

# SER 321 A Session

**SI Session**

**Tuesday, February 18th 2025**

*11:00 am - 12:00 pm MST*

# Agenda



OSI Model *Final Challenge!*

Parallel vs. Distributed Process Flow

Consensus!

RAFT

Peer to Peer Communication

# SI Session Expectations

Thanks for coming to the **SER 321** SI session. We have a packed agenda and we are going to try to get through as many of our planned example problems as possible. This session will be recorded and shared with others.

- If after this you want to see additional examples, please visit the drop-in tutoring center.
- We will post the link in the chat now and at the end of the session.
  - [tutoring.asu.edu](https://tutoring.asu.edu)
- Please keep in mind we are recording this session and it will be made available for you to review 24-48 hours after this session concludes.
- Finally, please be respectful to each other during the session.

# Interact with us:

## Zoom Features



### Zoom Chat

- Use the chat feature to interact with the presenter and respond to presenter's questions.
- Annotations are encouraged

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**OSI Model**

Unit

Layer

What we are *really*  
talking about

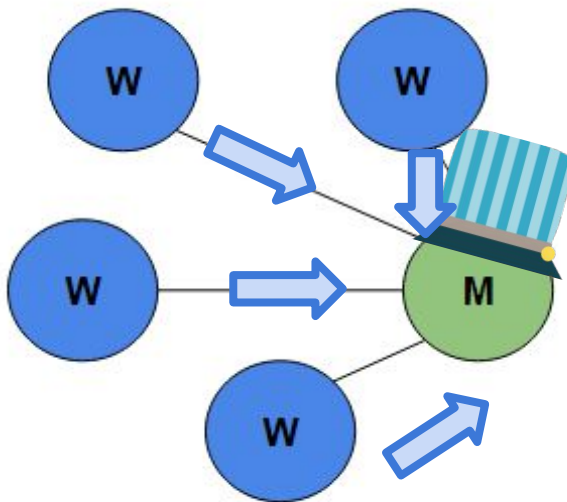
OSI Model *Final Challenge*

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## Distributed Systems

Does this look familiar?

How is this different from a parallel processing model?



D1

DATA



D1

D2

D3

D4

D1  
Result

D2  
Result

D3  
Result

D4  
Result



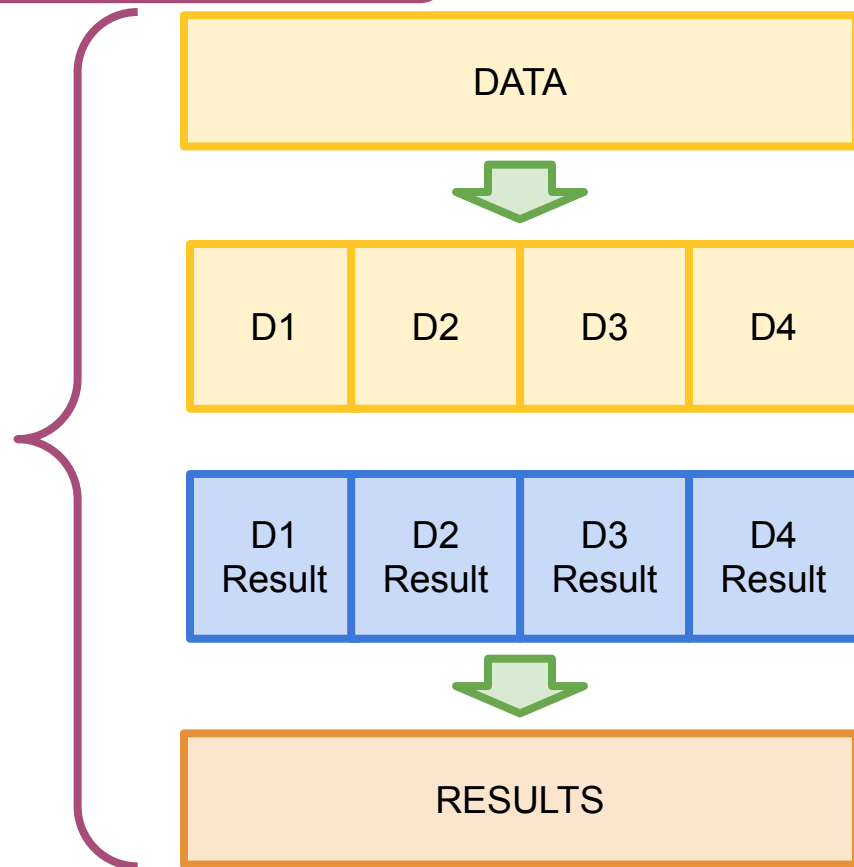
RESULTS

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**Distributed Systems**

What about Peer to Peer?

Would this sequence  
(*the data handling*) change  
in the different structure?



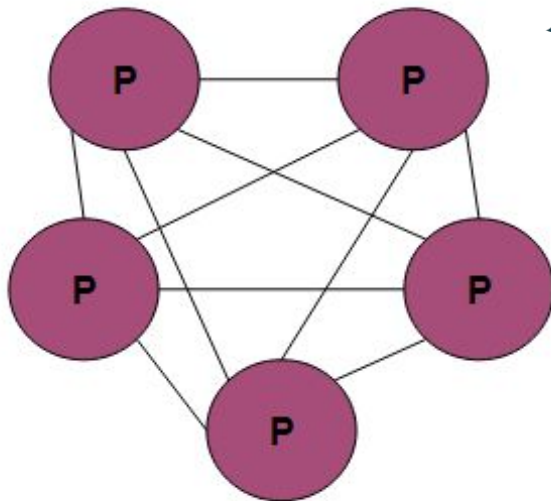
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**Distributed Systems**

What about Peer to Peer?

We want  
someone to  
wear the  
conductor  
hat!

A **LEADER**



How do we choose a leader?

DATA



D1

D2

D3

D4

D1  
Result

D2  
Result

D3  
Result

D4  
Result



RESULTS



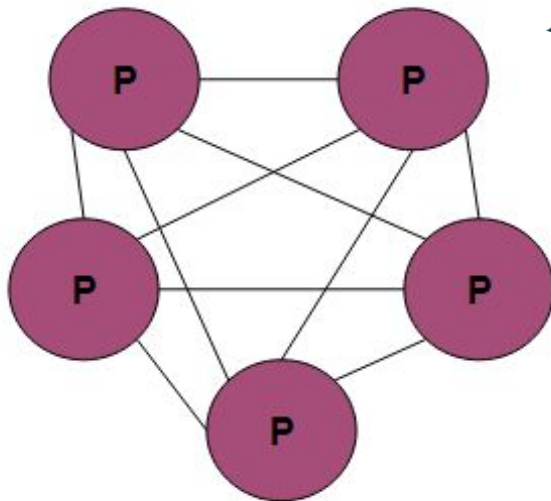
**SER 321**

**Distributed Systems**

What about Peer to Peer?

