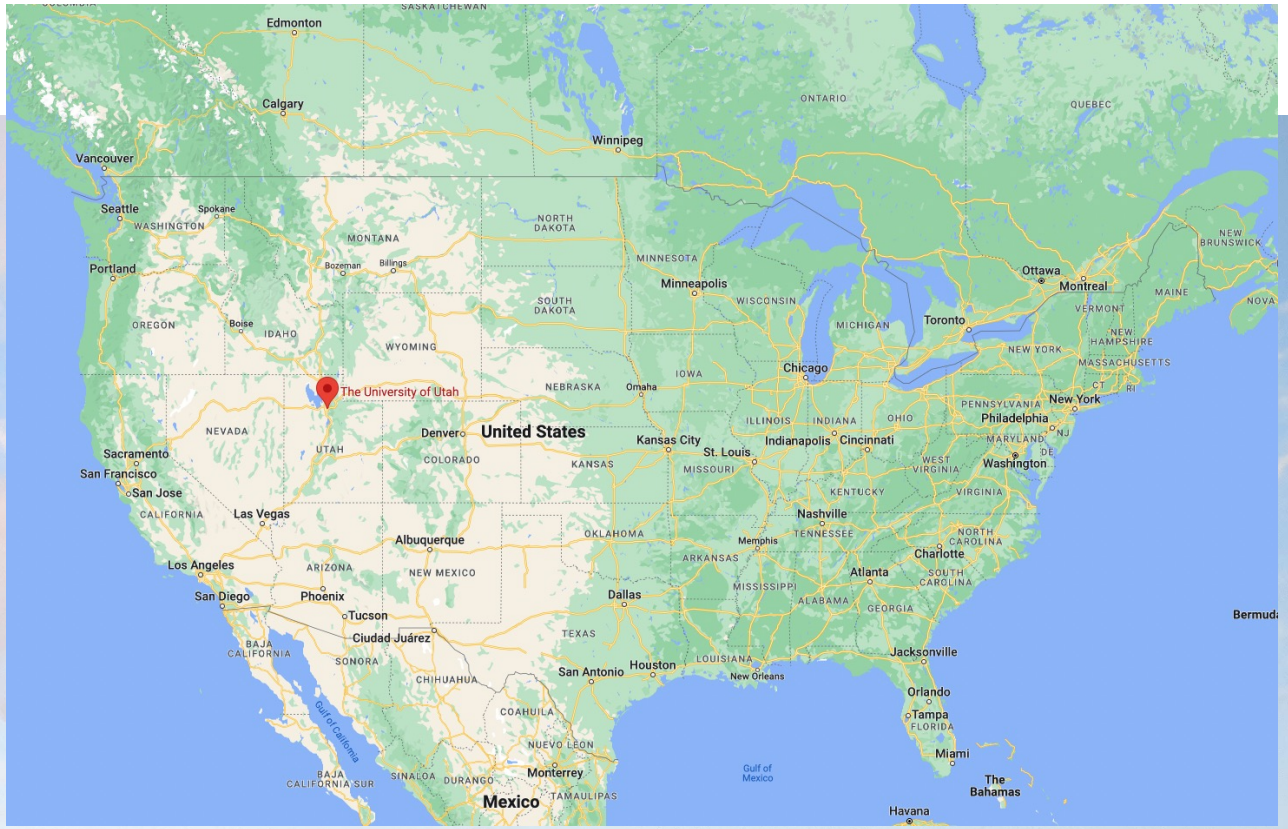
Jason Wiese

Rob Ricci

Sinthia Kabir

Tamanna Motahar

Isha Gosh



Studying scholarly infrastructure to….

understand change in academia;
improve scholarship quality;
improve scholars' quality of life.

cloudlab.us

Introduce CloudLab

Present user research & surprising findings

Show user research is valuable to you

cloudlab.us

Build Your Own Cloud ...

CloudLab provides researchers with control and visibility all the way down to the bare metal. Provisioning an entire cloud inside of CloudLab takes only minutes. Most CloudLab resources provide hard isolation from other users, so it can support hundreds of simultaneous "slices", with each getting an artifact-free environment suitable for scientific experimentation with new cloud architectures. Run standard cloud software stacks such as OpenStack, Hadoop, and Kubernetes. Or, build your own from the ground up. The bare metal's the limit!

CloudLab is built from the software technologies that make up Emulab and parts of GENI, so it provides a familiar, consistent interface for researchers.

Learn about the technology

... On Our Hardware

The CloudLab clusters have almost 1,000 machines distributed across three sites around the United States: Utah, Wisconsin, and South Carolina. In addition, it provides access to a number of federated facilities around and outside of the US. CloudLab is interconnected with nationwide and international infrastructure from Internet2, so it is possible to extend private, software-defined networks right to every server.

CloudLab interoperates with existing testbeds including GENI and Emulab, so you can take advantage of hardware at dozens of sites around the world.

Take a look at the hardware

Recent News

May 16, 2023 We're creating a user feedback group to help guide development of the platform and improve its usability. You can sign up via this short form

May 08, 2023 We've rolled out new standard disk images with newer OS versions, bigger root filesystems, and more.

September 29, 2022 A Tofino switch (supporting p4 in hardware) is available at Utah.

October 8, 2021 A user has posted a helpful guide to using our programmable Bluefield-2 NICs.

Cluster Status		
Utah	Up	61% full
Clemson	Up	70% full
Wisconsin	Up	78% full
Apt	Up	65% full
Massachusetts	Up	38%
Emulab	Up	37%

Activity	
Experiments Now	424
Projects	2,100
Users	10,020
Profiles	13,281
Experiments	311,800

1. Select a Profile | 2. Parameterize | 3. Finalize | 4. Schedule

Selected Profile: small-lan:55

Save/Load Parameters | Resource Availability

This profile is parameterized; please make your selections below, and then click **Next**.

+ Show All Parameter Help

Number of Nodes 1

Select OS image Default Image

Optional physical node type c4130

Specify a single physical node type (pc3000,d710,etc) instead of letting the resource mapper choose for you.

