

SER 321 B Session

Exam Review Session

Sunday, April 21st 2024

7:00 pm - 9:00 pm MST

Agenda



Exam Info

Study Guide

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

SER 321

Exam Information

[Exam Info Page](#)

80 minutes

Similar to the
quizzes

Opens: Wednesday
April 24th
@ 12:01 AM

Closes: Friday
April 26th
@ 11:59 PM

Front and Back!

MUST BE *Handwritten*



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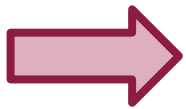
OSI Model

Unit

Layer

What we are *really*
talking about

| | | |
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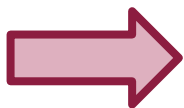
OSI Model

Unit

Layer

What we are *really*
talking about

| | | |
|------|----------|-----------------------------|
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| | | |
| | | |
| | | |
| | | |
| Bits | Physical | Signal, Binary transmission |



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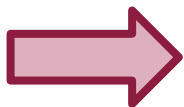
OSI Model

Unit

Layer

What we are *really*
talking about

| | | |
|-------|-----------|---------------------------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| Frame | Data Link | LLC, MAC, data transmission in LAN |
| Bits | Physical | Signal, Binary transmission |



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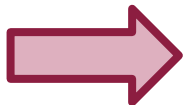
OSI Model

Unit

Layer

What we are *really*
talking about

| | | |
|--------|-----------|------------------------------------|
| | | |
| | | |
| | | |
| | | |
| Packet | Network | IP address, routing and delivery |
| Frame | Data Link | LLC, MAC, data transmission in LAN |
| Bits | Physical | Signal, Binary transmission |



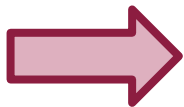
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OSI Model

Unit

Layer

What we are *really*
talking about



| | | |
|---------|-----------|------------------------------------|
| | | |
| | | |
| | | |
| Segment | Transport | TCP/UDP |
| Packet | Network | IP address, routing and delivery |
| Frame | Data Link | LLC, MAC, data transmission in LAN |
| Bits | Physical | Signal, Binary transmission |

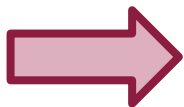
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OSI Model

Unit

Layer

What we are *really*
talking about

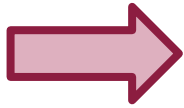


| | | |
|---------|-----------|------------------------------------|
| | | |
| | | |
| Data | Session | AuthN, authZ, session mgmt |
| Segment | Transport | TCP/UDP |
| Packet | Network | IP address, routing and delivery |
| Frame | Data Link | LLC, MAC, data transmission in LAN |
| Bits | Physical | Signal, Binary transmission |

SER 321**OSI Model**

Unit

Layer

What we are *really*
talking about

| | | |
|---------|--------------|--------------------------------------|
| | | |
| Data | Presentation | Translation, compression, encryption |
| Data | Session | AuthN, authZ, session mgmt |
| Segment | Transport | TCP/UDP |
| Packet | Network | IP address, routing and delivery |
| Frame | Data Link | LLC, MAC, data transmission in LAN |
| Bits | Physical | Signal, Binary transmission |

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Network Layer - IP

Given the following IP address, identify the...

Port

128.148.32.110 **8080**

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Network Layer - IP

Given the following IP address, identify the...

Subnet

128.148.32.110:8080

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Network Layer - IP

Given the following IP address, identify the...

Network

128.148.32.110:8080

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Network Layer - IP

Given the following IP address, identify the...

Host

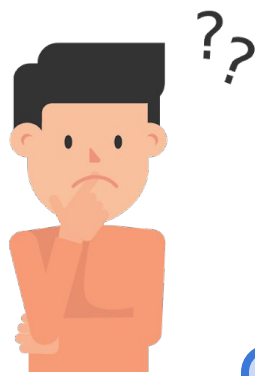
128.148.32.110:8080

What are the main differences?

| TCP | UDP |
|-----|-----|
| | |
| | |
| | |
| | |

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HTTP(S)



Stateful

OR

Stateless

Synchronous

OR

Asynchronous

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URLS

Given the following URL, identify the...

Query

<https://www.google.com/search?q=asu>

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URLS

Given the following URL, identify the...

Protocol

https://www.google.com/search?q=asu

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URLS

Given the following URL, identify the...

Path

<https://www.google.com/search?q=asu>

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URLS

Given the following URL, identify the...

Host

<https://www.google.com/search?q=asu>

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HTTP Responses

Status Codes →

1XX

2XX

3XX

4XX

5XX

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Sockets!

Sockets allow our client and server to communicate!

Location

Connection
Semantics

Message Format

Need to define **3 properties** before usage

IP or DNS

142.251.46.206

www.google.com

TCP or UDP

Connection
Oriented

Connectionless

Protocol Specs

Synchronous

Asynchronous

Stateless

Stateful

Binary

Text

Headers

No Headers



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Client Socket

Steps for the **Client Socket**

1.

2.

3.

4.

5.

6.

7.

8.

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Server Socket

Steps for the **Server Socket**

1.

2.

3.

4.

5.

6.