We want  
someone to  
wear the  
conductor  
hat!

A *LEADER*



Leader Election!

DATA



D1

D2

D3

D4

D1  
Result

D2  
Result

D3  
Result

D4  
Result



RESULTS

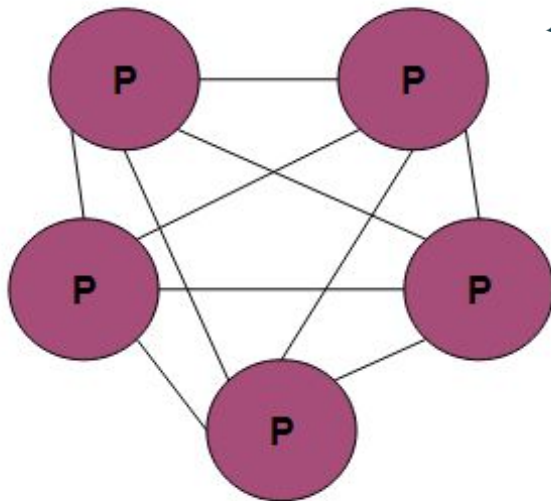
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**Distributed Systems**

What about Peer to Peer?

We want  
someone to  
wear the  
conductor  
hat!

A **LEADER**



Leader Election!

Type of  
**CONSENSUS**

What's  
consensus?



“General agreement or  
trust amongst a group”

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## Consensus

“General agreement or trust amongst a group”

## Types of Consensus?

Leader Election



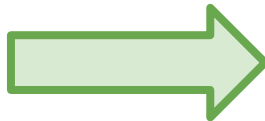
Who's in charge or keeping the beat

Result Verification



Check your work with a neighbor

Log Replication



Verify and maintain my copy of the data

Node Validation



Do I want to let you into my network

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**Consensus**

## Match the Consensus Algorithm to its Description!

2-Phase Commit

Blockchain

Proof of Work

RAFT

If you solve this  
resource-intensive problem, you  
may make a request

Leader Election and Log  
Replication coordinate  
transactions

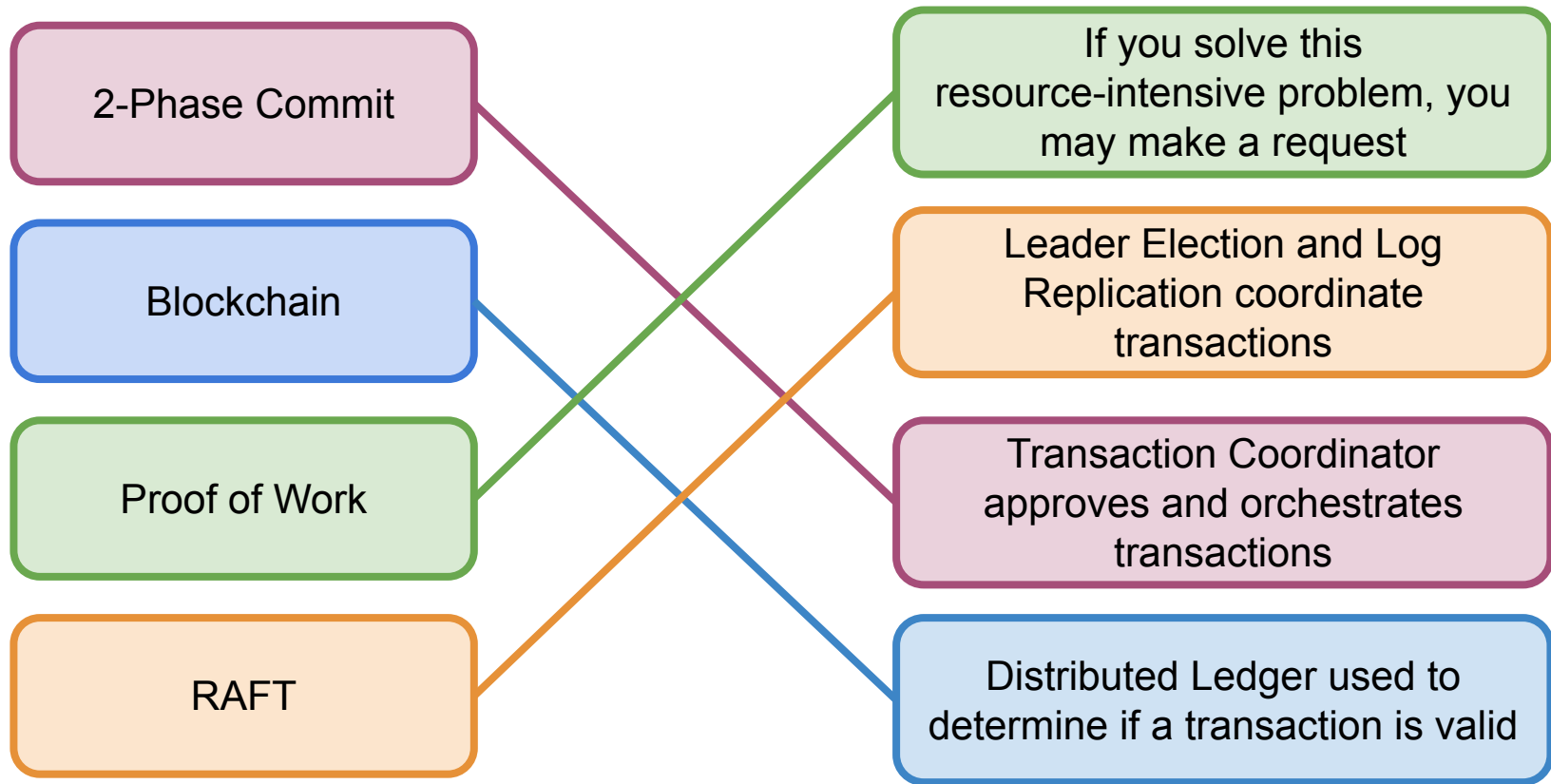
Transaction Coordinator  
approves and orchestrates  
transactions