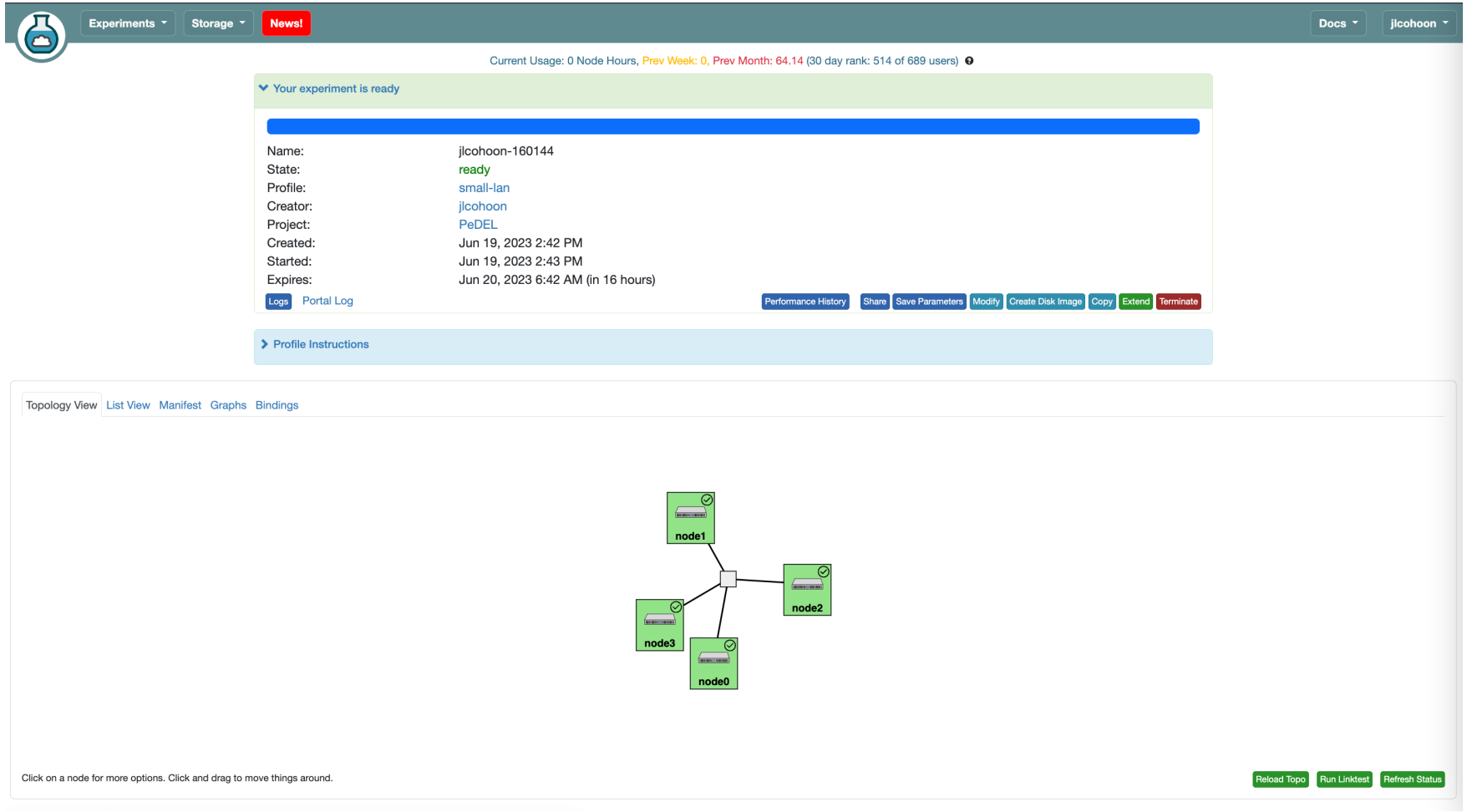
Optional physical desire

Use XEN VMs ☐

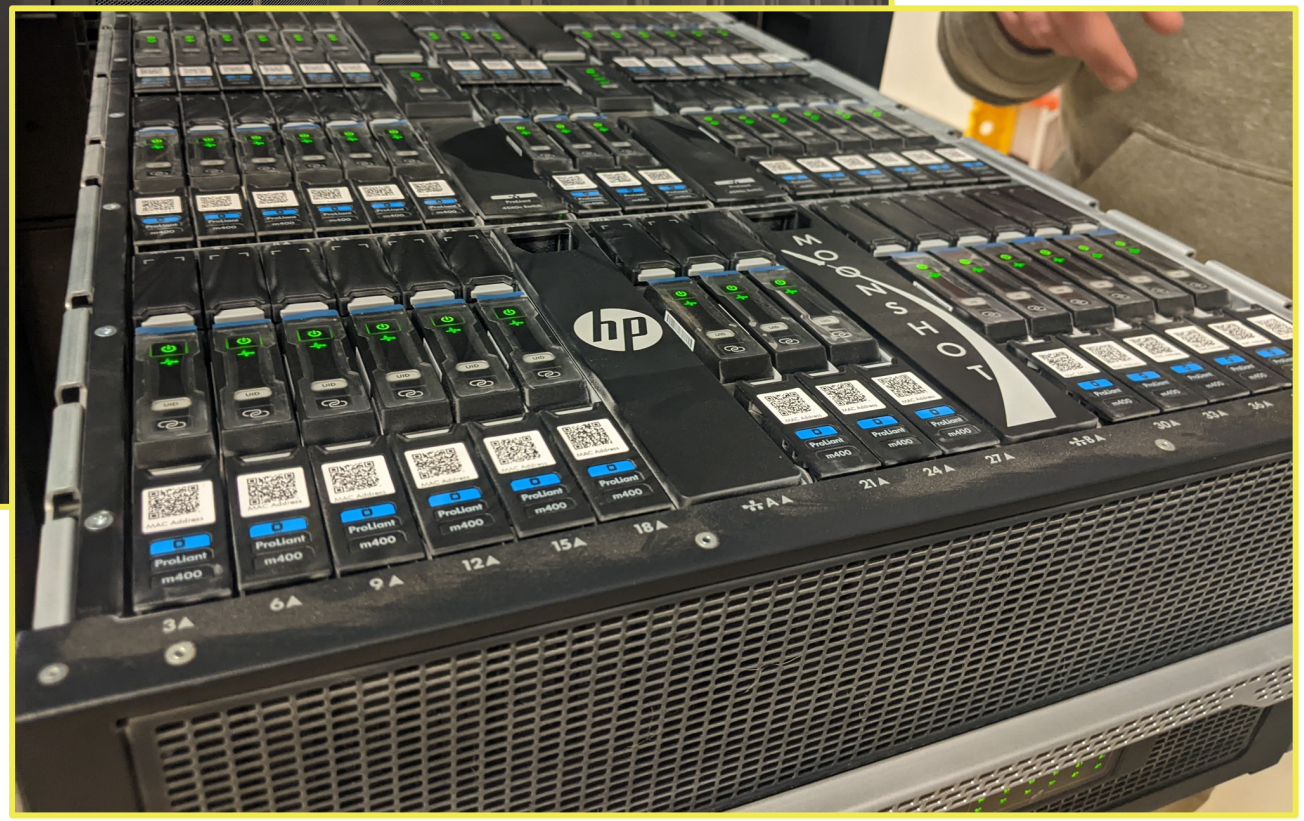
Start X11 VNC on your nodes ☐

› Advanced

Previous | Next


Experiments
Storage
News!
Docs
jlcohoon
Current Usage: 0 Node Hours, Prev Week: 0, Prev Month: 64.14 (30 day rank: 514 of 689 users)
Your experiment is ready
Name: jlcohoon-160144
State: ready
Profile: small-lan
Creator: jlcohoon
Project: PeDEL
Created: Jun 19, 2023 2:42 PM
Started: Jun 19, 2023 2:43 PM
Expires: Jun 20, 2023 6:42 AM (in 16 hours)
Logs
Portal Log
Performance History
Share
Save Parameters
Modify
Create Disk Image
Copy
Extend
Terminate
Profile Instructions
Topology View
List View
Manifest
Graphs
Bindings
node1
node2
node3
node0
Click on a node for more options. Click and drag to move things around.
Reload Topo
Run Linktest
Refresh Status

CloudLab2
Award #: 1743363
APC


hp
ProLiant
m400

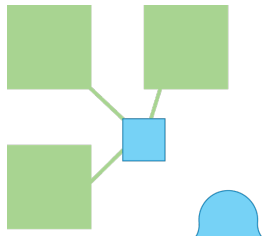
$0.^{00}$

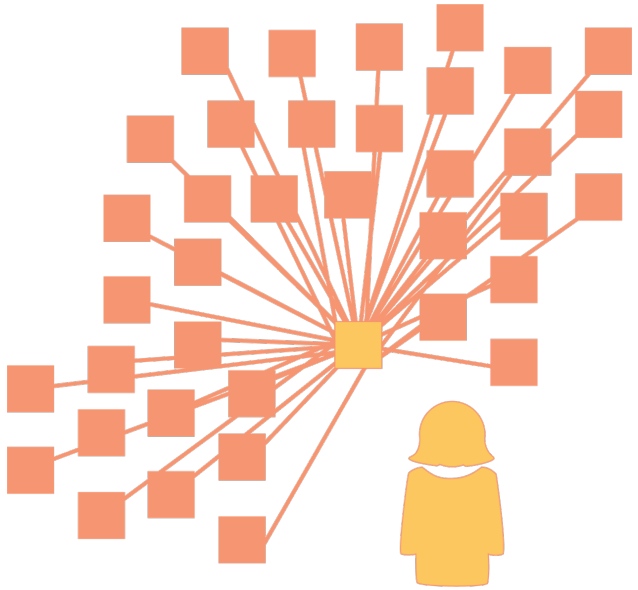
Duplyakin et al. (2019)

2.4 Resource Availability

Availability and diversity of resources play critical roles in the adoption and continued use of a testbed or other IaaS facility. **If users' needs frequently cannot be satisfied due to insufficient availability, those users will likely move to other facilities.** Users also tend to seek out hardware with cutting-edge features and the highest performance characteristics. New hardware types have been introduced to CloudLab over time in order to satisfy both capacity and the capability requirements. Not only did the new hardware attract new users, but it also reduced contention for older, already deployed resources.

First Come, First Serve





Reservation System

Reservation Request

Project PeDEL

Cluster(s) Select Cluster | Select Hardware | #Nodes

Number of Days (Optional) #Days Search — If you tell us how many days, we will find a slot and set the Start/End for you.

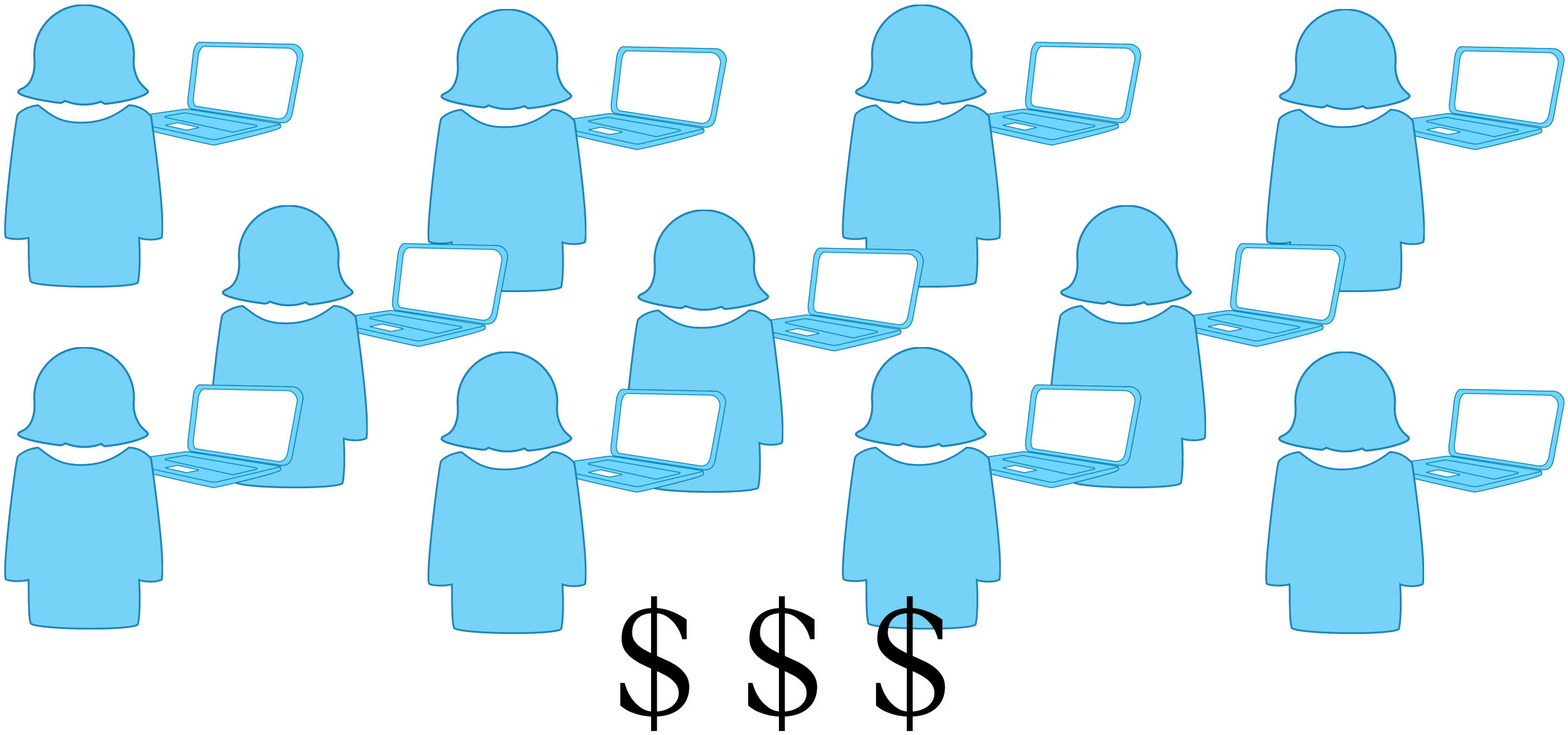
Reservation Start (Optional) MM/DD/YYYY | Start Time