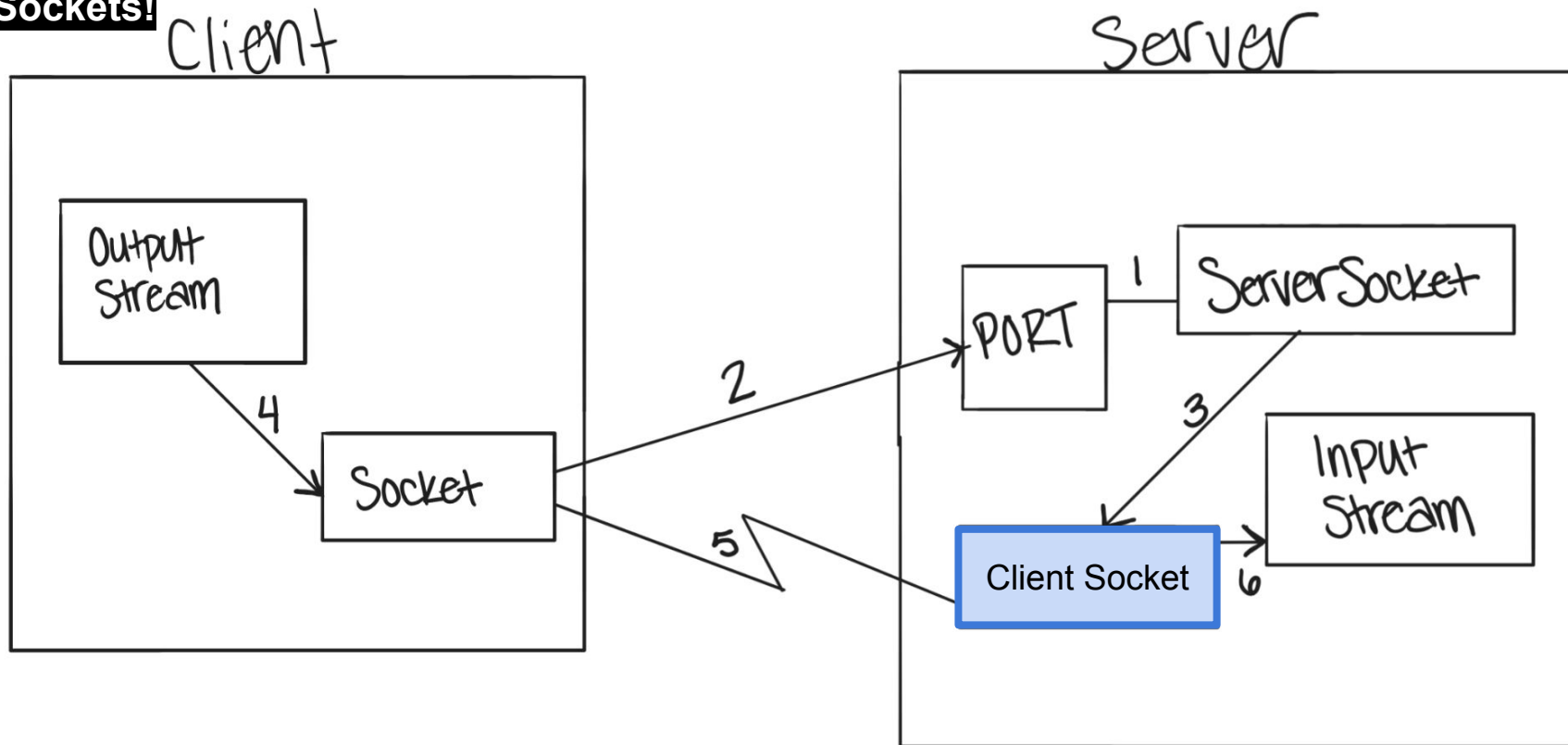
7.

8.

9.

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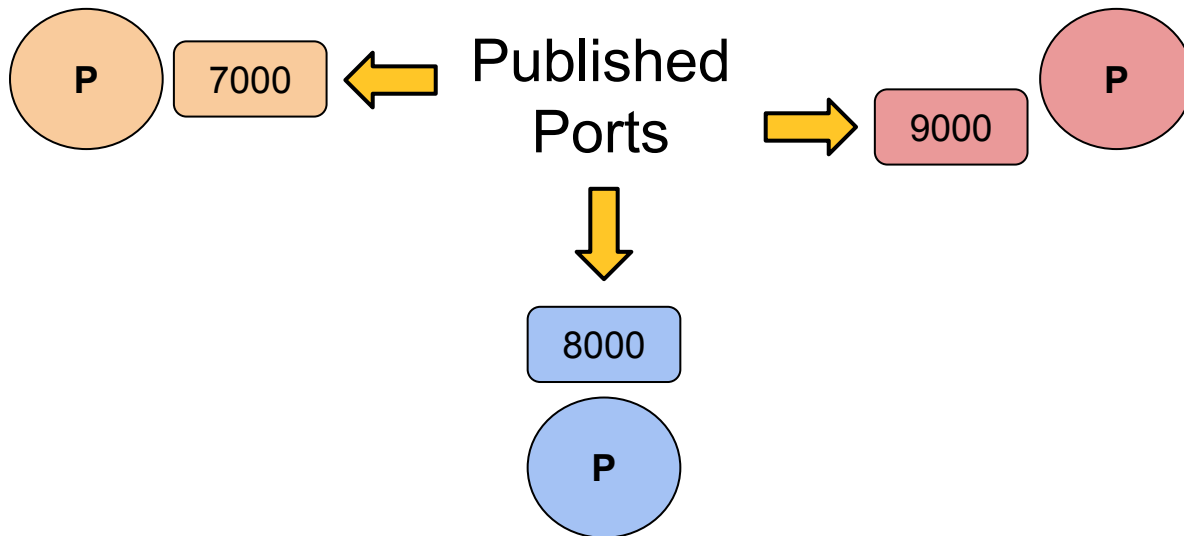
Sockets!