Distributed Ledger used to  
determine if a transaction is valid

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## Consensus

### Match the Consensus Algorithm to its Description!



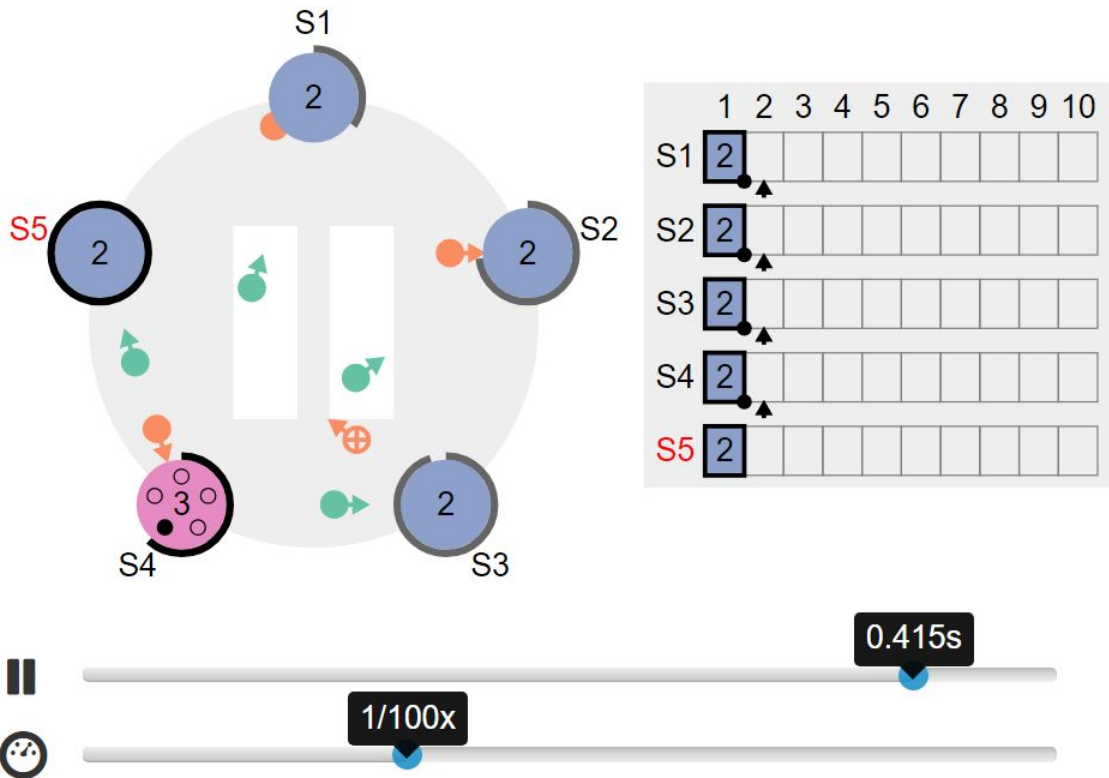
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## RAFT

RAFT is a  
great  
consensus  
example!

Leader Election

Log Replication



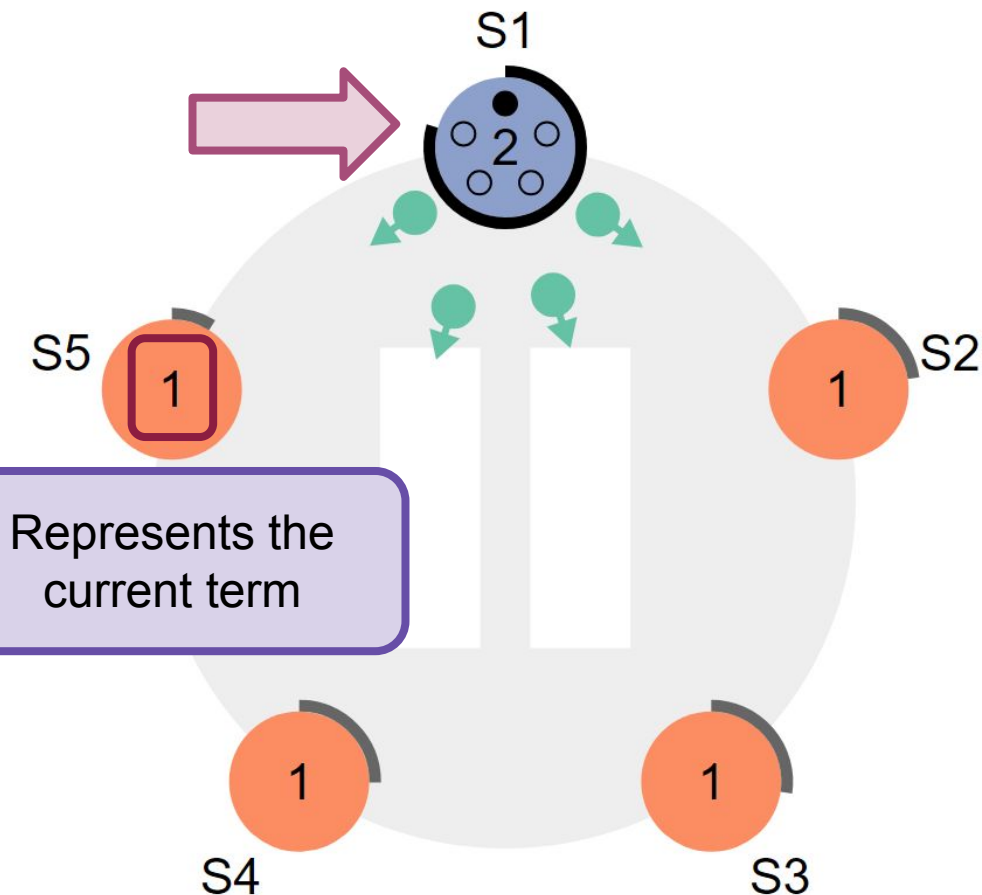
The Secret Lives of Data is a different visualization of Raft. It's more guided and less interactive, so it may be a gentler starting point.