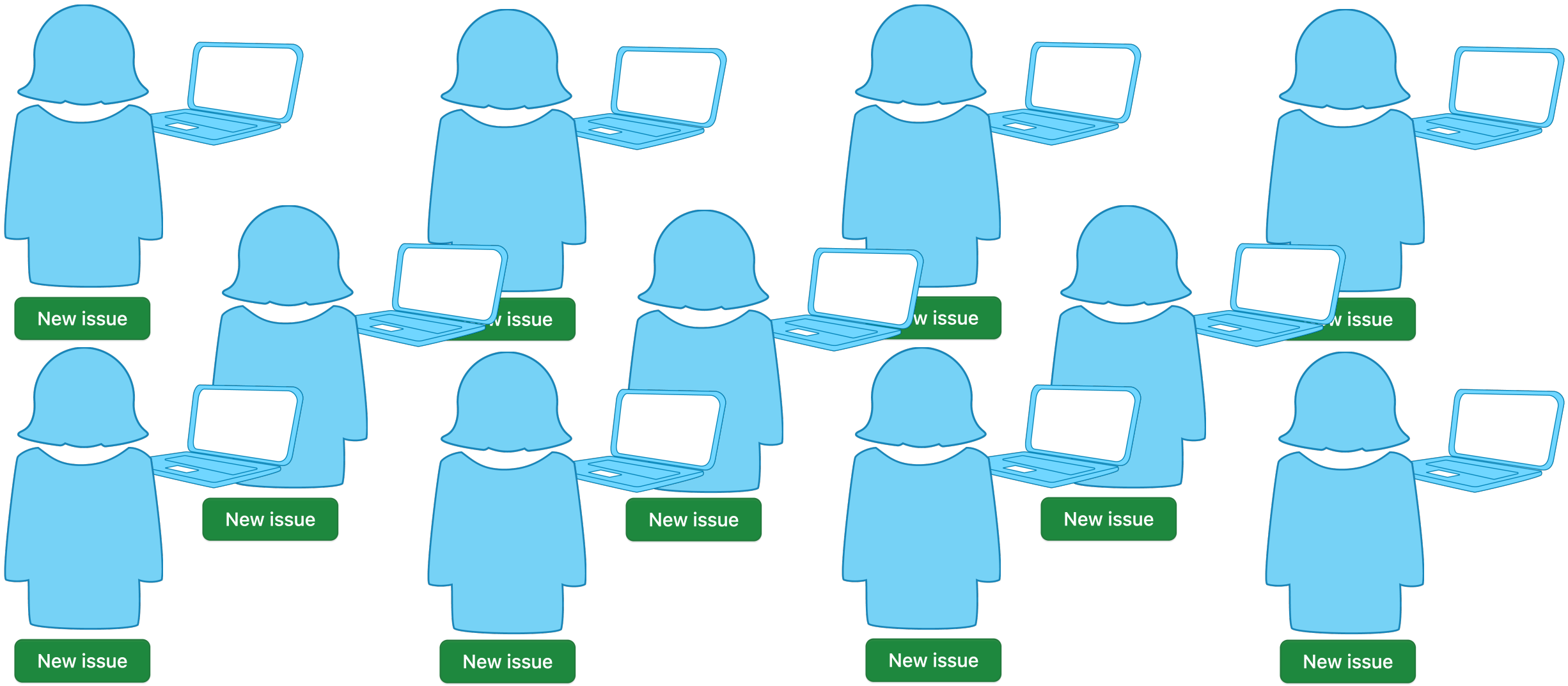
Reservation End MM/DD/YYYY | End Time

Reason Please provide a description of why you would like to reserve these resources. The better the description the more likely the reservation will be approved.

Is this reservation for a class (used by more then just yourself)? **Yes**

Check




New issue
New issue
New issue
New issue
New issue
New issue
New issue
New issue

By understanding user behavior,
you can more effectively guide it.

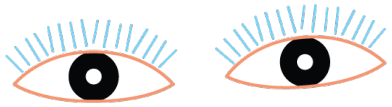
(Thaler & Sunstein, 2009)

Duplyakin et al. (2019, p11)

"A fairly large number of reservations [had] no identified usage…."

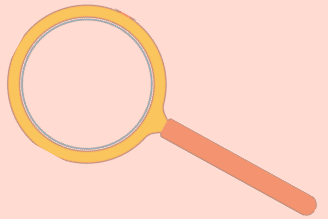
By understanding user behavior, you can more effectively guide it

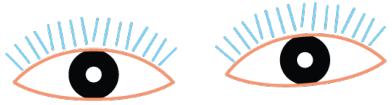
. . .toward responsible node use.



Observed typical tasks

Interviews for more depth

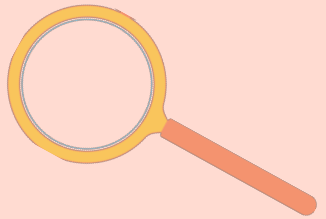




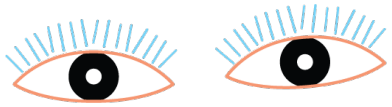
Observed typical tasks

“Can you tell me about your first interaction with CloudLab?”

“Can you tell me about a time where you’ve been frustrated while using Cloudlab?”



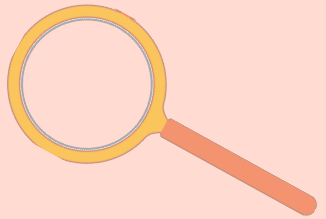
Gathering valid data



Observed typical tasks

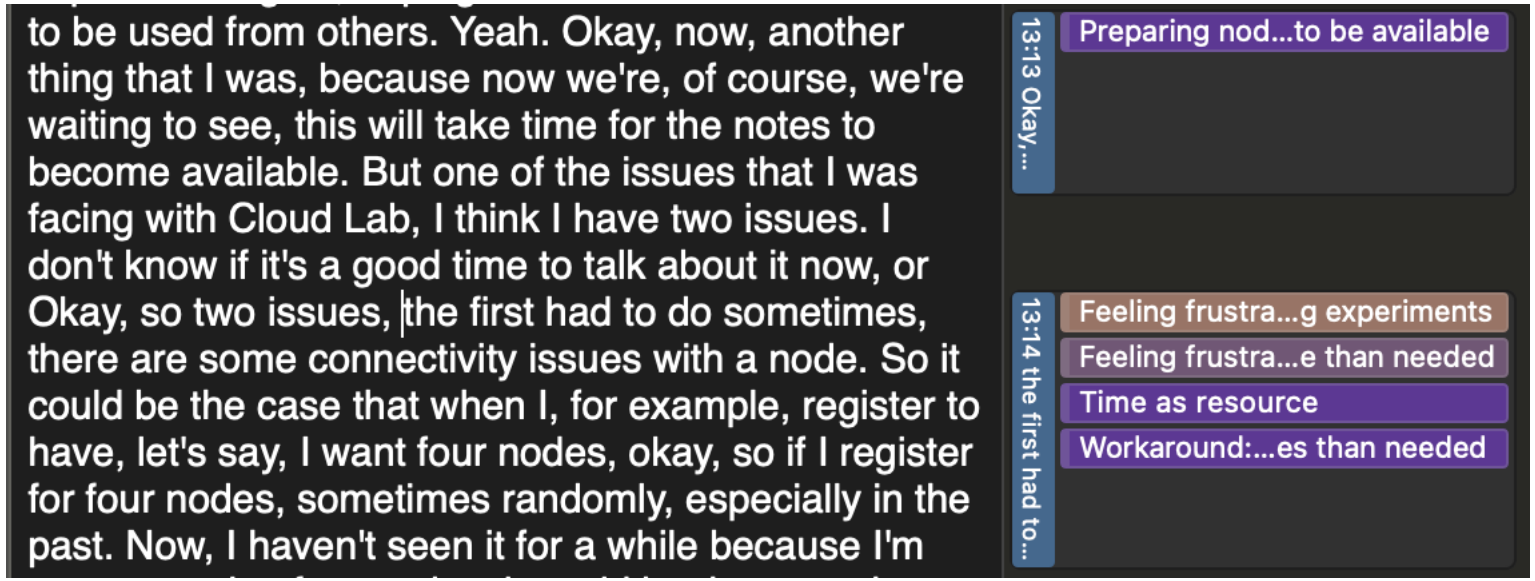
"Can you tell me about your first interaction with CloudLab?"