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Communication

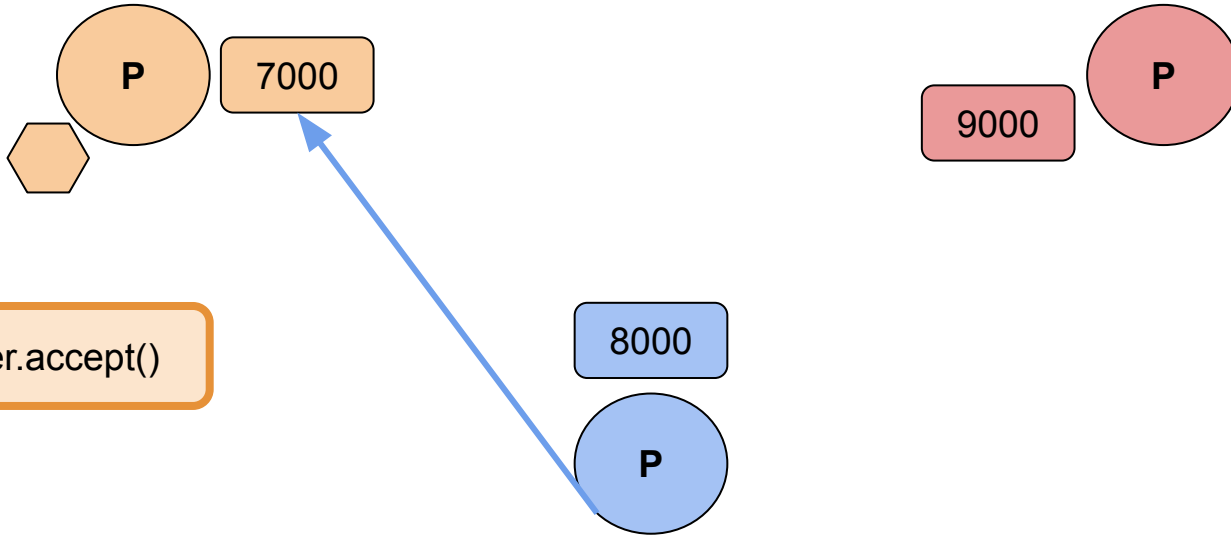
Remember that the OS allocates a new port for the client socket!



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Communication

Remember that the OS allocates a new port for the client socket!