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## RAFT

Every node has a *timer*

When it hits zero, the  
node triggers a new  
**Election Term**



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**RAFT**

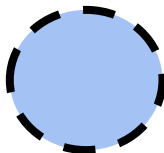
## Leader Election

Nodes have 3 states:

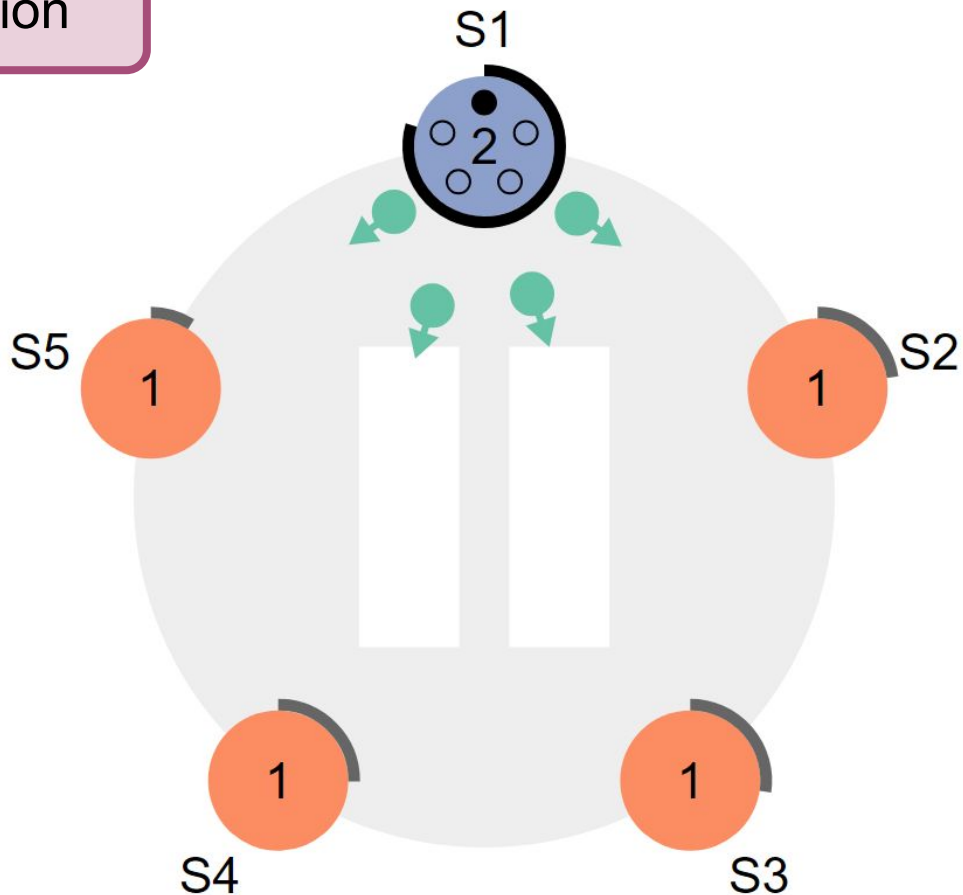
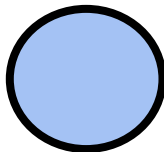
Follower