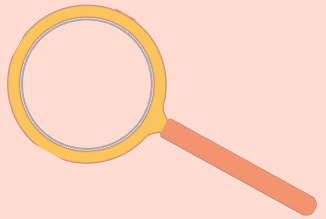
"Can you tell me about a time where you've been frustrated while using Cloudlab?"



Thematic analysis

1. Label data

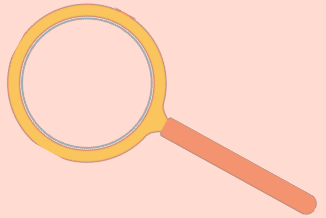




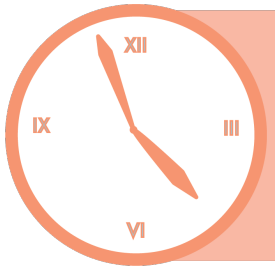
(Braun & Clarke, 2006)

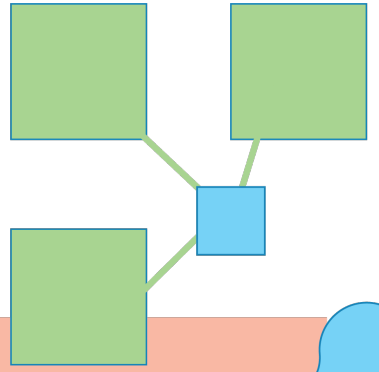
Thematic analysis

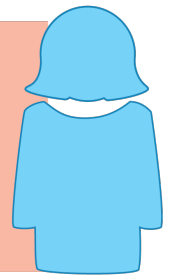
1. Label data
2. Group labeled data into themes

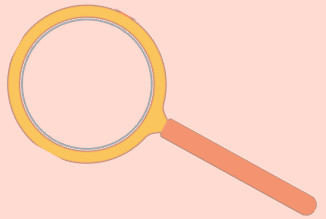


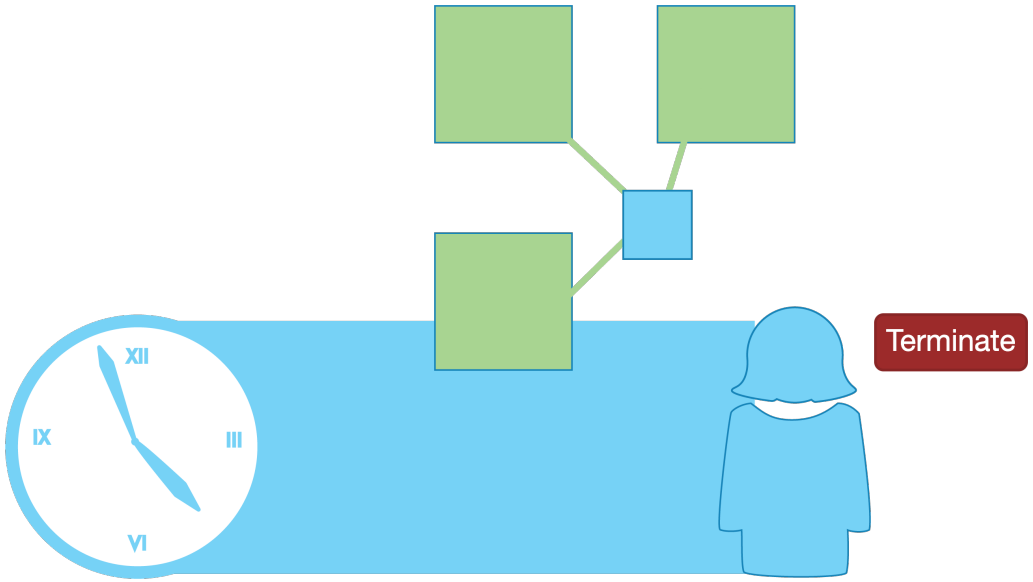
(Braun & Clarke, 2006)