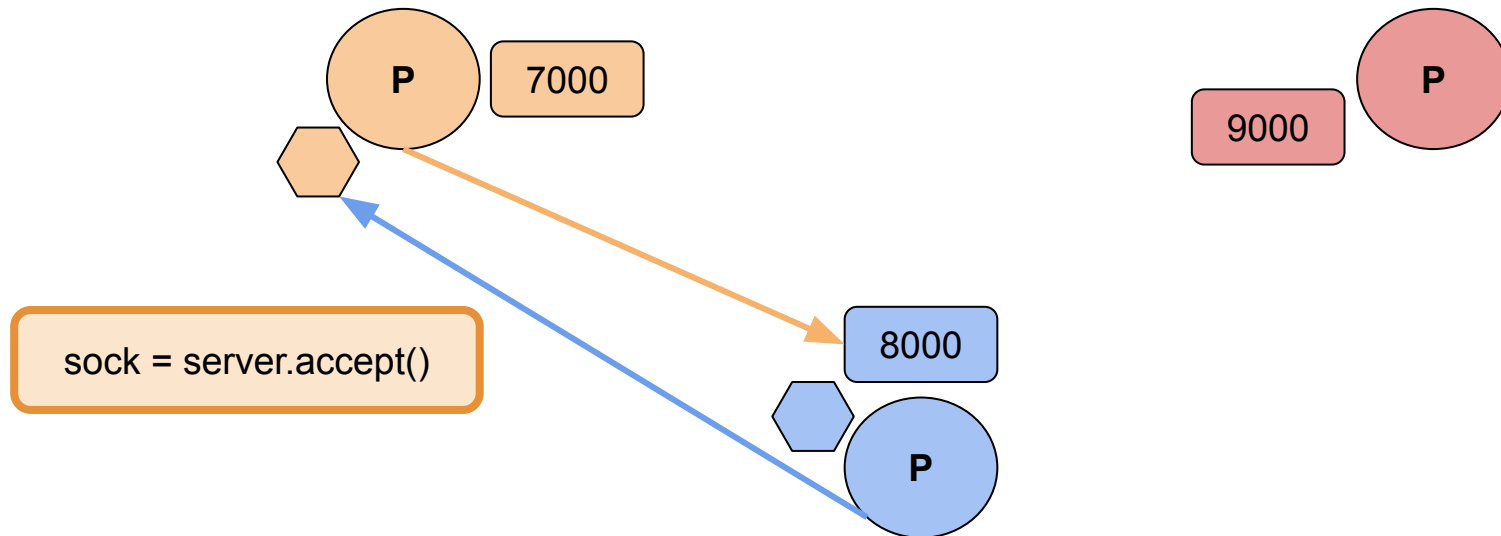


```
sock = server.accept()
```

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Communication

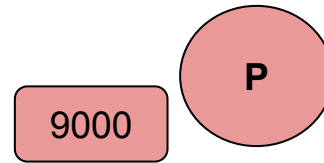
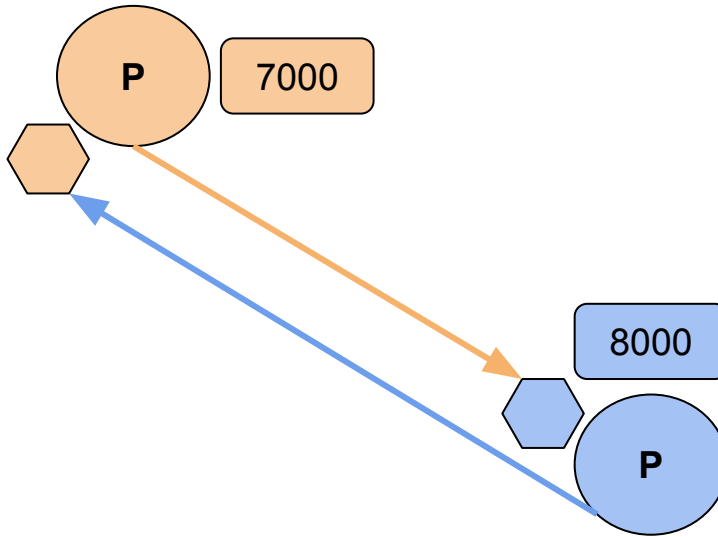
Remember that the OS allocates a new port for the client socket!



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Communication

Remember that the OS allocates a new port for the client socket!

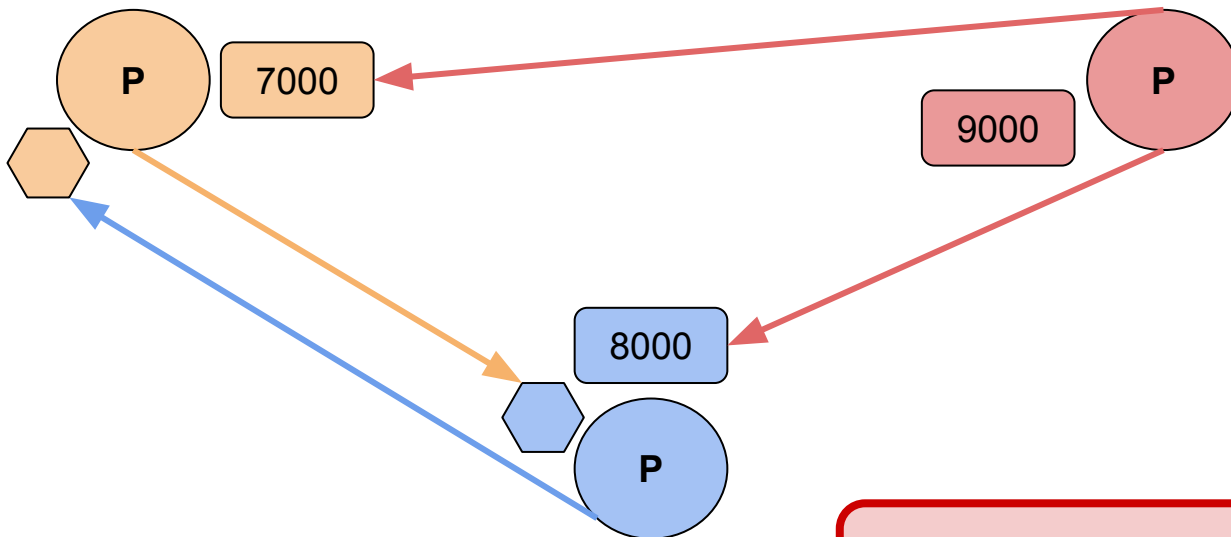


What about Peer 9000?

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Communication

Remember that the OS allocates a new port for the client socket!

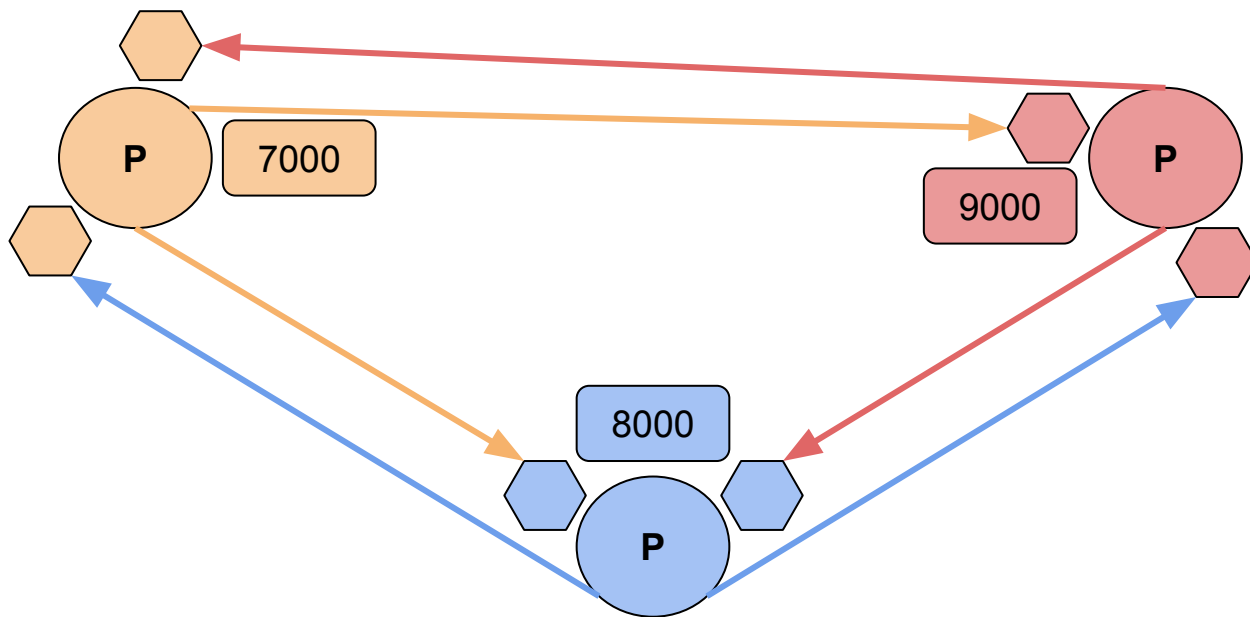


What about Peer 9000?

