

SER 321 C Session

SI Session

Sunday, July 7th 2024

6:00 pm - 7:00 pm MST

Agenda



Exam Info

Review!

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
- 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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Exam Information

[Exam Info Page](#)

80 minutes

Very similar to
the quizzes

Make sure to look at
the Study Guide!

Opens: Monday
July 8th
@ 12:01 AM

Closes: Wednesday
July 10th
@ 11:59 PM

Front and Back!

MUST BE *Handwritten*



JSON Sessions!

Date	Topic	Link
5/30/24	Intro & Recognition	<u>Session Link</u>
6/2/24	Intro & Recognition Cont.	<u>Session Link</u>
6/6/24	Request & Response Practice	<u>Session Link</u>
6/10/24	Syntax Specifics & Visual	<u>Session Link</u>

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Server Socket

Steps for the **Server Socket**

1.

2.

3.

4.

5.

6.

7.

8.

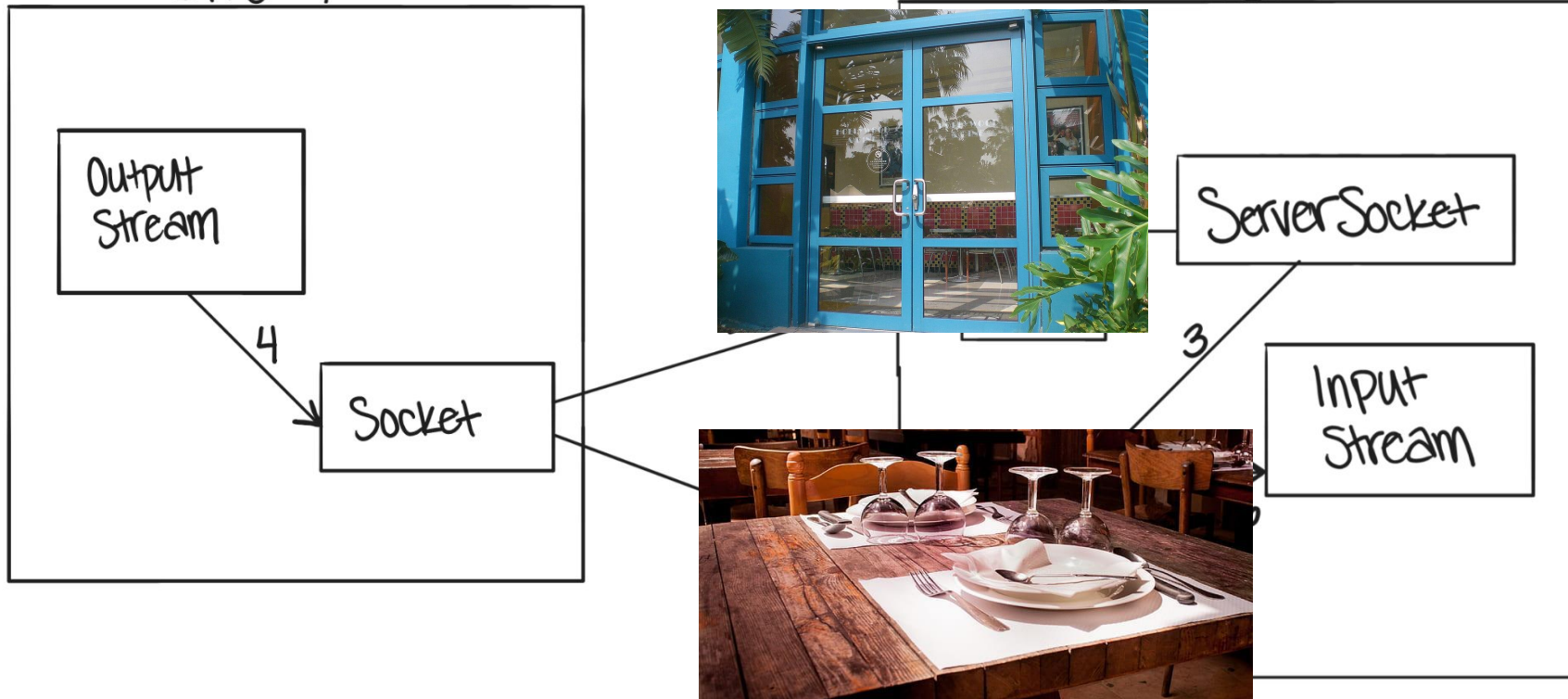
9.

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Sockets!

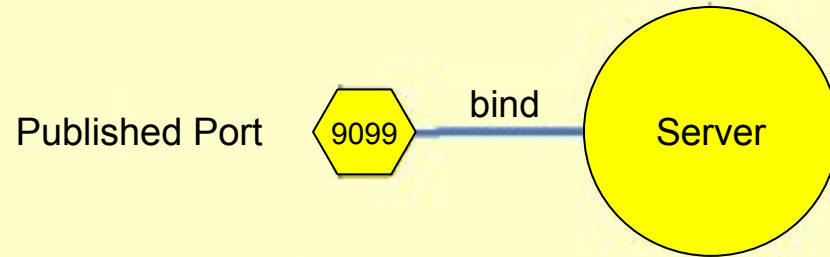
Client

Server



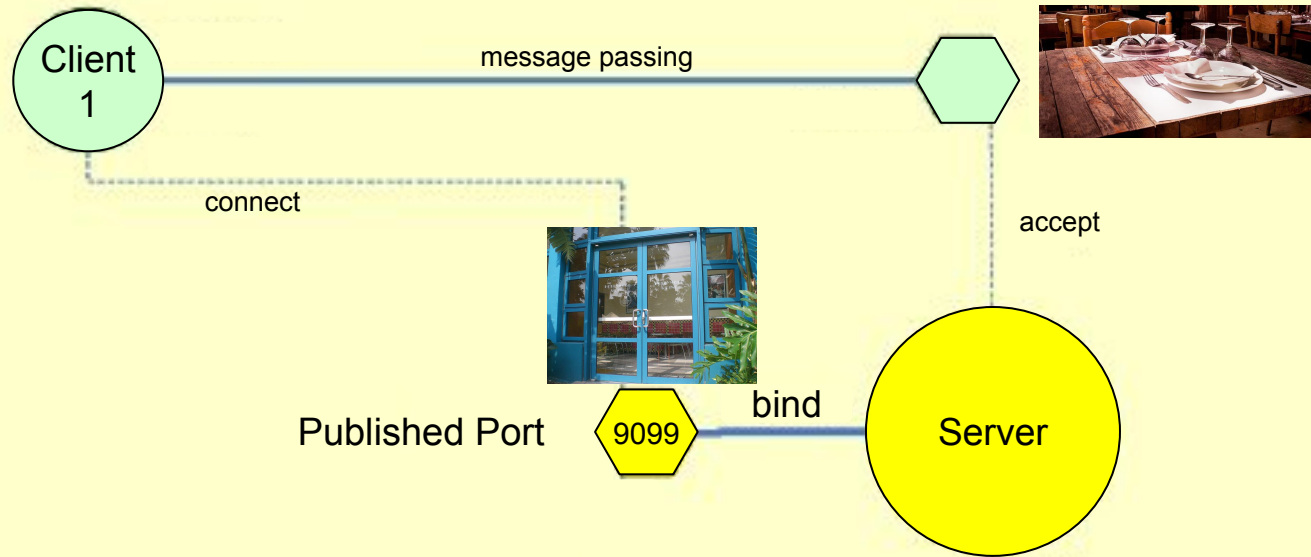
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Sockets!