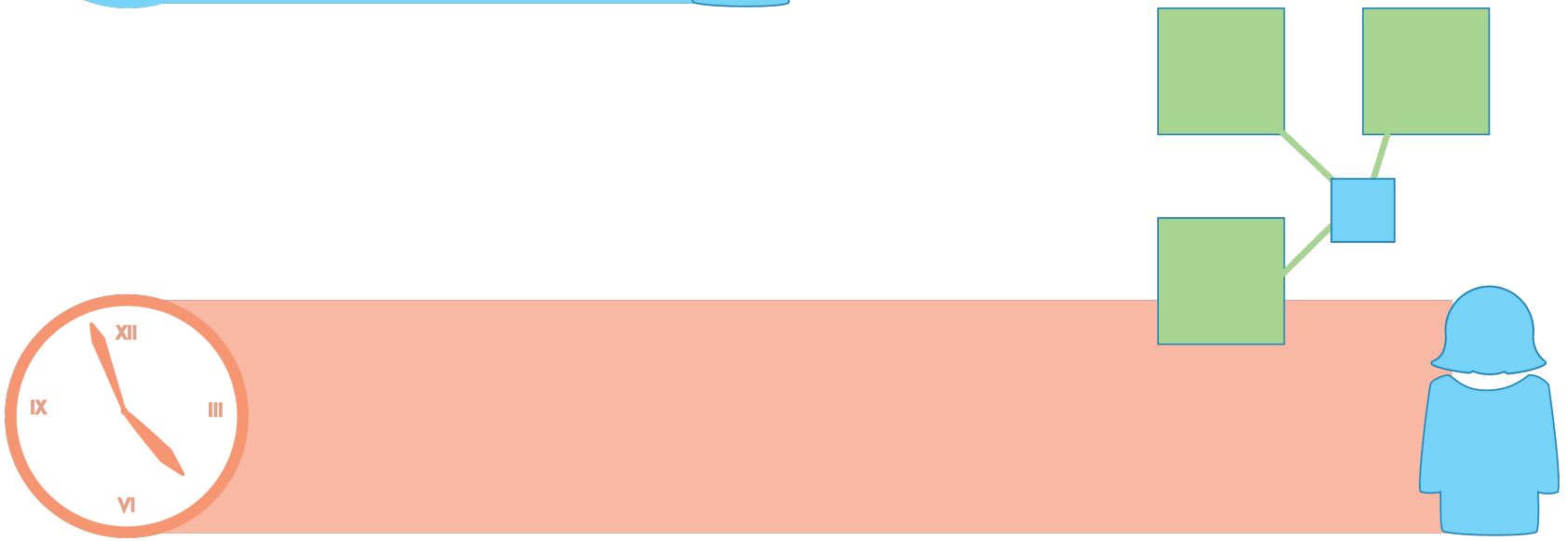

XII
III
VI
IX

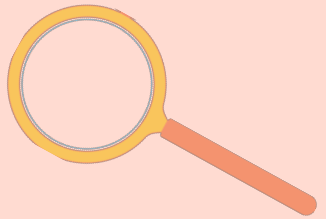


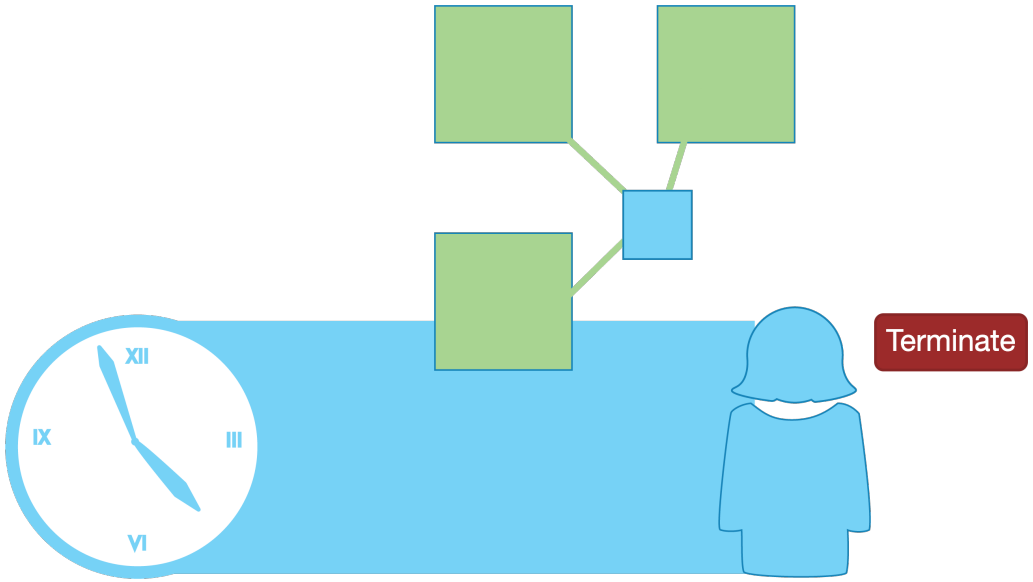


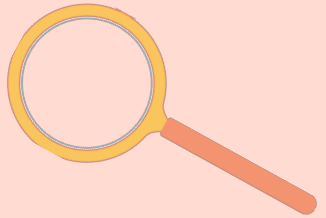



XII
IX
III
VI
Terminate

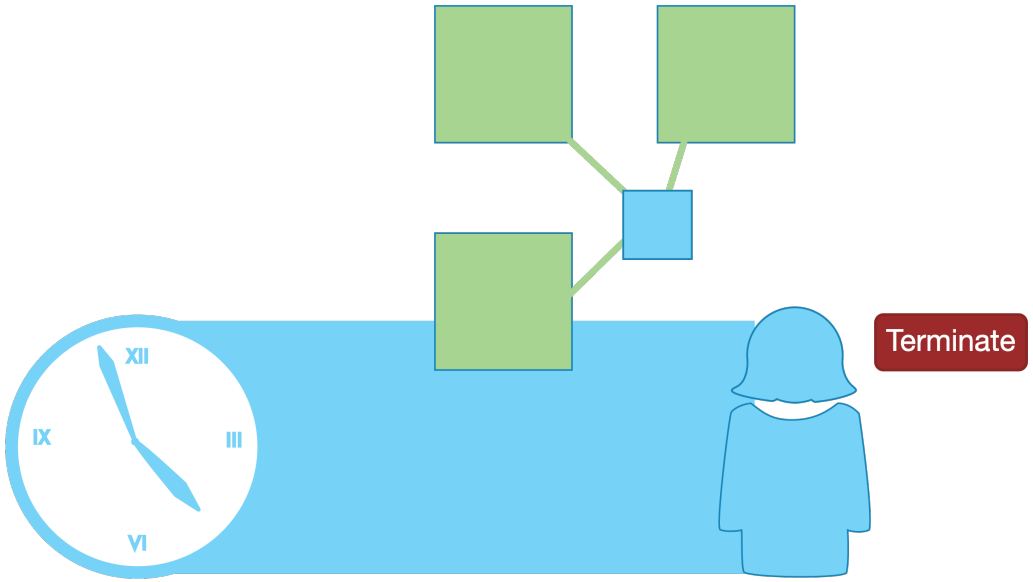

XII
IX
III
VI

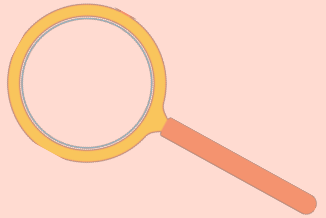




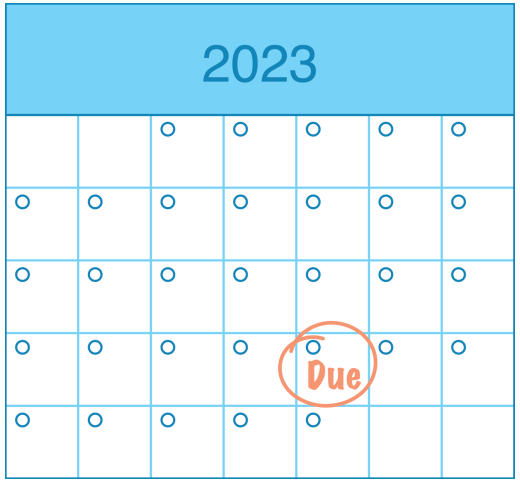


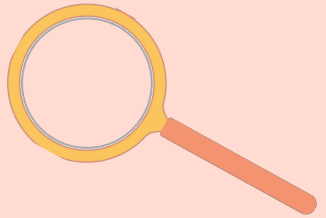
“As an avid user of CloudLab, I know how difficult sometimes it’s- it is to get those nodes. . . As a courtesy for other users, we just try to. . . delete the reservation once it’s done.” - P4

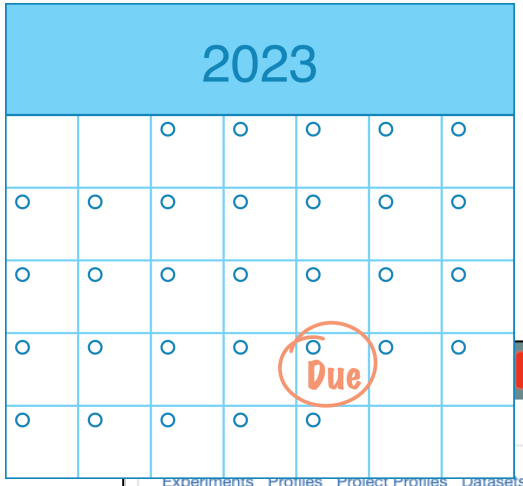




“I tell it to them in my instructions, you know…. ‘Make sure you delete your resources.’ The last question on the lab assignment is, ‘Upload a screenshot showing that you deleted your resources.’”- P10


2023
Due





News! Docs jlcohoon

Current Usage: 5.27 Node Hours, Prev Week: 5.28, Prev Month: 5.28 (30 day rank: 1036 of 1095 users)

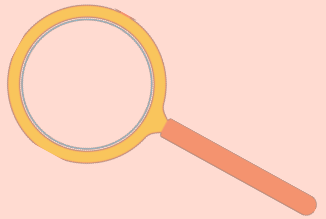
Experiments Profiles Project Profiles Datasets Reservations Parameter Sets Membership Usage Account

	Creator	Project	Created	Starts	Ends	Status	Notes
	jlcohoon	PeDEL	Apr 3, 2023 6:02 PM	Apr 3, 2023 6:02 PM	Apr 4, 2023 6:00 PM	Approved	...
	jlcohoon	PeDEL	Apr 3, 2023 6:10 PM	Apr 11, 2023 12:00 AM	Apr 13, 2023 8:00 PM	Approved	...
	jlcohoon	PeDEL	Apr 2, 2023 9:22 AM	Apr 28, 2023 8:30 AM	May 6, 2023 12:59 PM	Approved	...

Other Reservations in my Projects

	Creator	Project	Created	Starts	Ends	Status	Notes
	tmotahar	PeDEL	Mar 31, 2023 11:00 AM	Apr 2, 2023 12:00 AM	Apr 7, 2023 8:00 PM	Approved	...
	kskabir	PeDEL	Mar 31, 2023 10:41 AM	Apr 2, 2023 2:00 AM	Apr 4, 2023 11:59 PM	Approved	...
	tmotahar	PeDEL	Mar 31, 2023 11:02 AM	Apr 11, 2023 12:00 AM	Apr 13, 2023 8:00 PM	Approved	...
	kskabir	PeDEL	Mar 31, 2023 10:45 AM	Apr 18, 2023 12:00 AM	Apr 20, 2023 8:00 PM	Approved	...

Powered by emulab Question or comment? Join the Help Forum Supported by NSF © 2023 The University of Utah



Experiment cannot be extended before the reservation ends 13 views

@umich.edu

Hi, I have a reservation till November 29. But my experiment created on Nov 9 can not be extended

Leigh Stoller

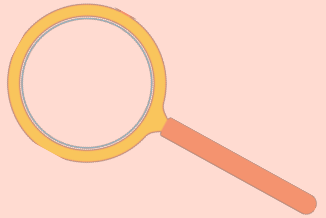
Hi. Reservations are per-project. Looks like other members of your project are using some of the same

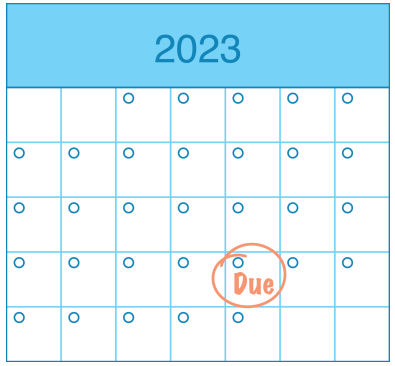
@umich.edu

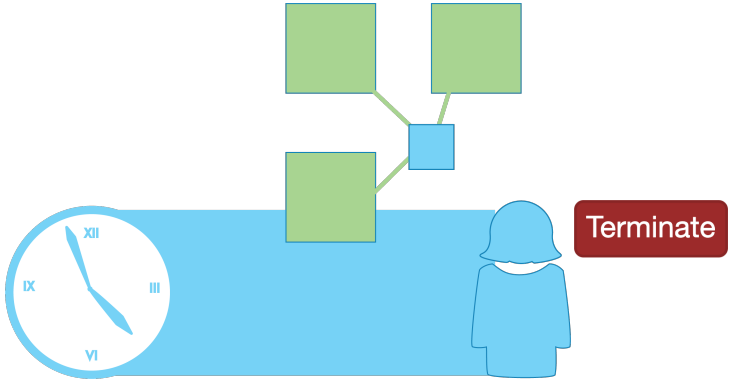
to cloudlab-users

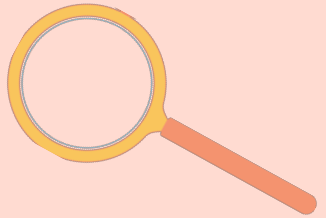
I see. Thanks!