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Communication

Remember that the OS allocates a new port for the client socket!



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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

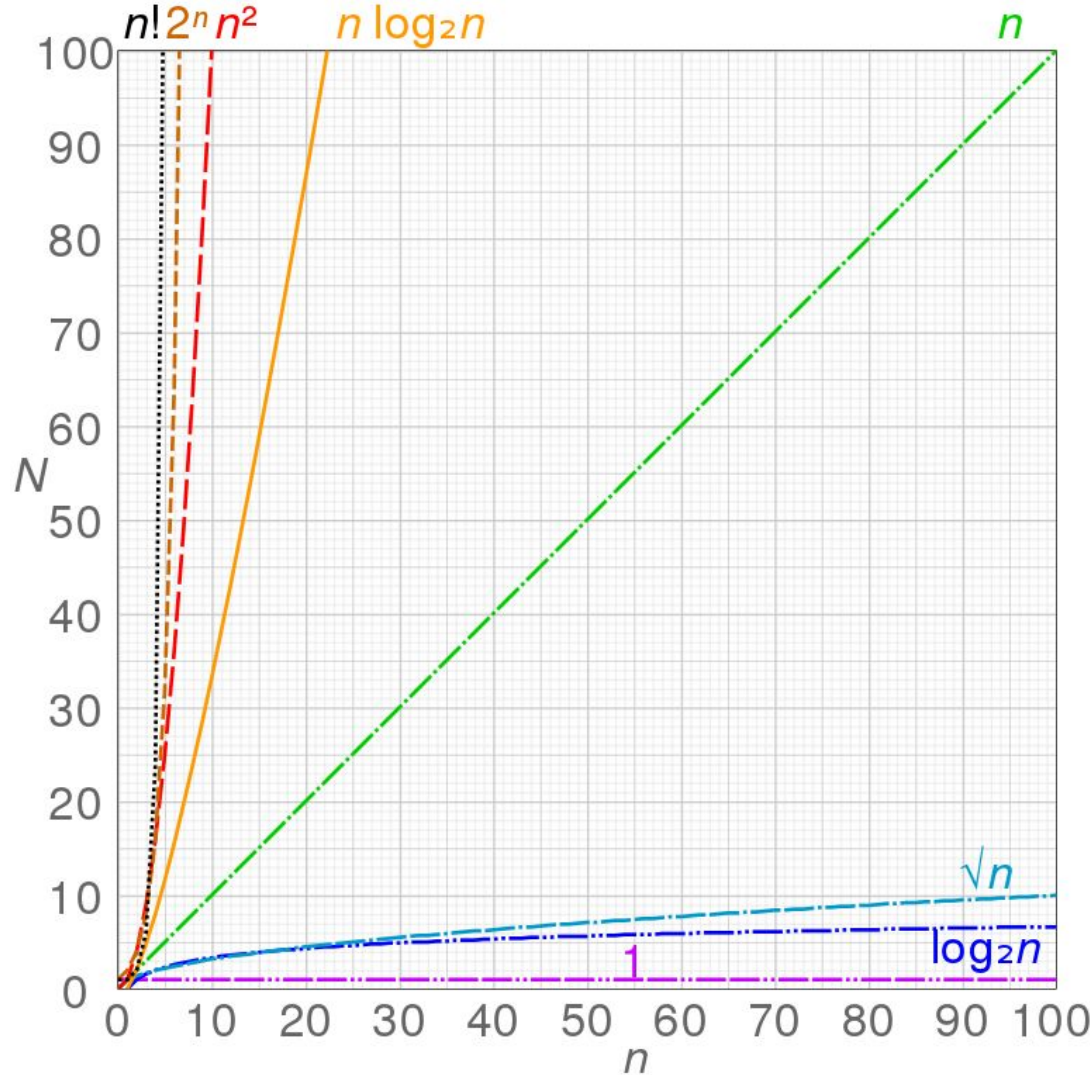
- Single computer
- Work split among different *processors*
- Memory is shared **or** distributed
- Communicate through *bus*