Candidate



Leader



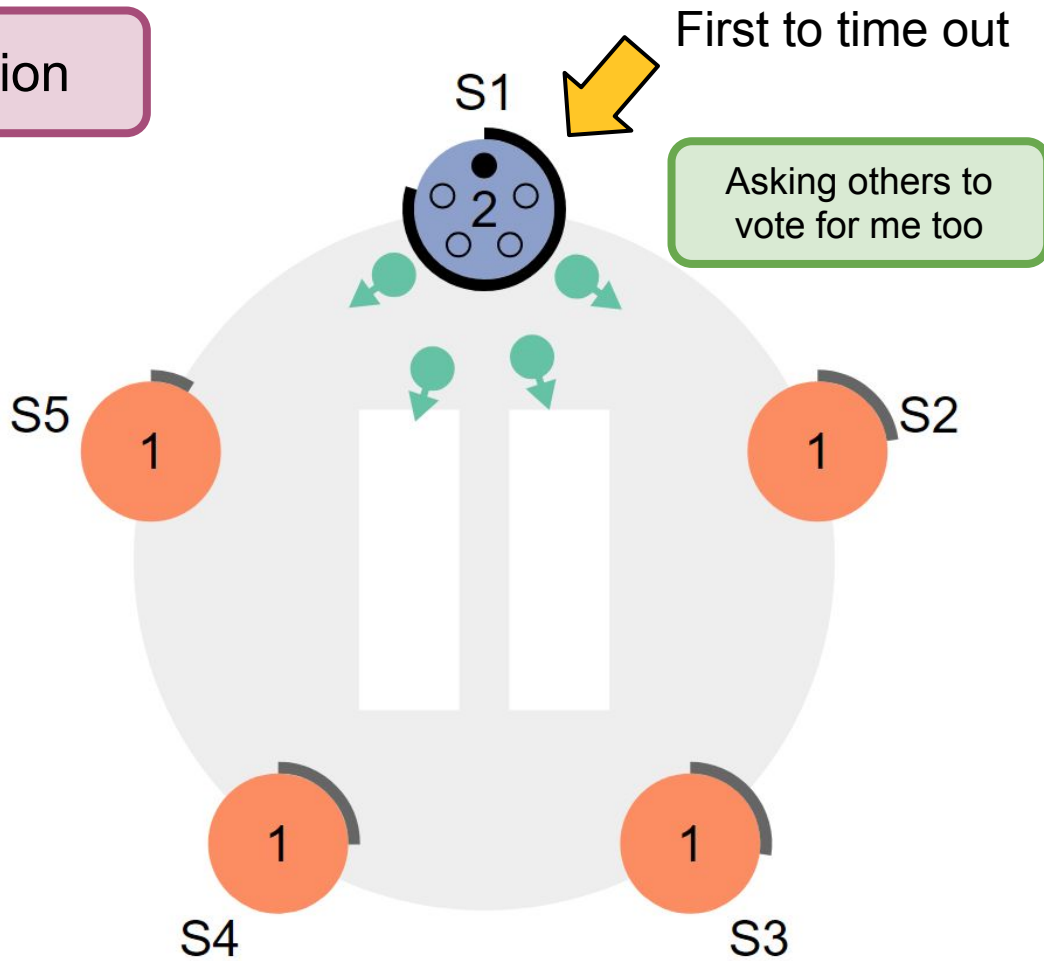


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**RAFT**

Leader Election

This is the first election

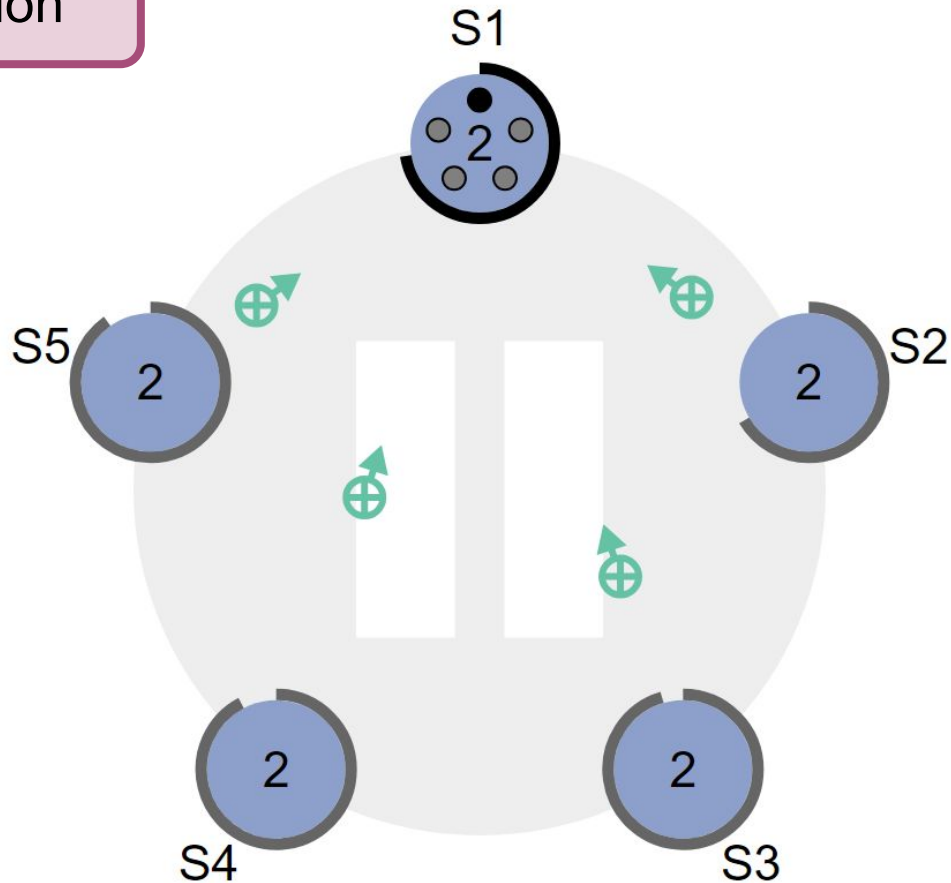


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**RAFT**

## Leader Election

Other nodes said  
sure whatever

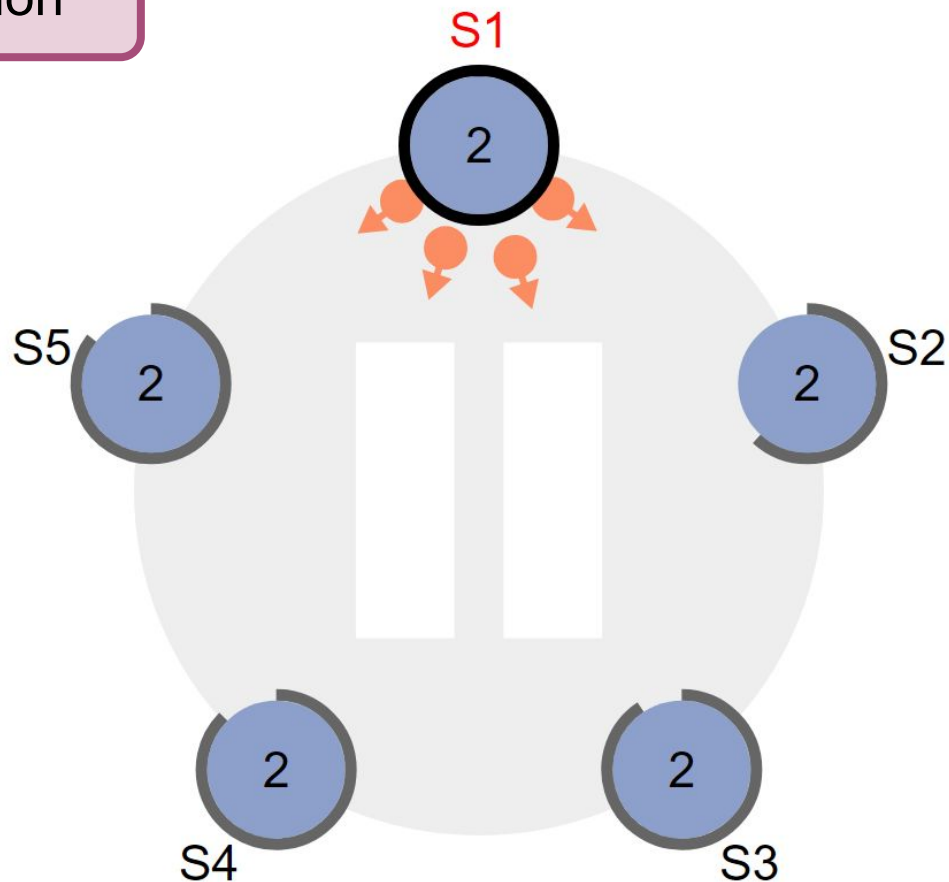


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**RAFT**

Leader Election

Now confirmed  
as Leader





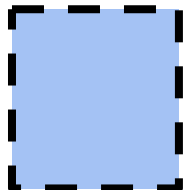
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**RAFT**

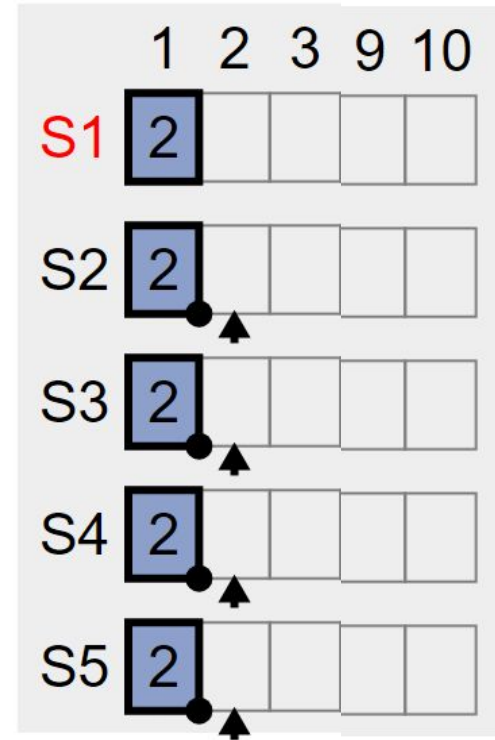
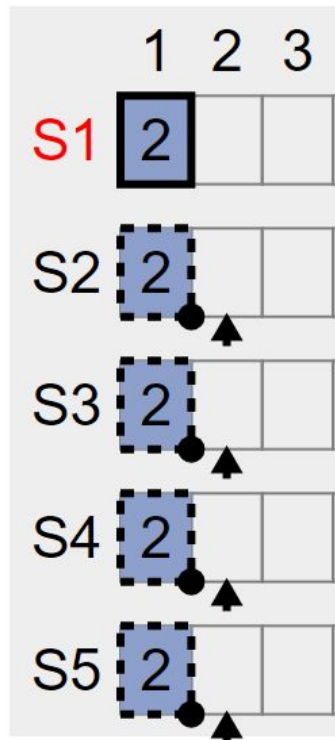
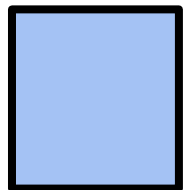
Log Replication

Same Pattern!