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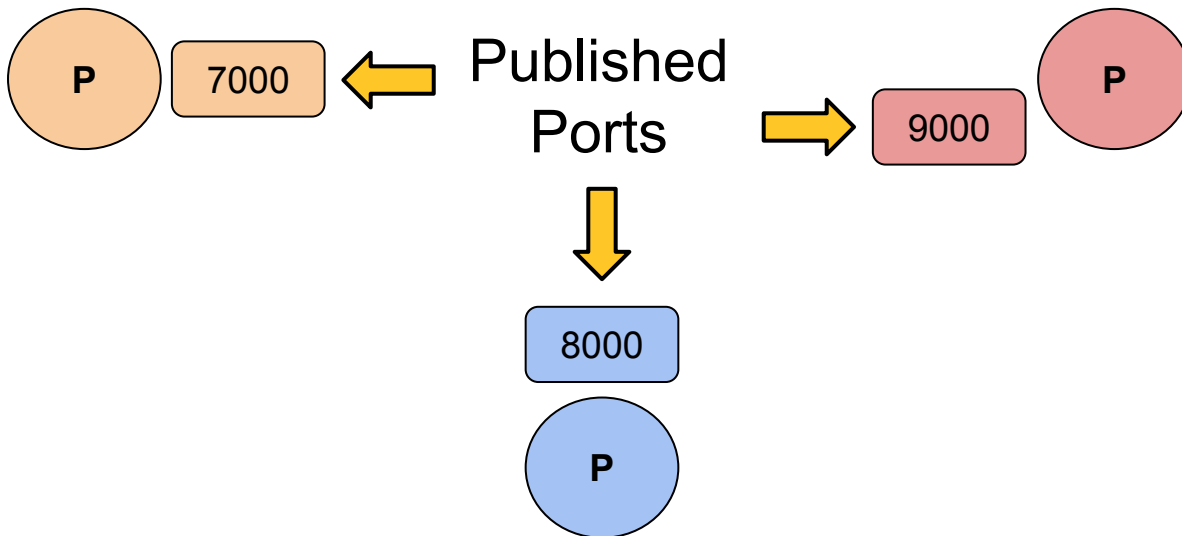
Sockets!



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Communication

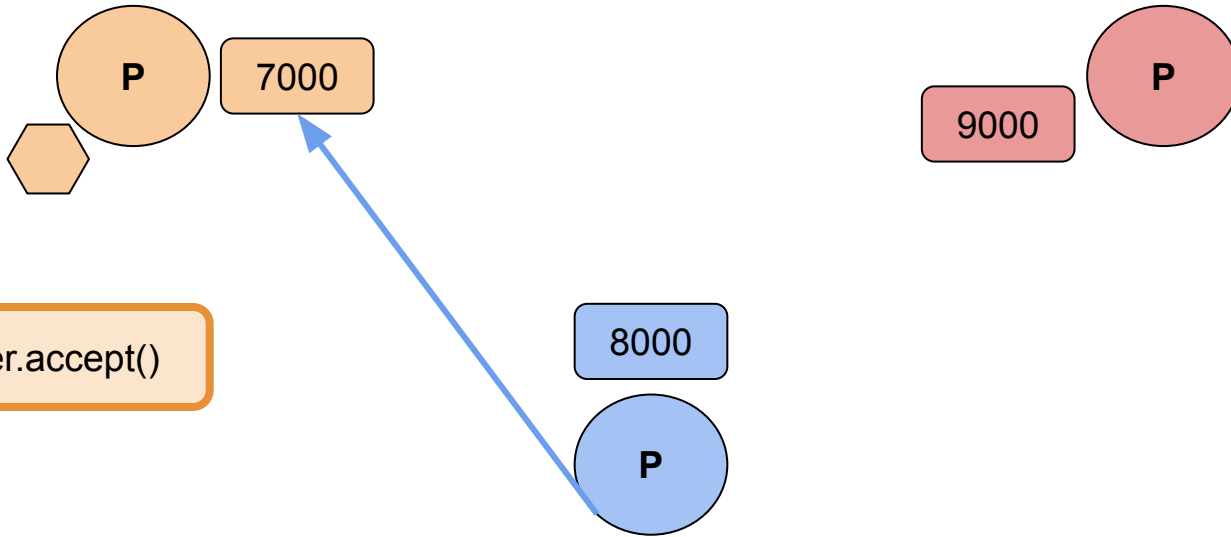
What does that imply for a Peer to Peer structure?



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Communication

What does that imply for a Peer to Peer structure?