Reply all | Reply to author | Forward







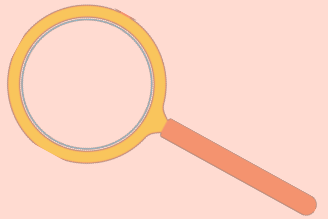


By understanding user behavior, you can more effectively guide it

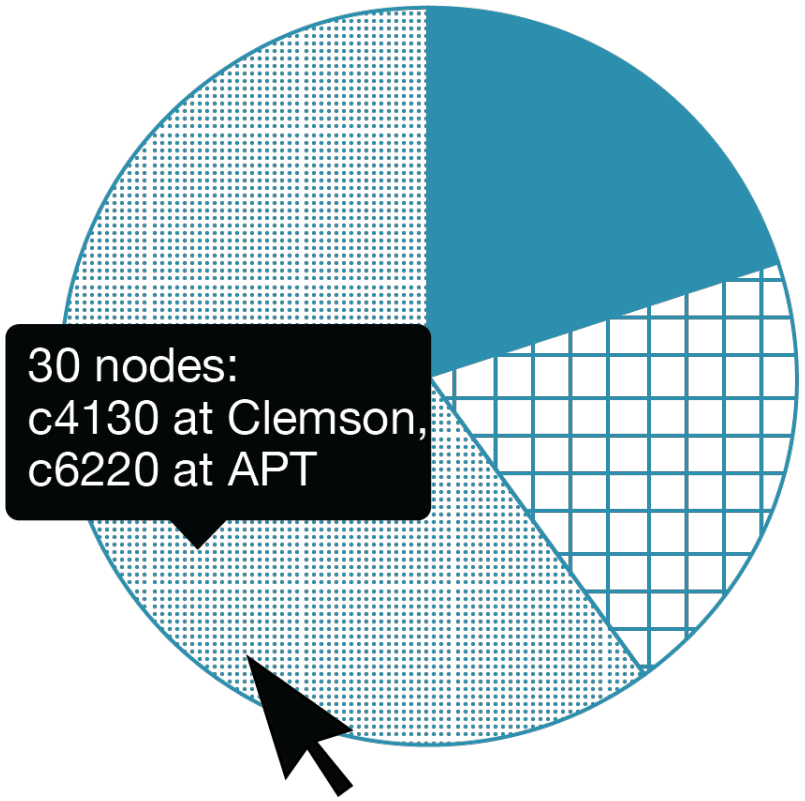
. . .toward responsible node use.

Use visualizations to

- Raise awareness of work habits and plans
- Support coordination
- Show use of reserved nodes affects project members



(Aragon et al., 2008; Begole et al., 2002; Dourish & Bellotti, 1992; Palen, 1999; Steinhardt & Jackson, 2015)

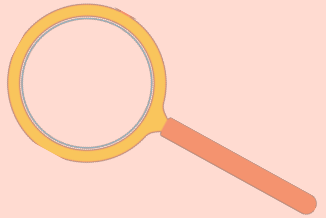


All Filter node type

Not allocated

Allocated to **me**

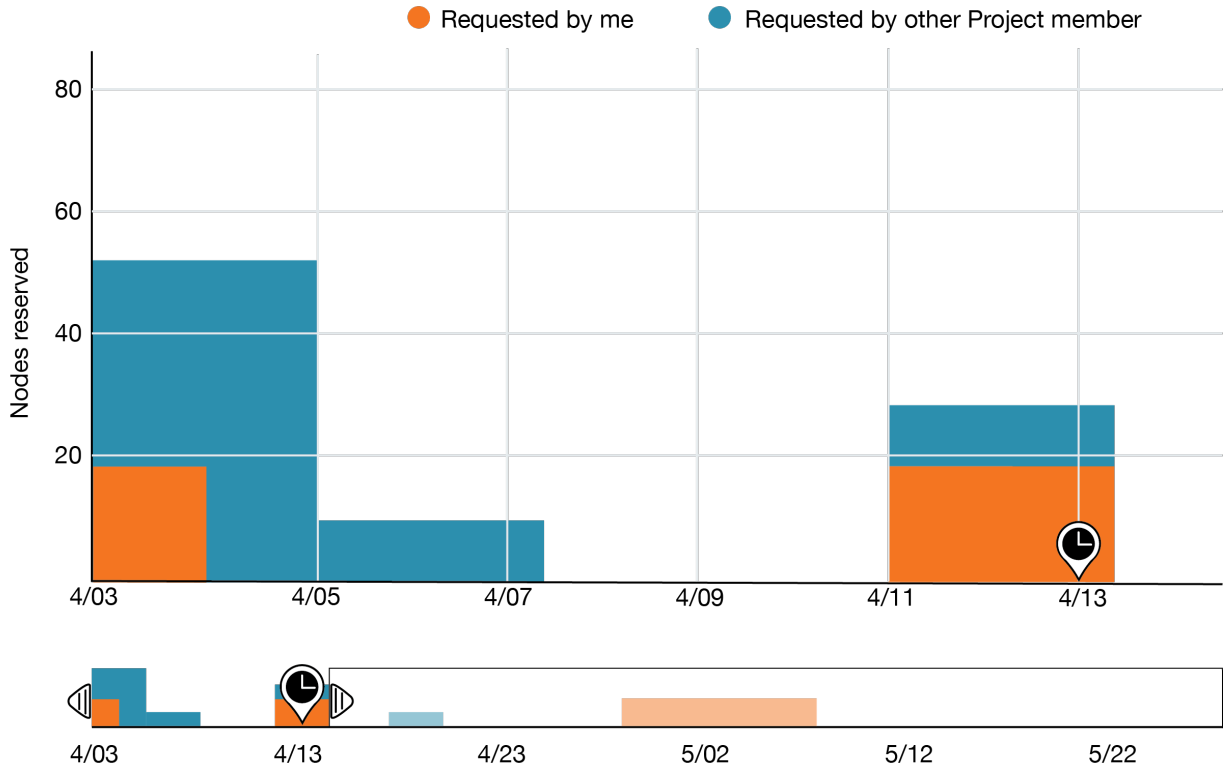
Allocated to **other Project members**

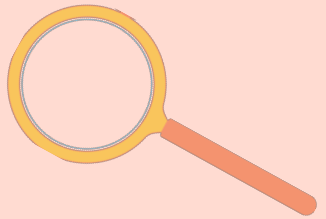


Add new event

4/13/23 Raquel's ACM R&R deadline
replicating results

9/10/23 Lee & Amir's IEEE submission deadline
debugging

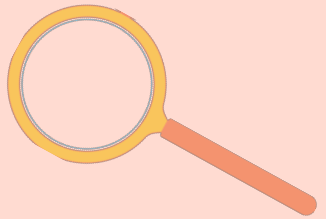




CloudLab @cloudlabus · Jun 6

📢 Hey, CloudLab users! Take this survey to give feedback on a possible interface change! Join the user feedback group for similar opportunities in future. utah.sjc1.qualtrics.com/jfe/form/SV_7N...

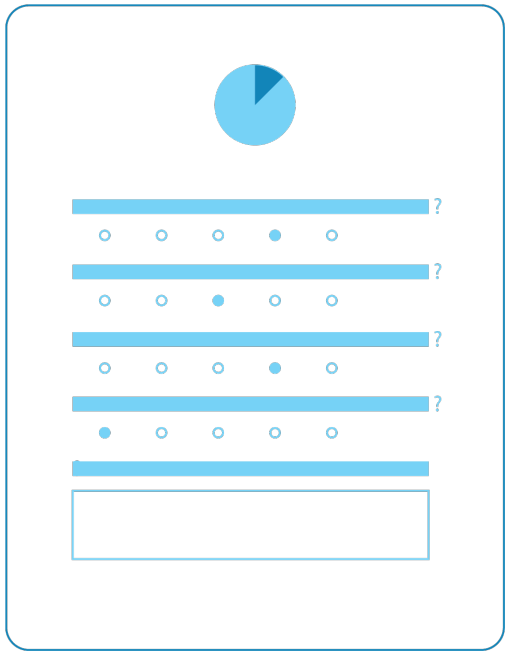
2 5 521 Tip

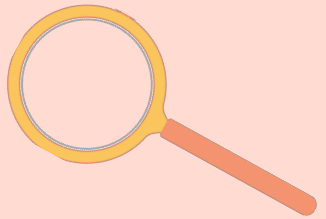


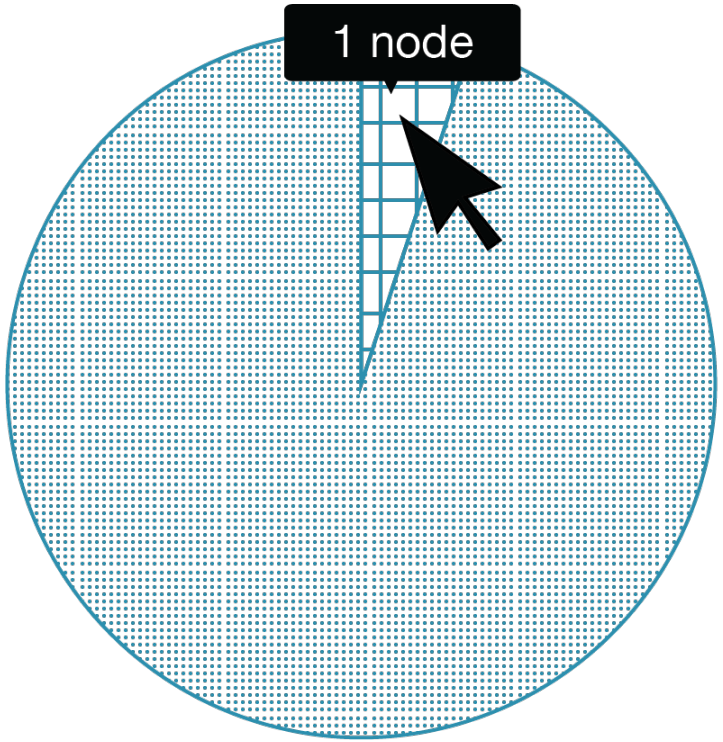
CloudLab @cloudlabus · Jun 6

📢 Hey, CloudLab users! Take this survey to give feedback on a possible interface change! Join the user feedback group for similar opportunities in future. utah.sjc1.qualtrics.com/jfe/form/SV_7N...