Candidate



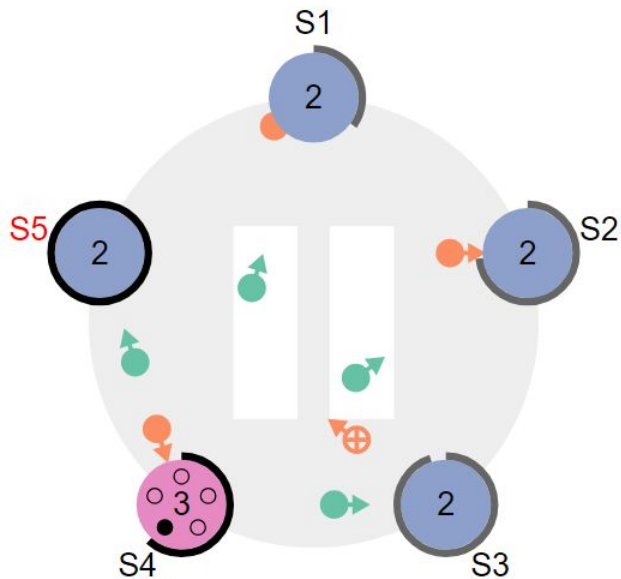
Added



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## RAFT

RAFT



	1	2	3	4	5	6	7	8	9	10
S1	2									
S2	2									
S3	2									
S4	2									
S5	2									

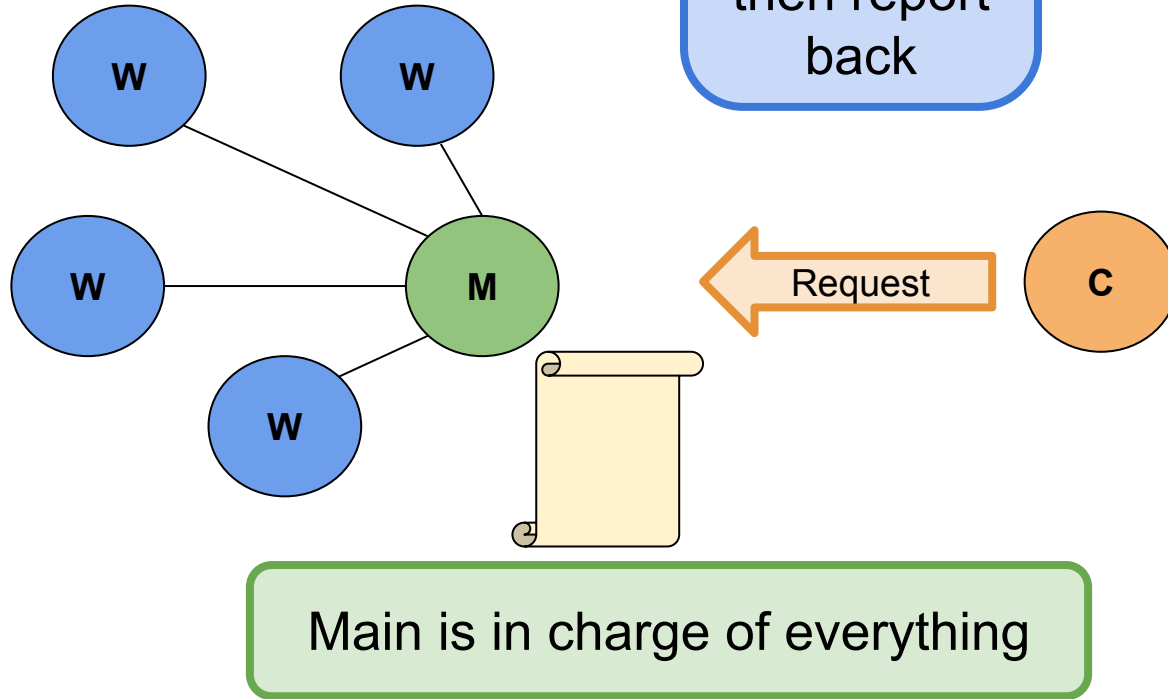


1/100x

0.415s

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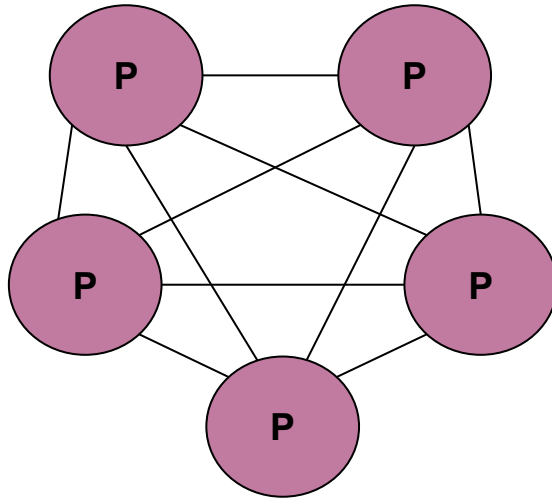
## Communication



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## Communication

How do we handle the client in a Peer to Peer system?