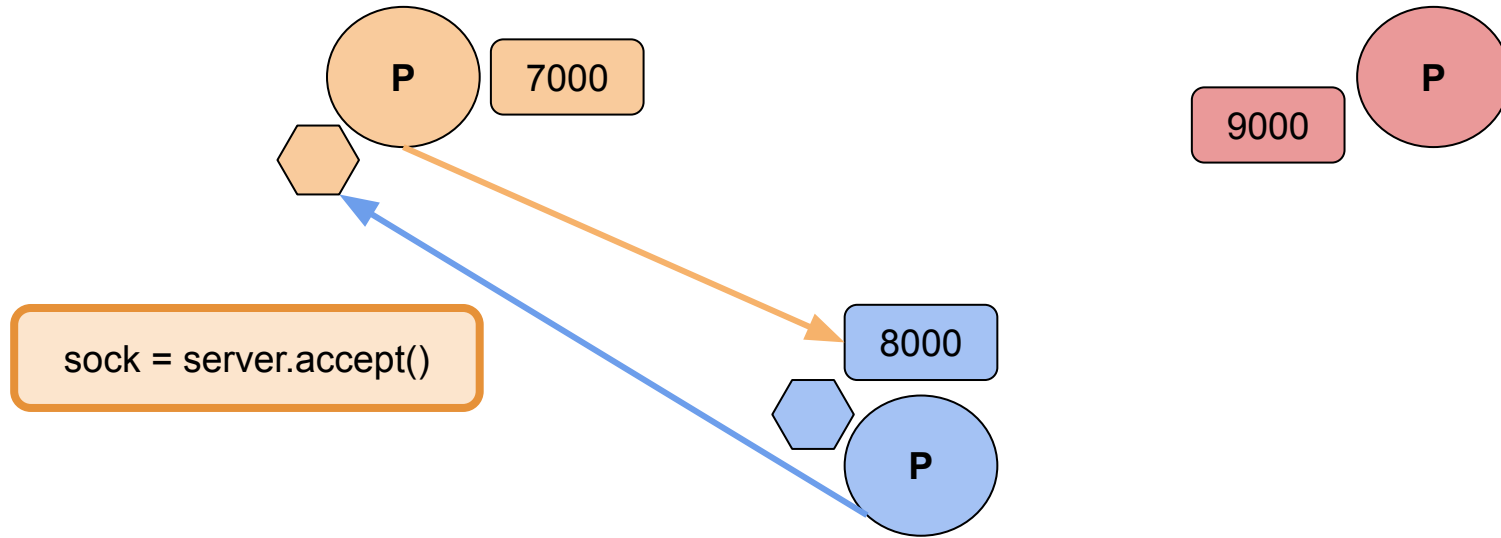


`sock = server.accept()`

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Communication

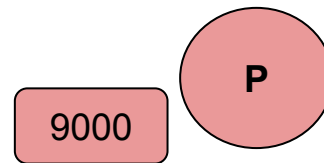
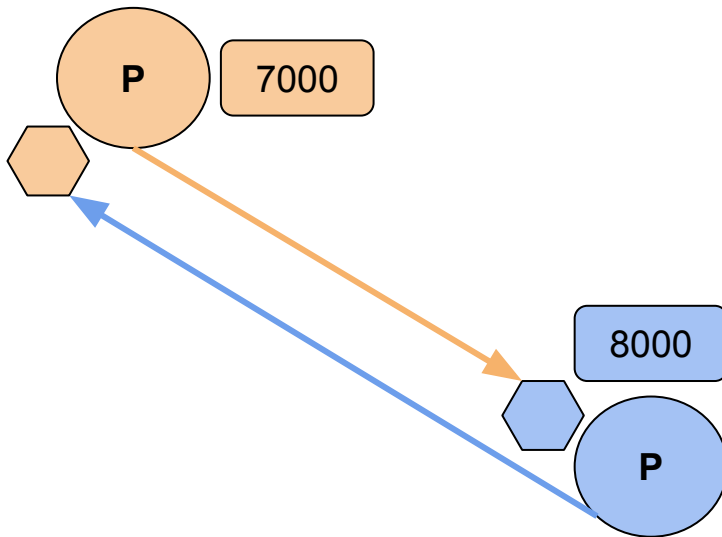
What does that imply for a Peer to Peer structure?



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Communication

What does that imply for a Peer to Peer structure?

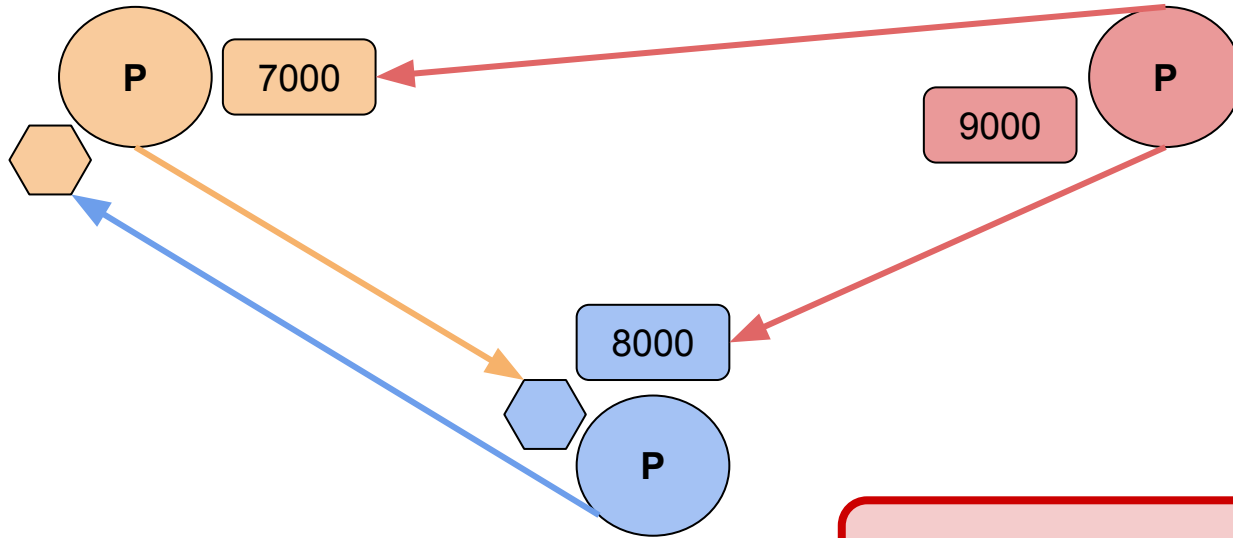


What about Peer 9000?

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Communication

What does that imply for a Peer to Peer structure?

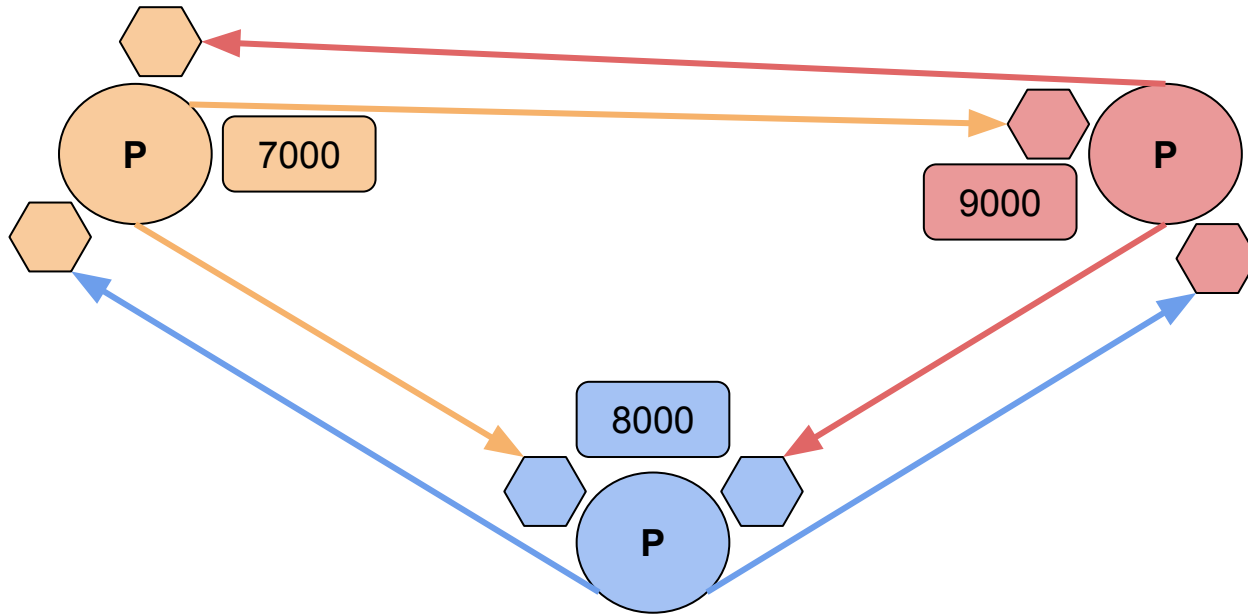


What about Peer 9000?

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Communication

What does that imply for a Peer to Peer structure?



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Threading Pitfalls

Starvation

A thread is only able to acquire some of the resources it needs

Deadlock

More than one thread accesses a single resource at the same time

Race Condition

A thread never gains access to the resource it needs

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Threading Pitfalls

Starvation

A thread is only able to acquire some of the resources it needs

Deadlock

More than one thread accesses a single resource at the same time

Race Condition

A thread never gains access to the resource it needs

What's the difference?

Starvation

A thread never gains access to the resource it needs

Waiting to access the **CPU**

vs.

Deadlock

A thread is only able to acquire some of the resources it needs

Waiting to access the **resource**

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Serialization

Can we recall some of the formats?

JSON

Java Object
Serialization

Protocol Buffers

XML

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Serialization

Binary

Text

Two main
approaches for
storing the
content...

What about the data format?

JSON

Java Object
Serialization

Protocol Buffers

XML

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Serialization

Binary

Text

Who uses *TEXT*?