2 5 521 Tip





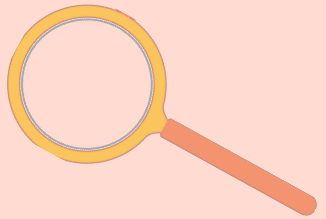


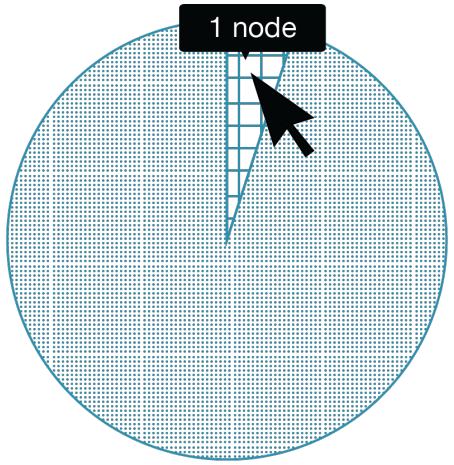
c4130 at Clemson

Filter node type

Allocated to **me**

Allocated to **other Project members**





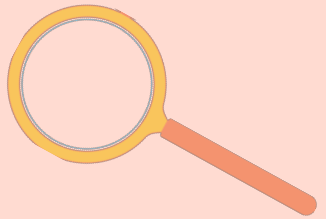
c4130 at Clemson

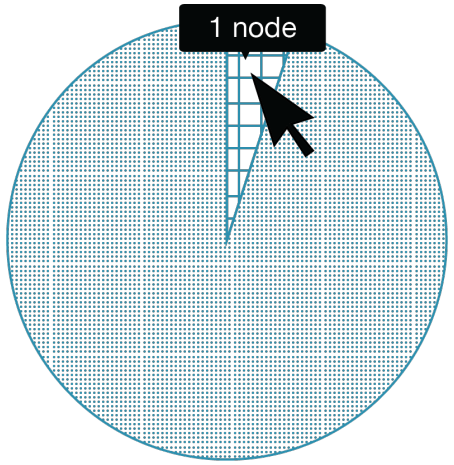
Filter node type

Allocated to **me**

Allocated to **other Project members**

	True	False	Impossible to know
There are reserved nodes ready for allocation to any PeDEL member's experiment.	○	○	○
Other PeDEL members are currently using more reserved nodes than jlcohoon.	○	○	○
A c4130 node is in use in one of jlcohoon's experiments.	○	○	○





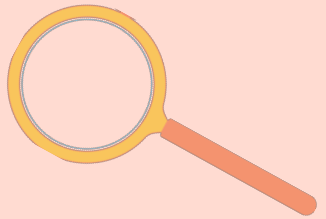
c4130 at Clemson

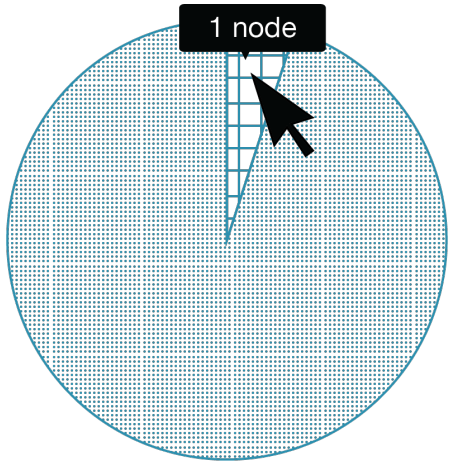
Filter node type

Allocated to **me**

Allocated to **other Project members**

	True	False	Impossible to know
There are reserved nodes ready for allocation to any PeDEL member's experiment.	○	○	○
Other PeDEL members are currently using more reserved nodes than jlcohoon.	○	○	○
A c4130 node is in use in one of jlcohoon's experiments.	●	○	○