Request is sent to the  
*current leader*

or

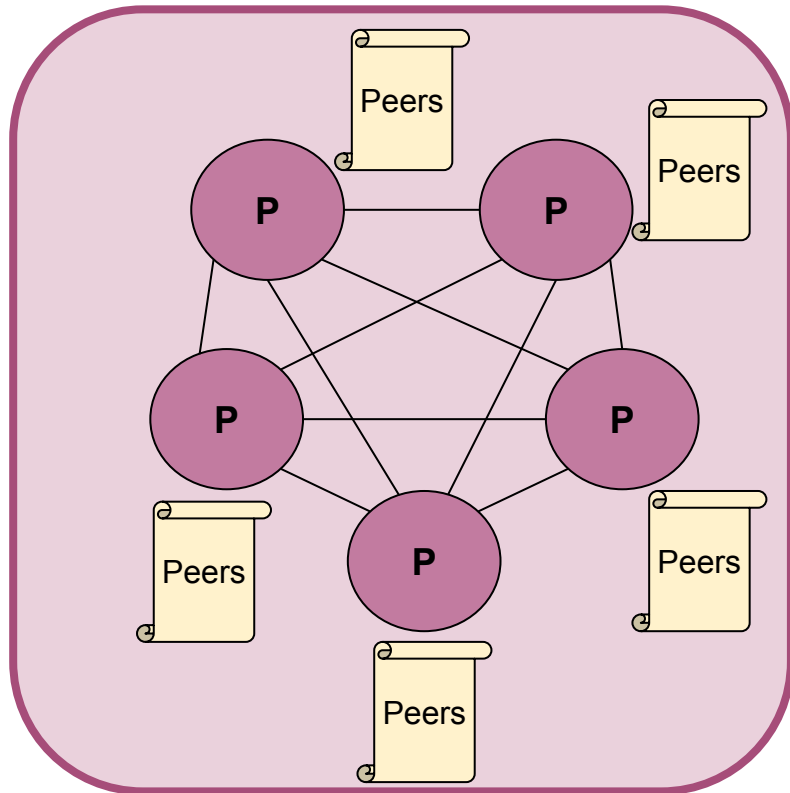
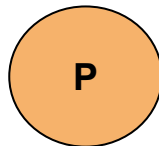
Peer that received the  
request *acts as the leader*



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**Communication**

What about *adding* a Peer to the Cluster?



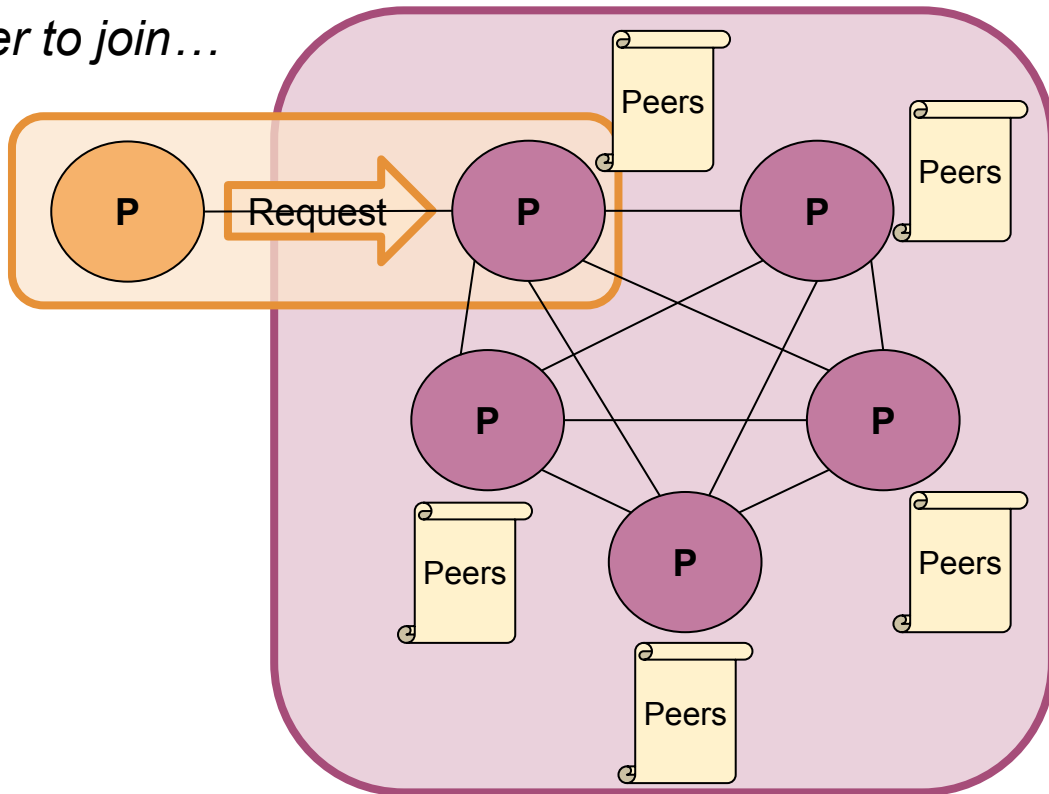
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## Communication

What about **adding** a Peer to the Cluster?

*Assuming we want to allow the peer to join...*

Is that all?



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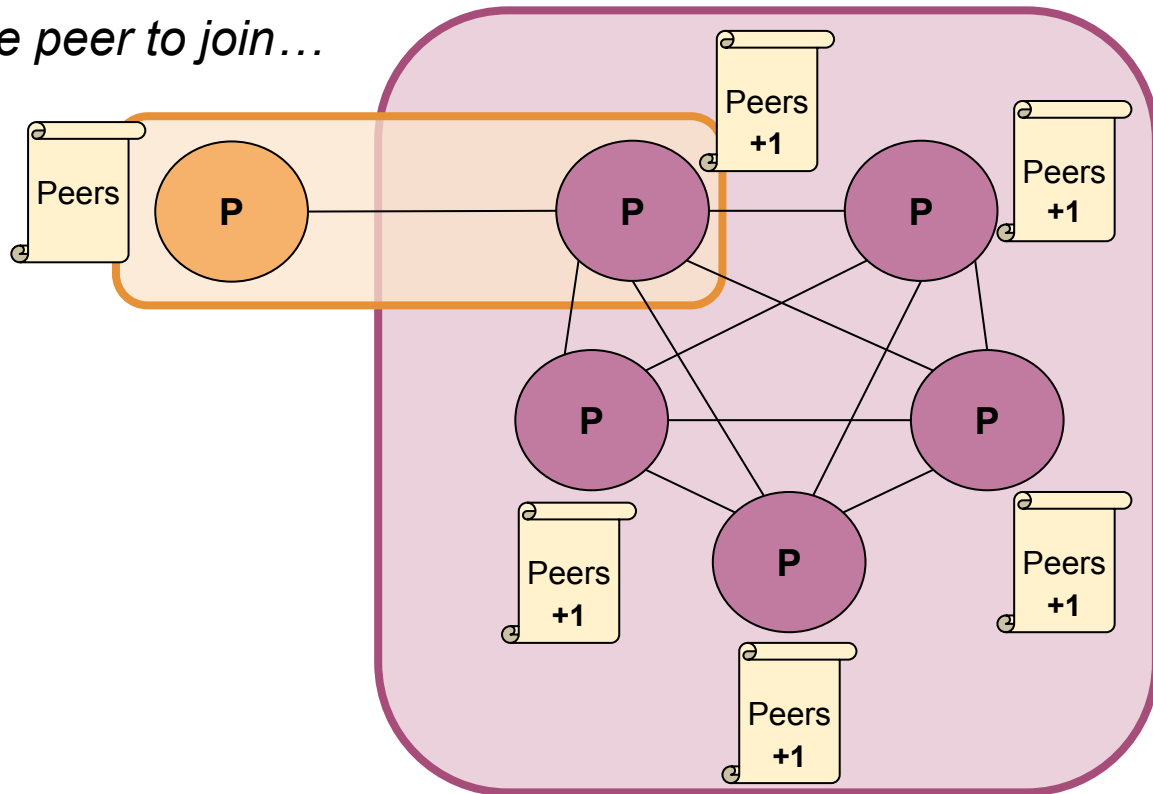
## Communication