Text

JSON

Java Object
Serialization

Protocol Buffers

Text

XML

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Serialization

Binary

Text

What does
this imply?

Who uses ***BINARY***?

Text

JSON

Binary

Java Object
Serialization

Binary

Protocol Buffers

Text

XML

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Serialization

Generic
Superclass

Streams and their types

```
OutputStream out = sock.getOutputStream();
```

Buffered Stream

Bytes

Data Stream

Primitive DATA Types

Object Stream

Java Objects

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Systems

Parallel



A Venn diagram with two overlapping circles. The left circle is light blue with a blue outline and is labeled 'Parallel'. The right circle is light red with a red outline and is labeled 'Distributed'. The intersection of the two circles is shaded with a mix of blue and red. The text 'SER 321' is in a yellow box at the top left, and 'Systems' is in a black box below it.

Distributed

Parallel

- Single computer
- Work split among different *processors*
- Memory is shared **or** distributed
- Communicate through *bus*

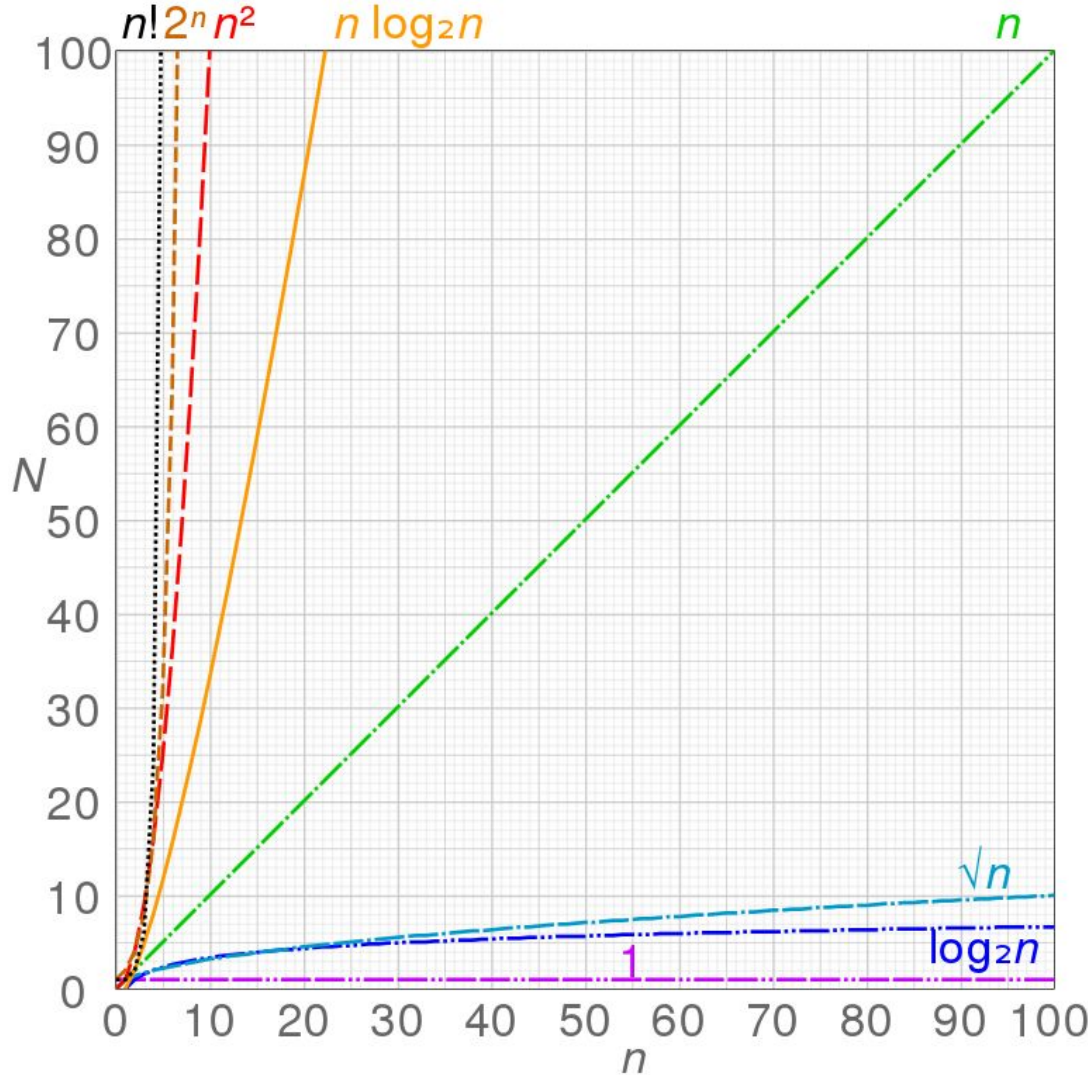
Distributed

- Many computers
 - Work split among different *locations*
 - Memory is distributed
 - Communicate through *message passing*
- Work is partitioned
 - Partitions processed individually
 - **Can** improve performance
 - **Can** improve speed

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Distributed Systems

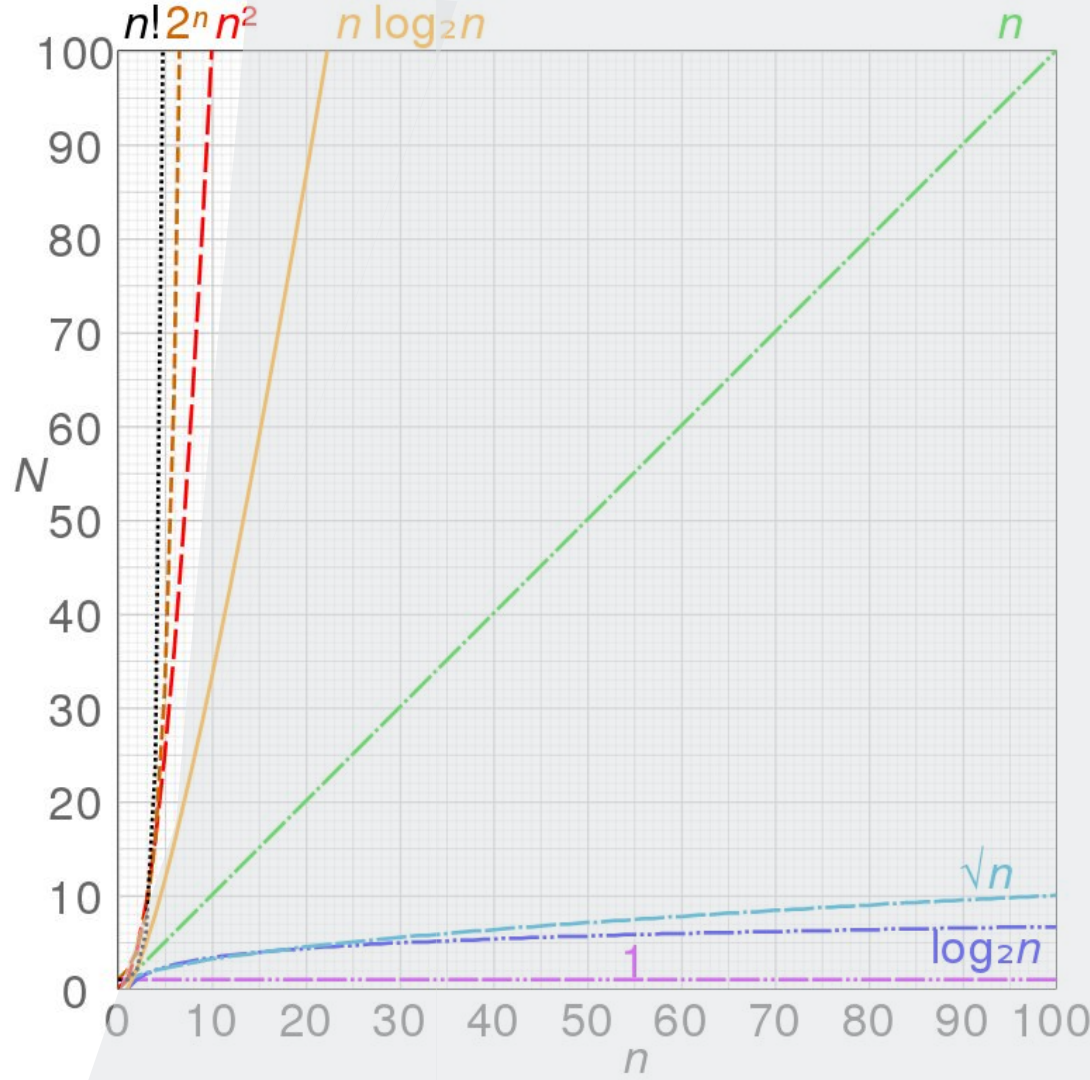
When should
we *consider*
distributing?