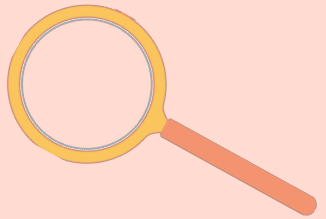
c4130 at Clemson

Filter node type

Allocated to **me**

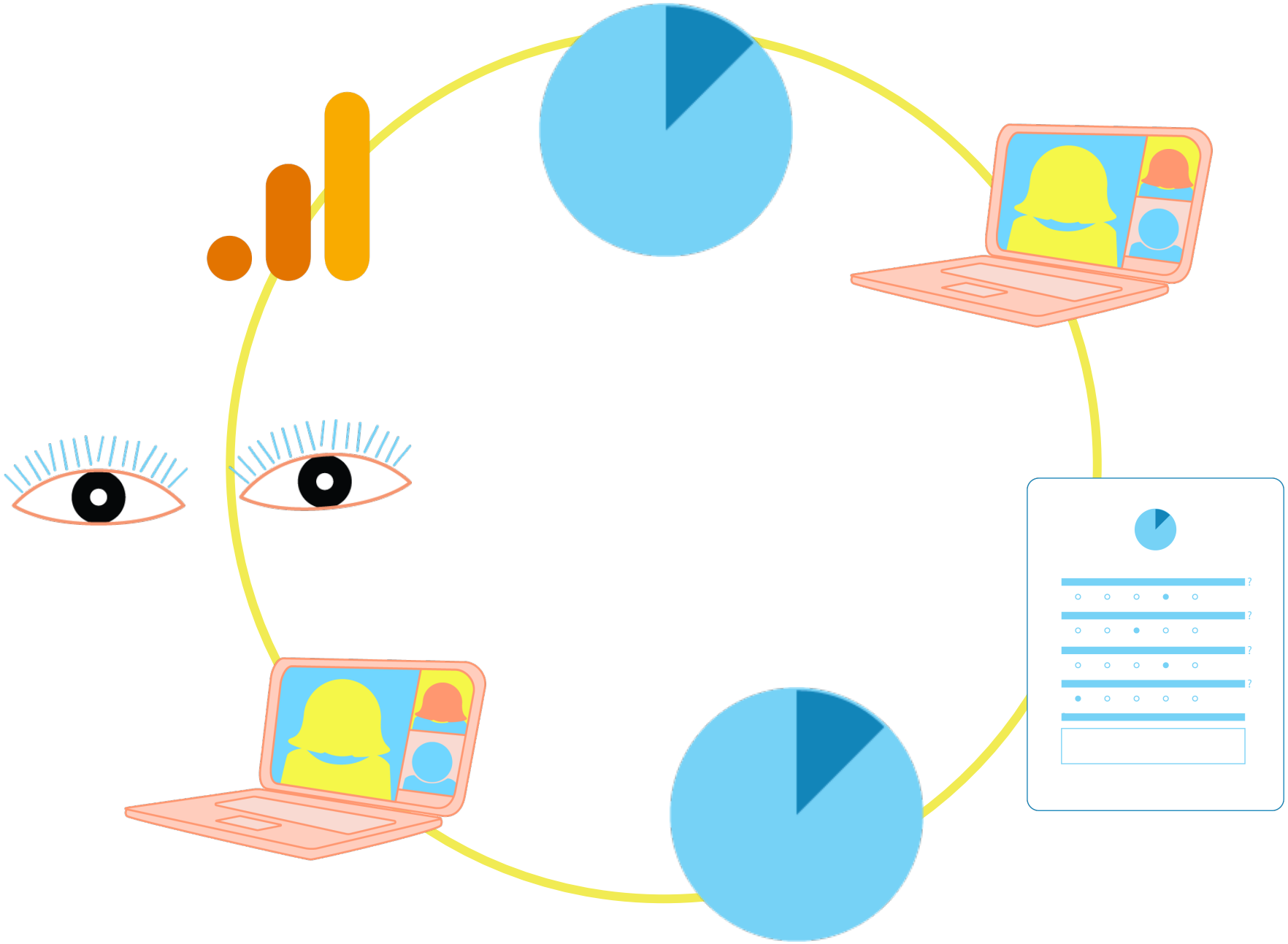
Allocated to **other Project members**

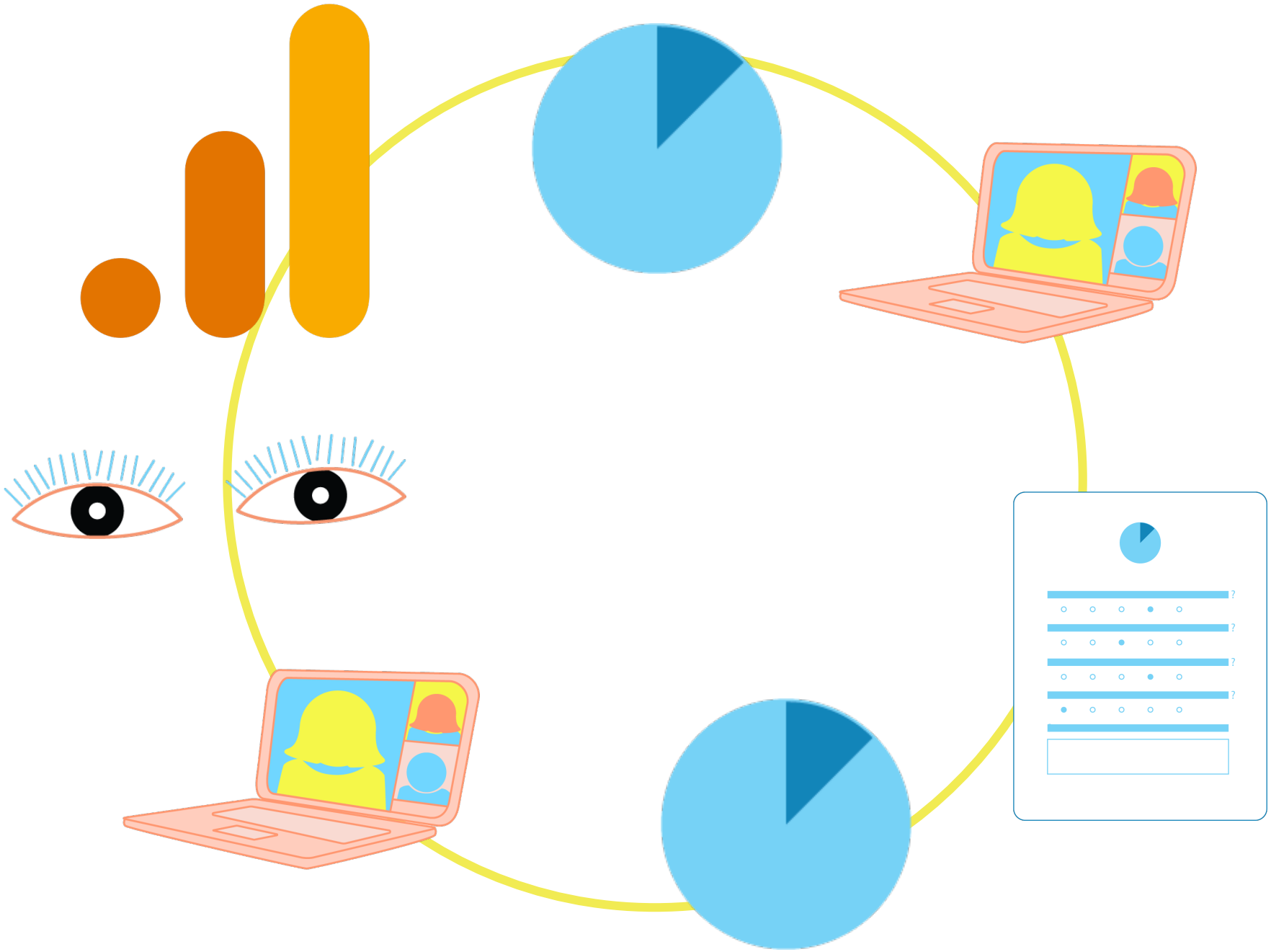
	True	False	Impossible to know
There are reserved nodes ready for allocation to any PeDEL member's experiment.	○	○	○
Other PeDEL members are currently using more reserved nodes than jlcohoon.	○	○	○
A c4130 node is in use in one of jlcohoon's experiments.	○	○	●

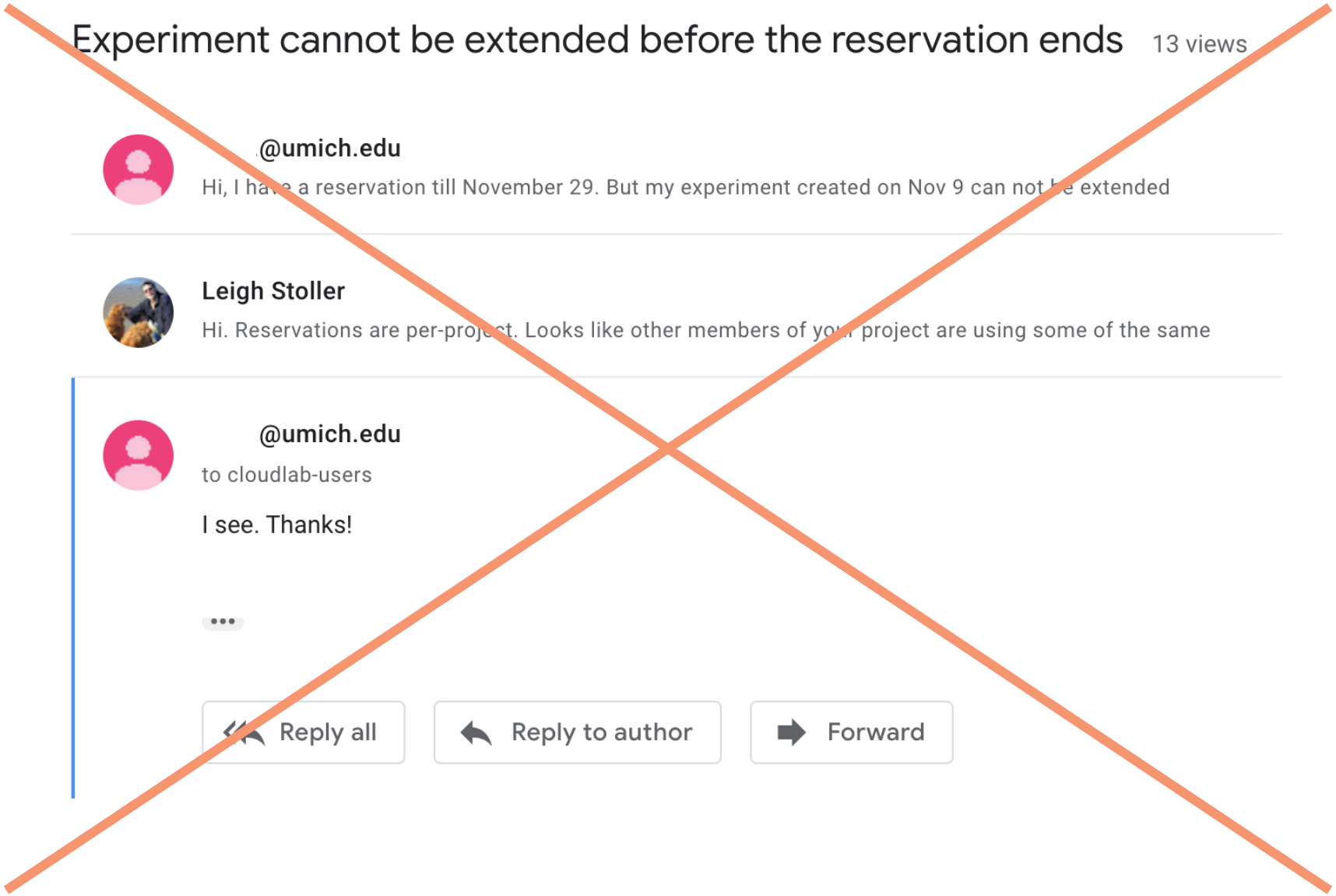


Users have different experiences, language, and assumptions from you.

Thanks to Jason Wiese for this succinct phrasing.






Experiment cannot be extended before the reservation ends
13 views
@umich.edu
Hi, I have a reservation till November 29. But my experiment created on Nov 9 can not be extended
Leigh Stoller
Hi. Reservations are per-project. Looks like other members of your project are using some of the same
@umich.edu
to cloudlab-users
I see. Thanks!
Reply all
Reply to author
Forward

Benefit Users

- More node hours available
- Less time coordinating

Benefit Devs

- More node hours available
- Less time answering questions

Facilitators

Facilitators

1. I have an advocate who has integrated me into the team

Facilitators

1. I have an advocate who has integrated me into the team
2. I was made aware of questions and goals

Facilitators

1. I have an advocate who has integrated me into the team
2. I was made aware of questions and goals
3. Multiple data sources are available

Facilitators

1. I have an advocate who has integrated me into the team
2. I was made aware of questions and goals
3. Multiple data sources are available
4. Recruitment burden is lessened

Finding Time through User Research

Maybe want to use CloudLab? Check out our available hardware.

cloudlab.us

Thanks to our participants, Rob Ricci and the CloudLab dev team, Jason Wiese, Sinthia Kabir, Tamanna Motahar, and Isha Gosh.

Johanna (Hannah) Cohoon
hannah.cohoon@utah.edu
hannahcohoon.com

This material is based upon work supported by the National Science Foundation under Grant No. 2027208.