What about **adding** a Peer to the Cluster?

*Assuming we want to allow the peer to join...*

Three Additional Steps:

- 1.
- 2.
- 3.



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Scratch Space

## Upcoming Events

### SI Sessions:

- Thursday, February 20th at 7:00 pm MST
- Sunday, February 23rd at 7:00 pm MST
- Tuesday, February 25th at 11:00 am MST - **Q&A Session**

### Review Sessions:

- Tuesday, February 25th at 11:00 am MST - **Q&A Session**
- Thursday, February 27th at 7:00 pm MST - **Exam Review Session (2hrs)**

# Questions?

## Survey:

<https://asuasn.info/ASNSurvey>



# More Questions?

Check out our other resources!

tutoring.asu.edu



## Academic Support

Academic Support Network (ASN) provides a variety of free services in-person and online to help currently enrolled ASU students succeed academically.

### Services



#### Subject Area Tutoring

Need in-person or online help with math, science, business, or engineering courses? Just hop into our Zoom room or drop into a center for small group tutoring. We'll take it from there.

[Need help using Zoom?](#)

[View the tutoring schedule](#)

[View digital resources](#)

Go to Zoom



#### Writing Tutoring

Need help with undergraduate or graduate writing assignments? Schedule an in-person or online appointment, access your appointment link, or wait in our drop-in queue.

[Access your appointment link](#)

[Access the drop-in queue](#)

Schedule Appointment



#### Online Study Hub

Join our online peer communities to connect with your fellow Sun Devils. Engage with our tools to search our bank of resources, videos, and previously asked questions. Or, ask our Tutorbot questions.

Now supporting courses in Math, Science, Business, Engineering, and Writing.

Online Study Hub

1-

Go to Zoom

2-

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[View digital resources](#)






1. Click on 'Go to Zoom' to log onto our Online Tutoring Center.
2. Click on 'View the tutoring schedule' to see when tutors are available for specific courses.

# More Questions?

## Check out our other resources!

[tutoring.asu.edu/online-study-hub](https://tutoring.asu.edu/online-study-hub)

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[University College](#)

## Online Study Hub

Online peer communities for students and tutors, YouTube channels, and Tutorbots.



### What are online peer communities?

Individual courses have an online peer community that allows you to connect with your peers to post and answer questions and to develop study groups.



### How can tutoring center videos help?

Videos can help supplement the learning you're doing in and outside of class and include step-by-step methods for how to understand concepts.



### How does the Tutorbot work?

You can ask the Tutorbot questions about course concepts and the Tutorbot will recommend additional resources and examples to help address your questions.

Select a subject

- Any -

Apply



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Select a subject

- Any -

Apply

Business


### ACC 231

Uses of Accounting Info I

 [Peer Community](#)

### ACC 241

Uses of Accounting Info II

 [Peer Community](#)

### CIS 105

Computer Applications and Information Technology

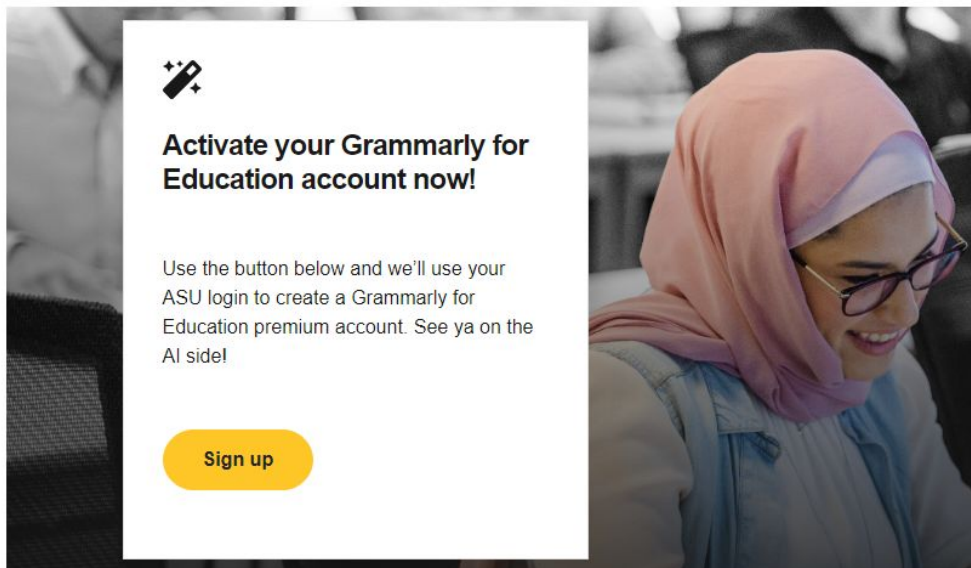
 [Peer Community](#)

Don't forget to check out the Online Study Hub for additional resources!



# Expanded Writing Support Available

Including Grammarly for Education, at no cost!



[tutoring.asu.edu/expanded-writing-support](https://tutoring.asu.edu/expanded-writing-support)

\*Available slots for this pilot are limited

## Additional Resources

- [Course Repo](#)
- [Gradle Documentation](#)
- [GitHub SSH Help](#)
- [Linux Man Pages](#)
- [OSI Interactive](#)
- [MDN HTTP Docs](#)
  - [Requests](#)
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