Distributed Systems

When should
we *consider*
distributing?

Super Duper Extra Extra
Large Orders of Magnitude!

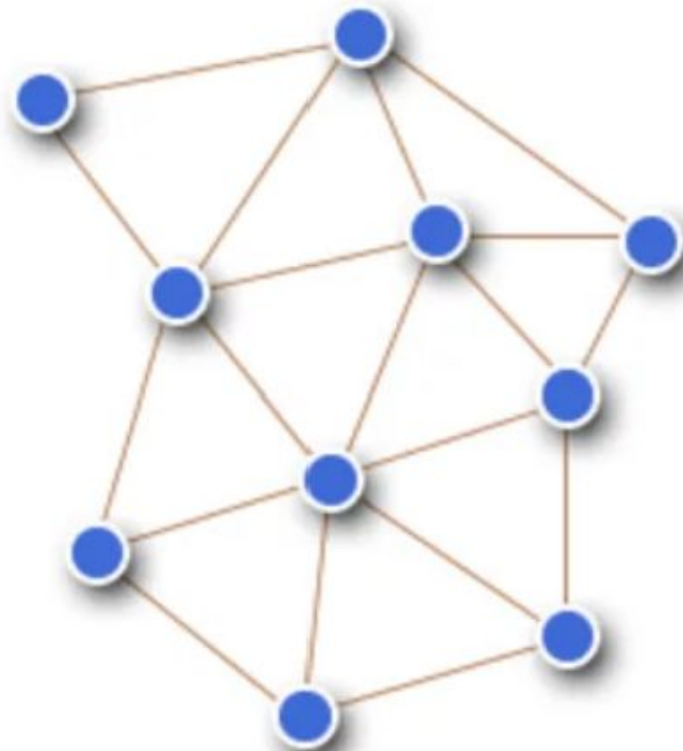


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Distributed Systems

Remember that we are operating in *reality*

- Nodes *will* fail
- Web of nodes *will constantly* change
- Network is not *always* reliable
- Latency is *always present*
- The path traversed *changes*
- Some resources *must be shared*
- *You* need to prevent the pitfalls!
 - No deadlocks
 - No starvation
 - No error states

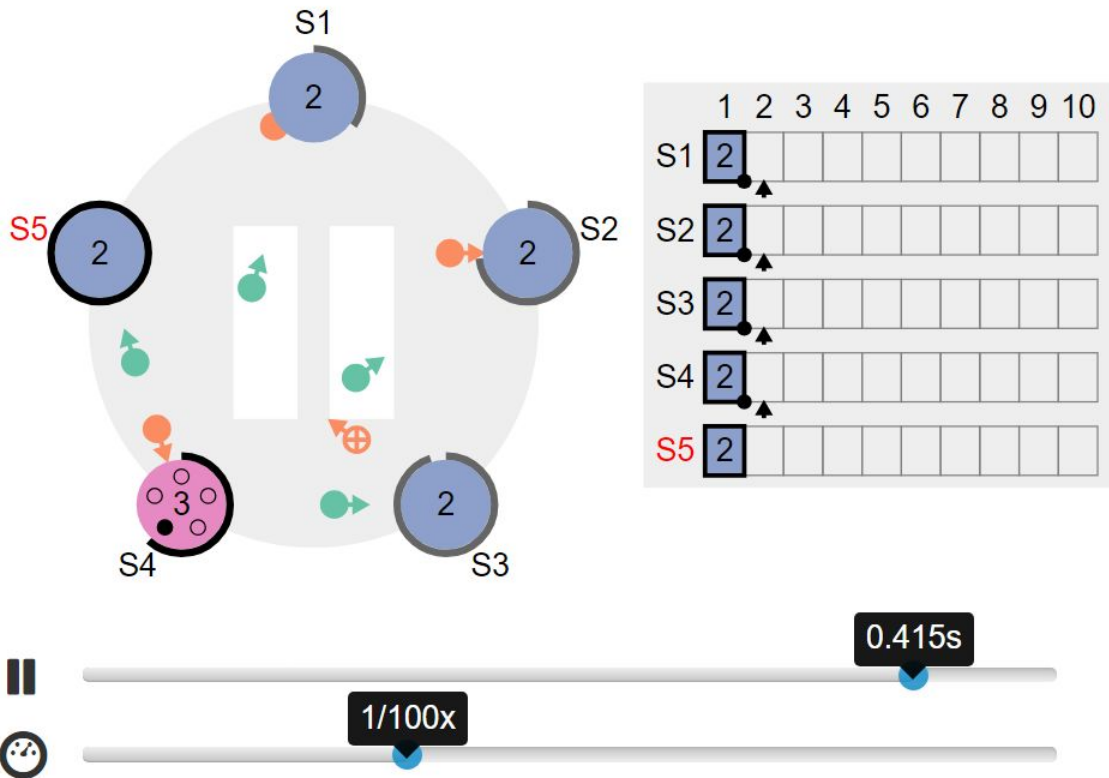


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RAFT

How do we
feel about
Consensus?

RAFT



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Consensus

“General agreement or trust amongst a group”

Thoughts on usage?

Who's in charge or keeping the beat



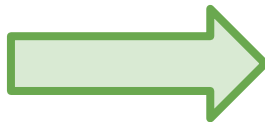
Leader Election

Check your work with a neighbor



Result Verification

Verify and maintain my copy of the data



Log Replication

Do I want to let you into my network



Validate Nodes

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Middleware

We have been:

Serializing
Messages

Sending
Messages

Parsing
Messages

Handle
Messages

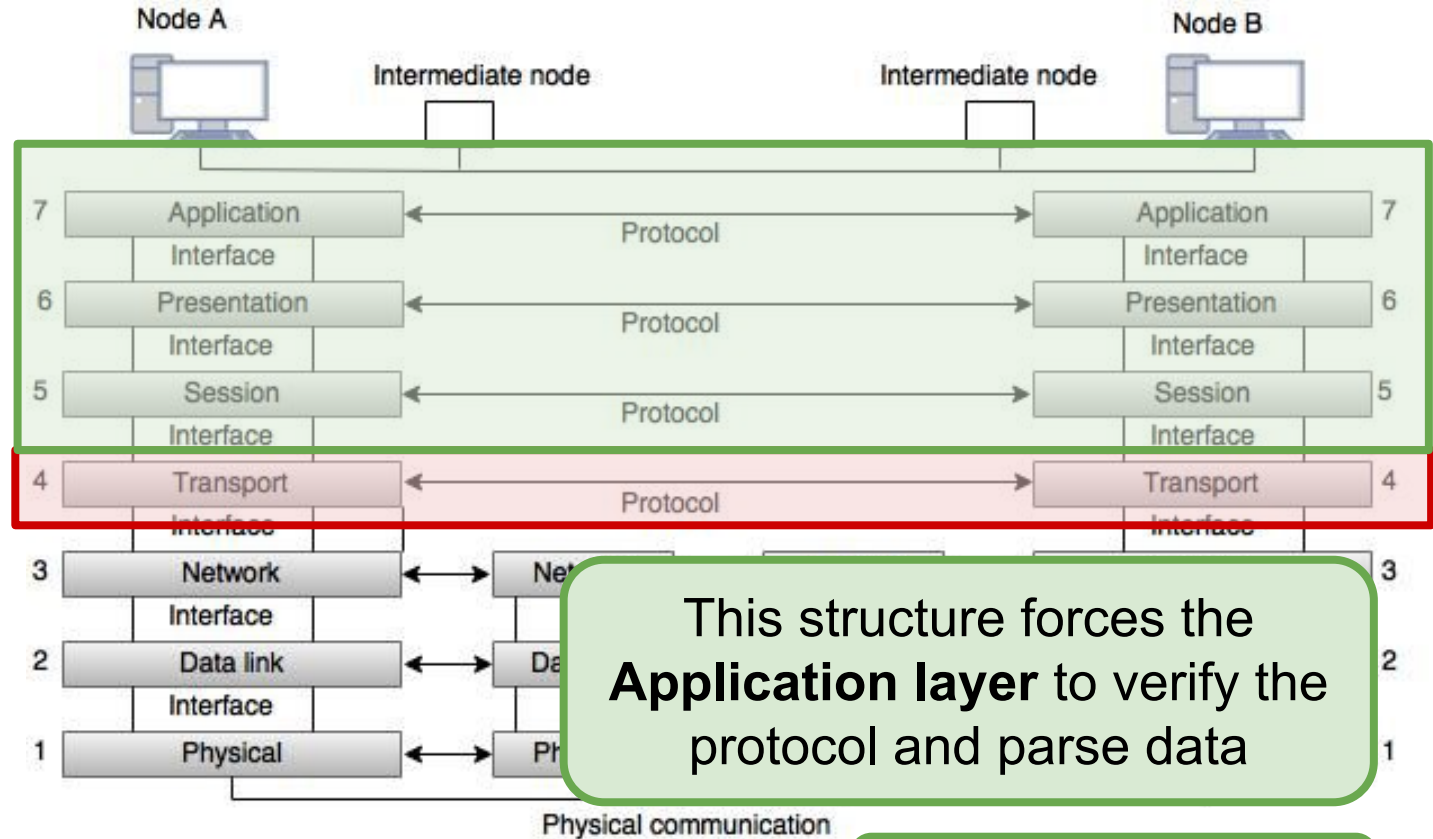


Fig: OSI Model

Not really its job...

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Middleware

With Middleware:

Serializing
Messages

Sending
Messages

Parsing
Messages

Handle
Messages

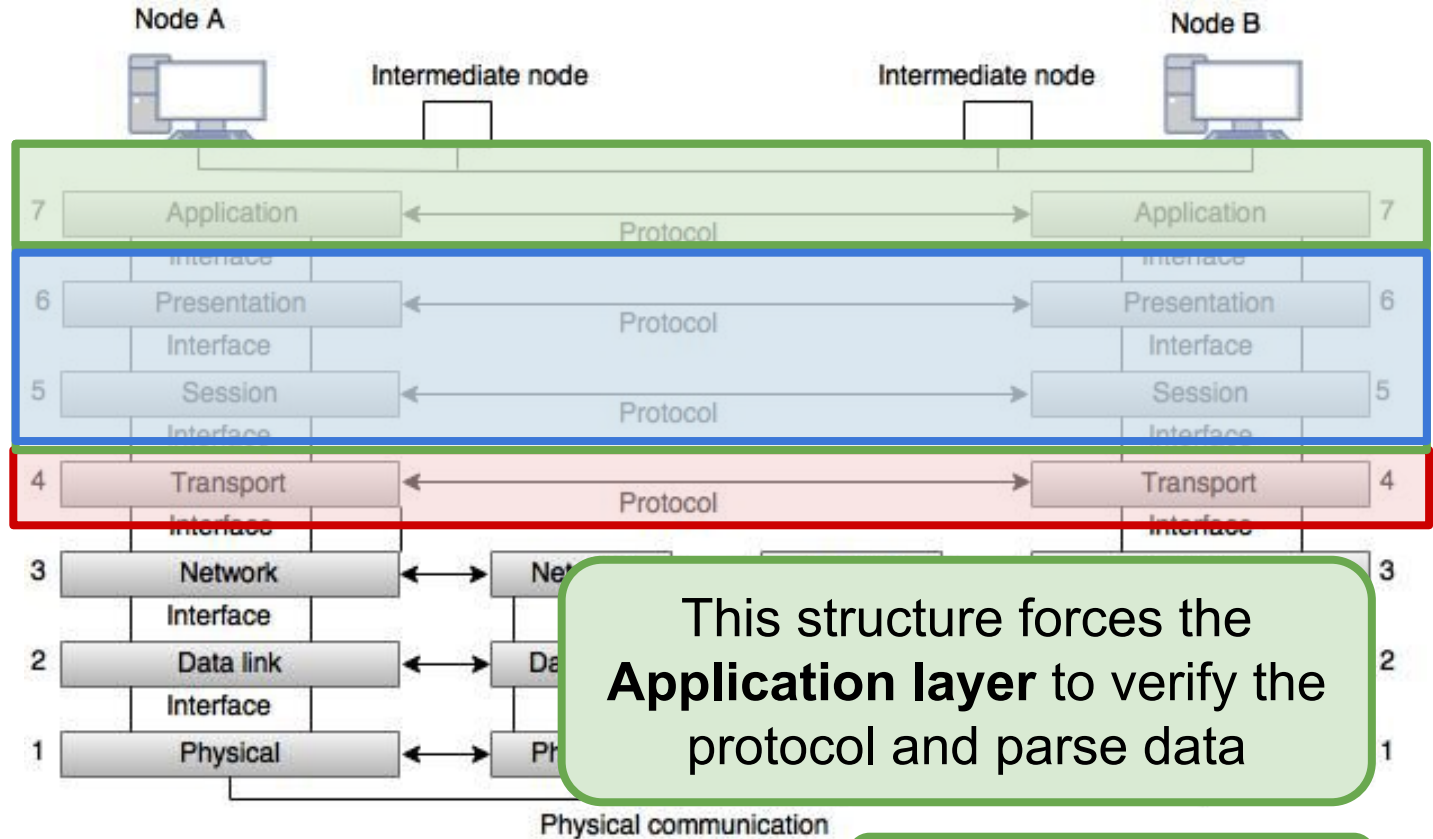


Fig: OSI Model

Not really its job...

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Middleware

With Middleware:

Serializing
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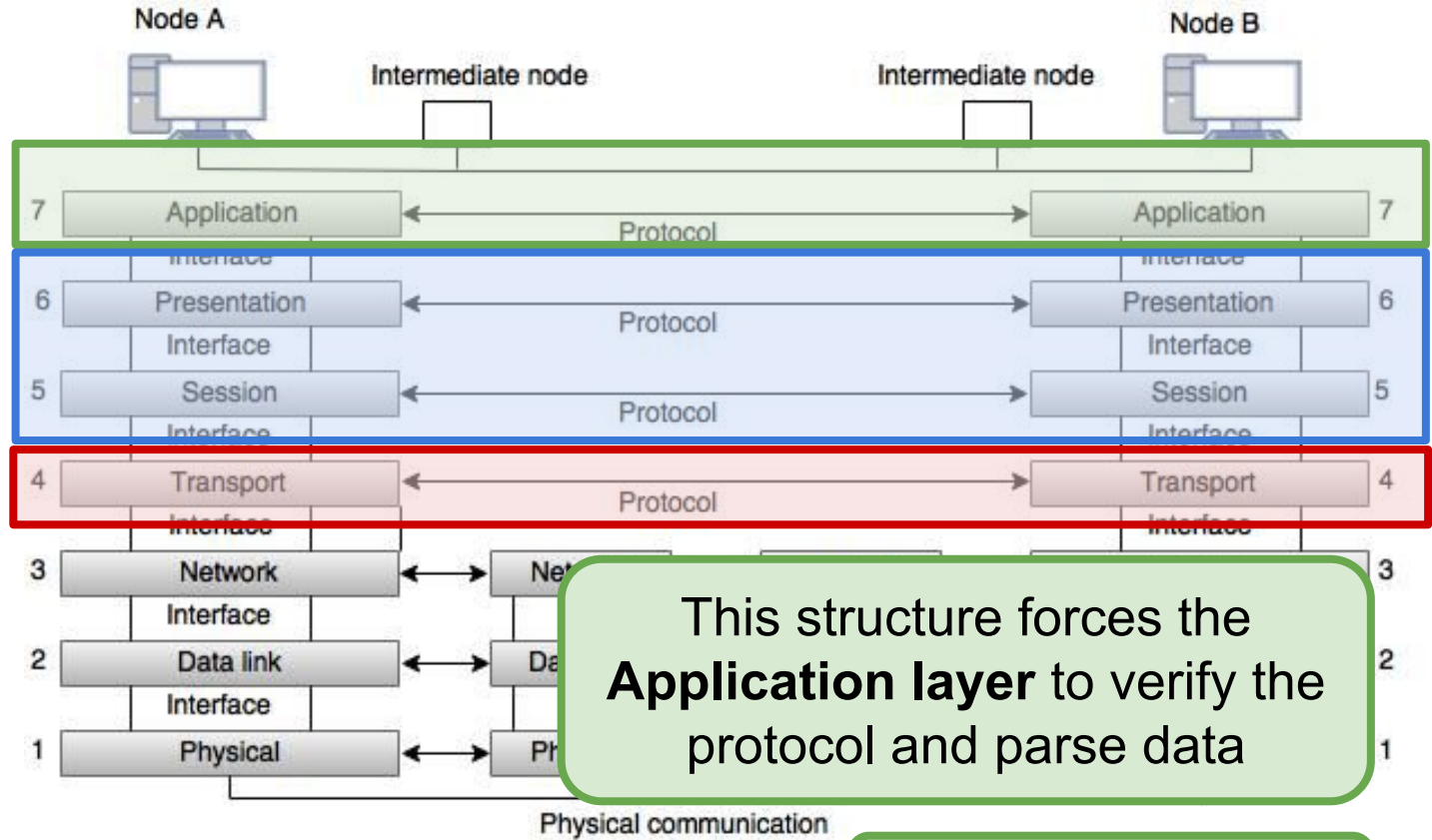


Fig: OSI Model

Not really its job...

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Middleware

Middleware:

Session Layer Responsibilities:

Authentication

Authorization

Session Management

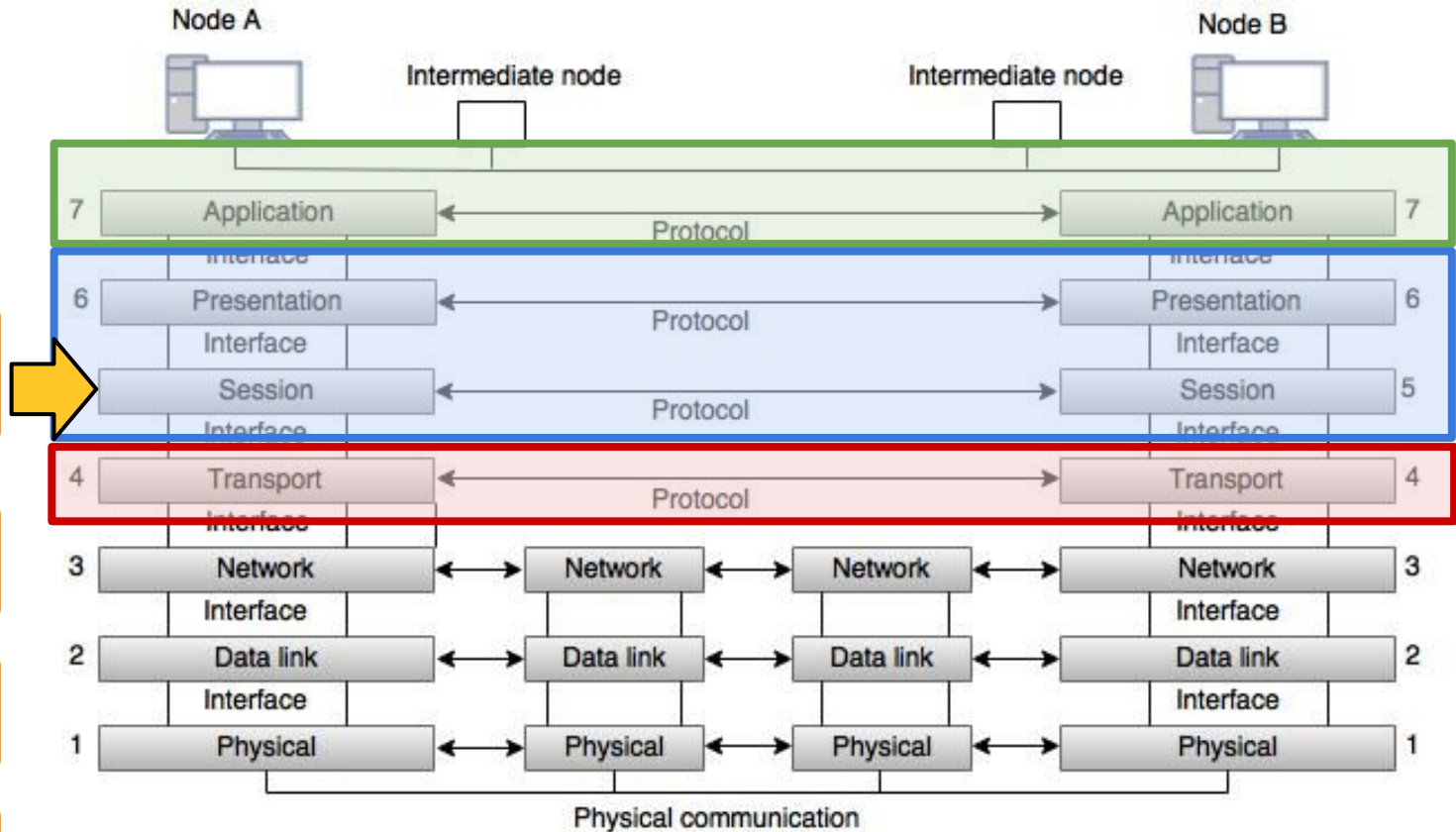


Fig: OSI Model

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Middleware

Middleware:

*Presentation
Layer
Responsibilities:*

Translation

Compression

Encryption

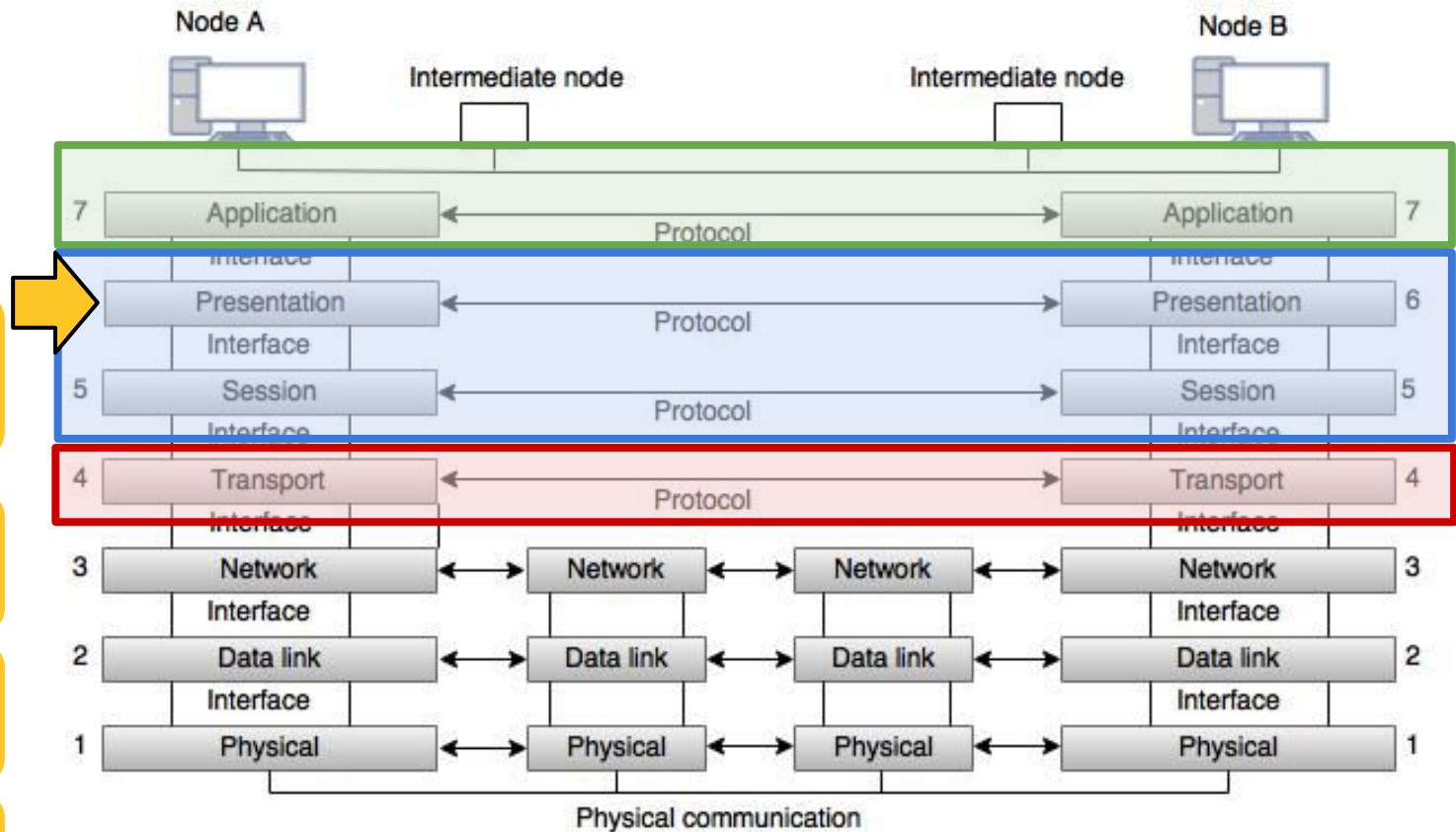


Fig: OSI Model

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Middleware

Why do we care?

Agility

Reusability

Efficiency

Cost
Effectiveness

Portability

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Scratch Space

Questions?



Survey:

<http://bit.ly/ASN2324>



Upcoming Events

SI Sessions:

- N/A

Review Sessions:

- N/A

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.

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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!

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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.

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Business


ACC 231

Uses of Accounting Info I

 [Peer Community](#)

ACC 241

Uses of Accounting Info II

 [Peer Community](#)

CIS 105

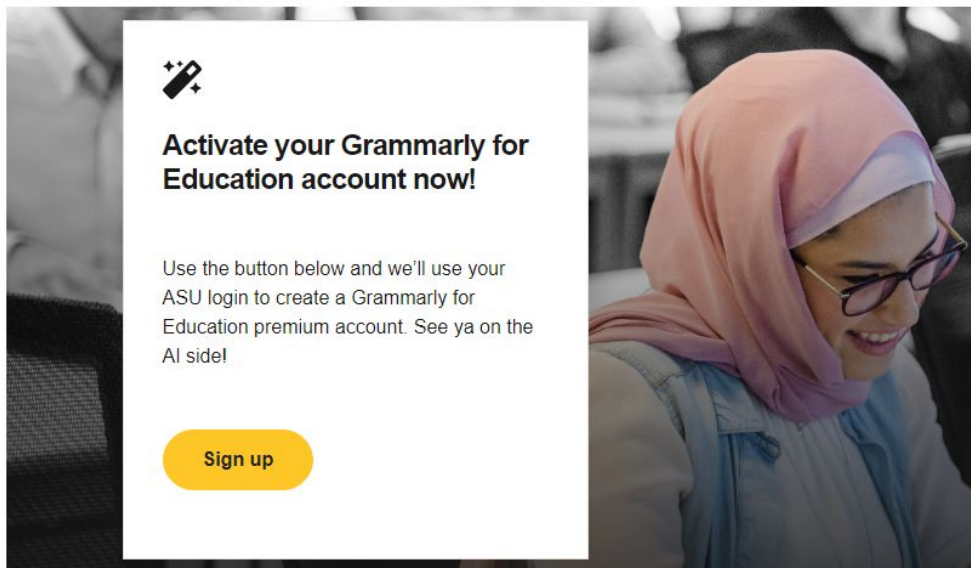
Computer Applications and Information Technology

 [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

*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](#)
 - [Responses](#)
- [JSON Guide](#)
- [org.json Docs](#)
- [javax.swing package API](#)
- [Swing Tutorials](#)
- [Dining Philosophers Interactive](#)
- [Austin G Walters Traffic Comparison](#)
- [RAFT](#)