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

Distributed Systems

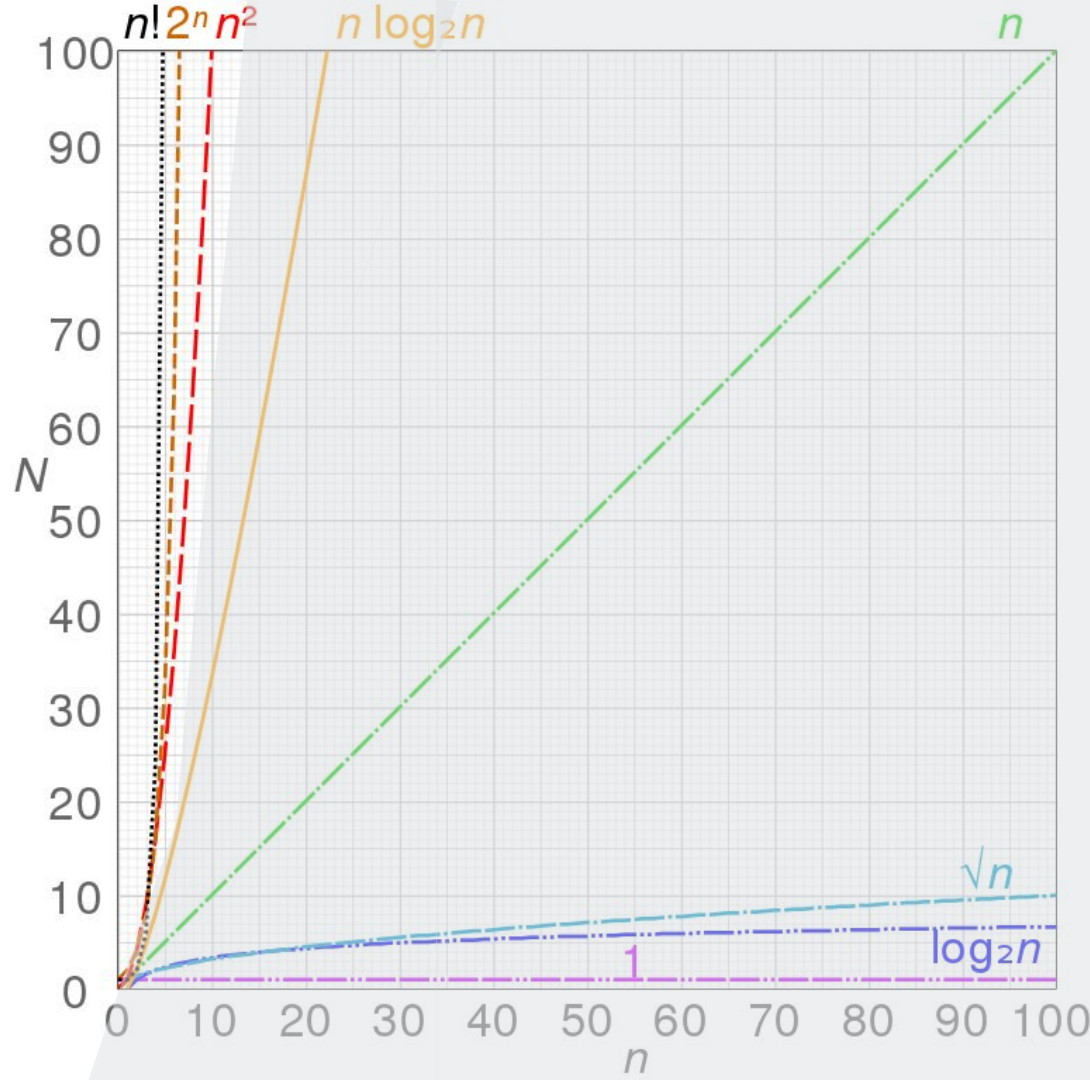
When should
we *consider*
distributing?



Distributed Systems

When should
we *consider*
distributing?

Super Duper Extra Extra
Large Orders of Magnitude!

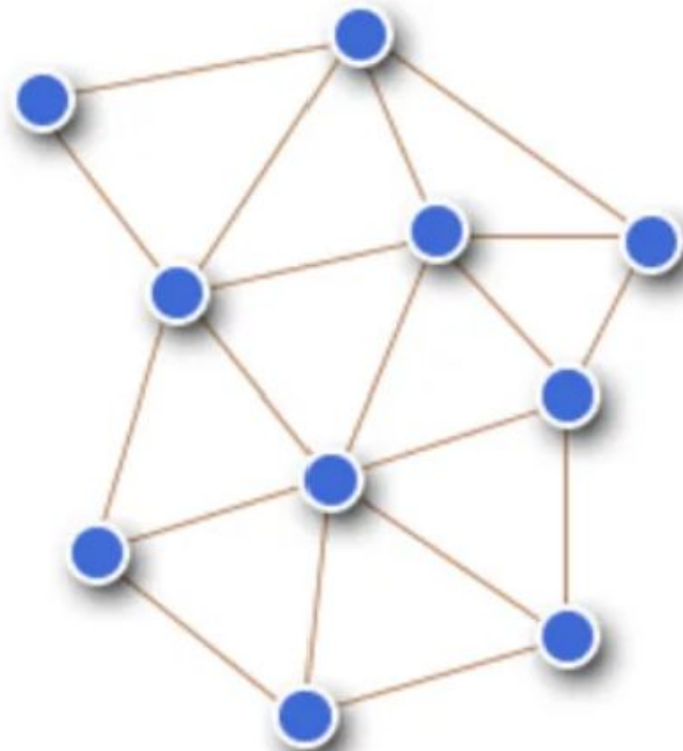


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Distributed Systems

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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Consensus

“General agreement or trust amongst a group”

Thoughts on usage?

Leader Election



Who's in charge or keeping the beat

Verify Results



Check your work with a neighbor

Synchronize Data



Verify and maintain my copy of the data

Validate Nodes



Do I want to let you into my network

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Middleware

We have been:

Constructing
(valid) Messages

Serializing
Messages

Sending
Message

Handle Message

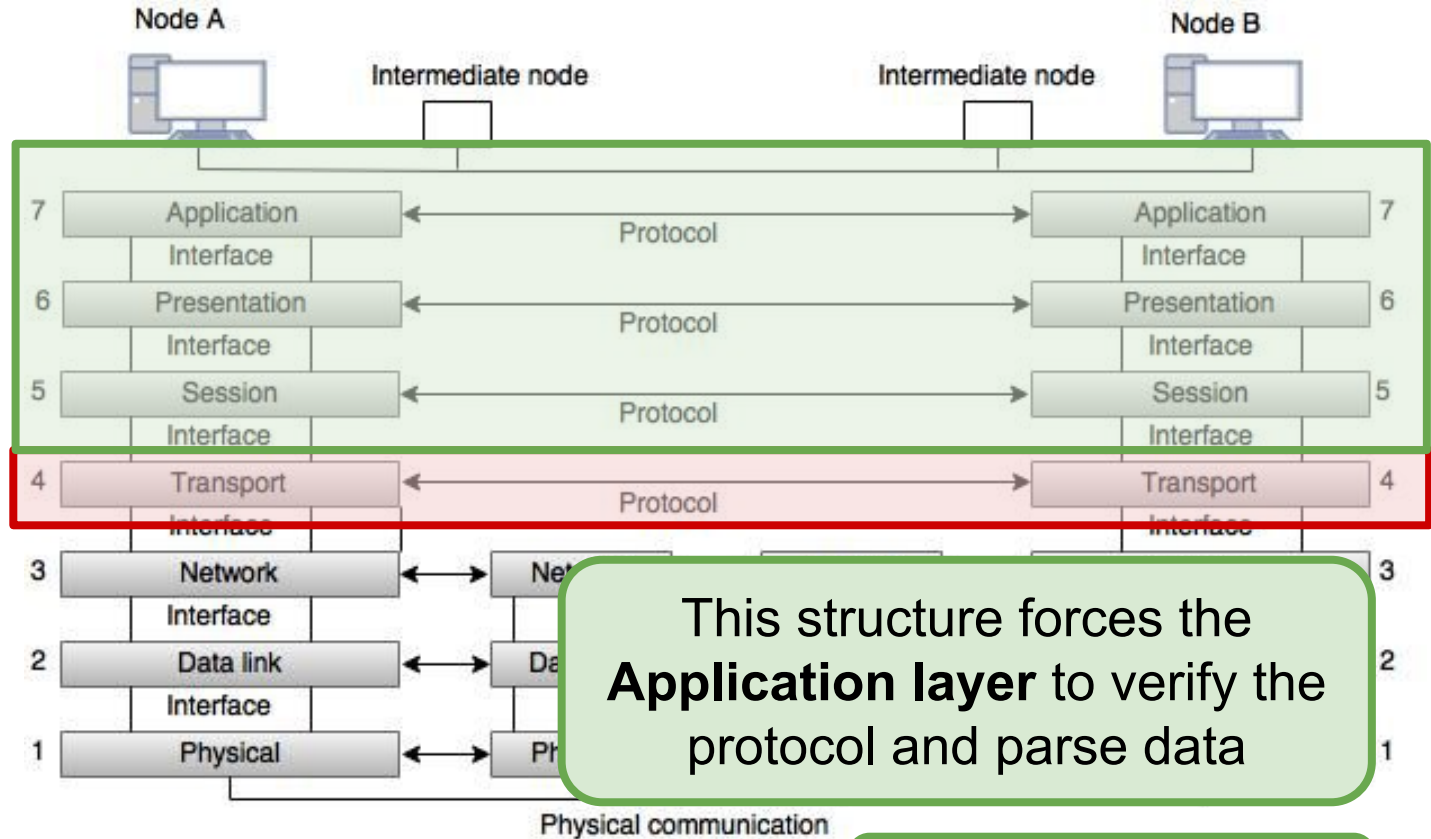


Fig: OSI Model

Not really its job...

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Middleware

Middleware:

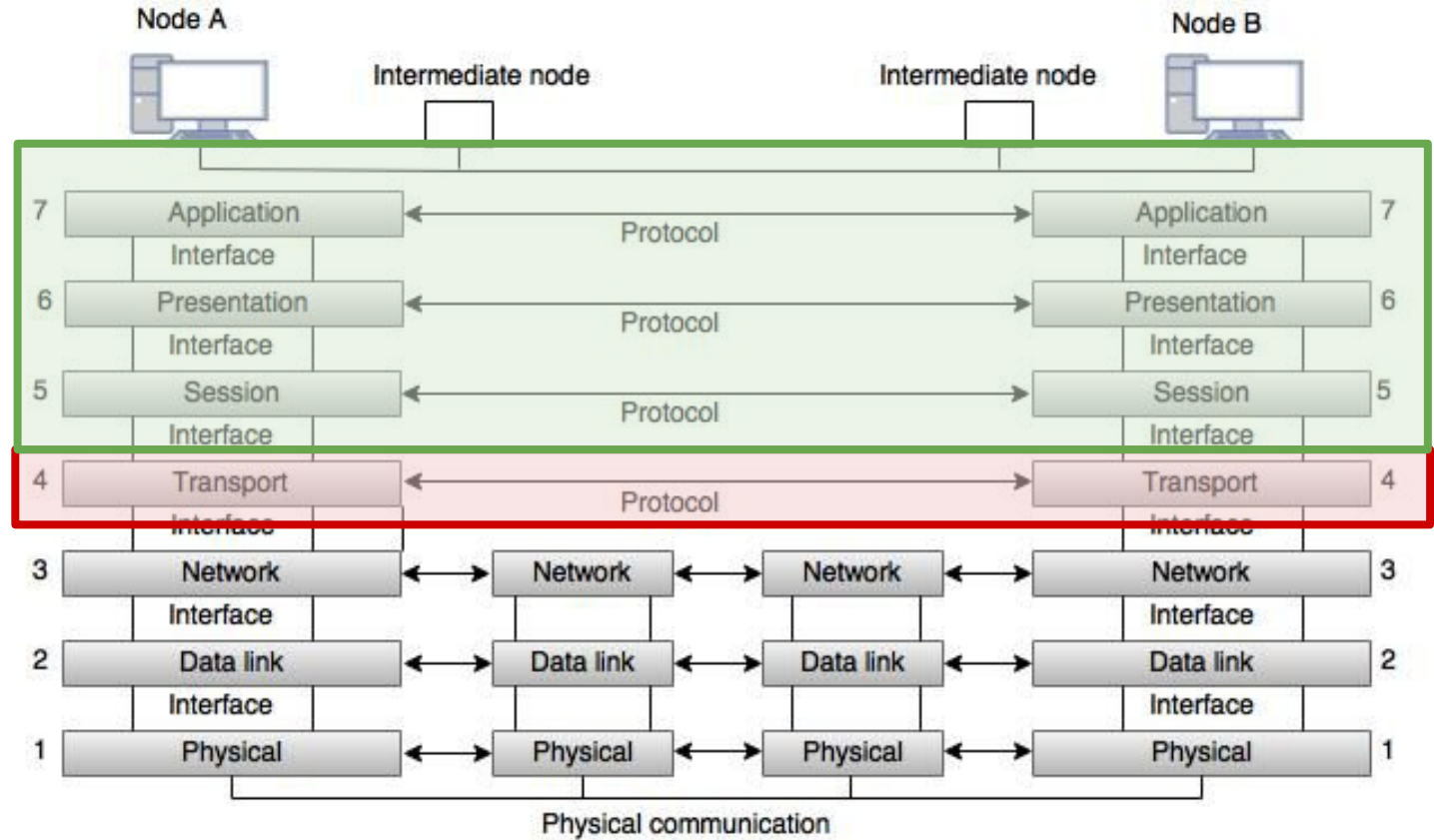


Fig: OSI Model

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Middleware

Middleware:

All that is
handled
within the
middleware!

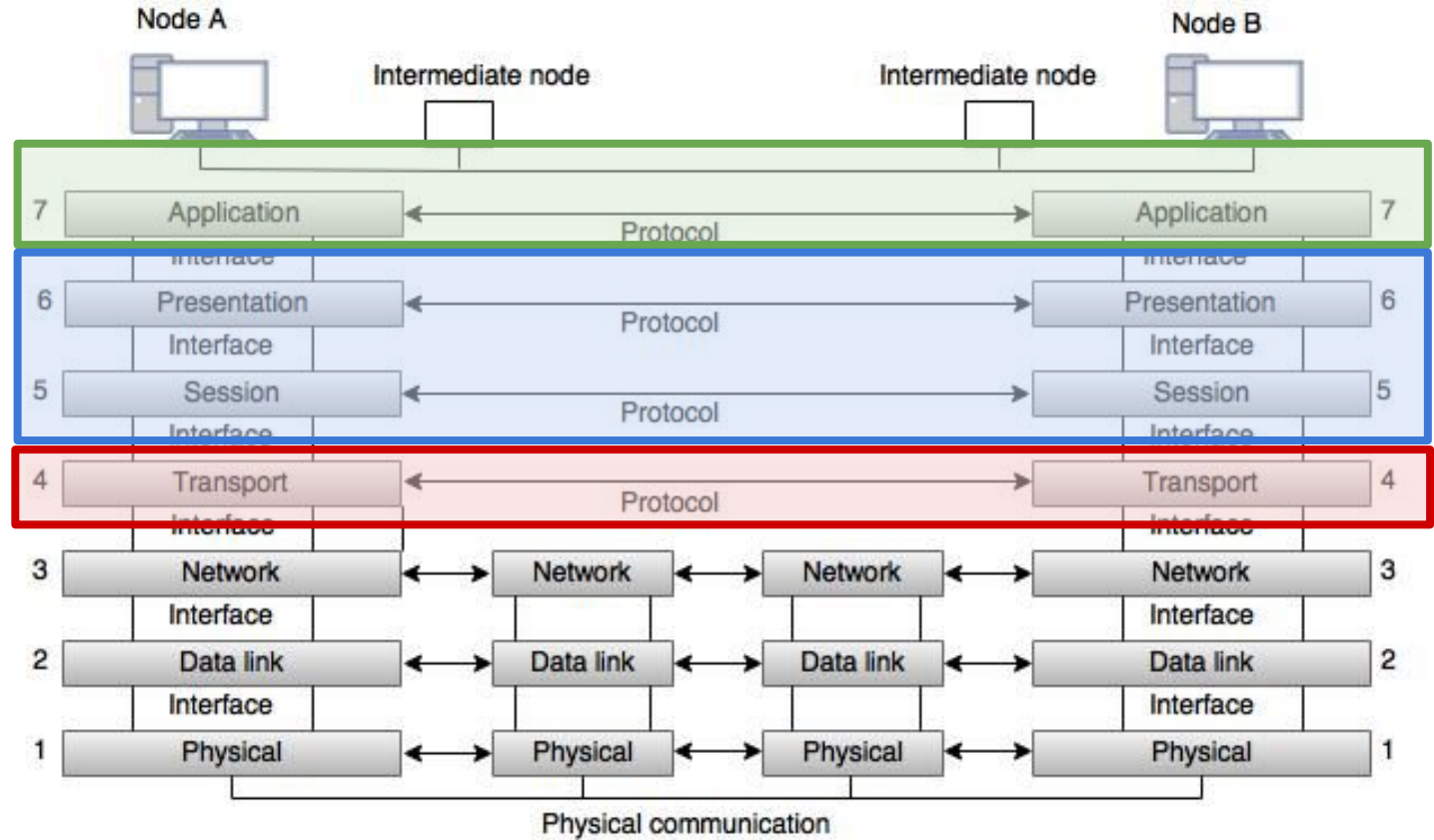


Fig: OSI Model

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Middleware

Middleware:

Session Layer Responsibilities:

Authentication

Authorization

Session Management

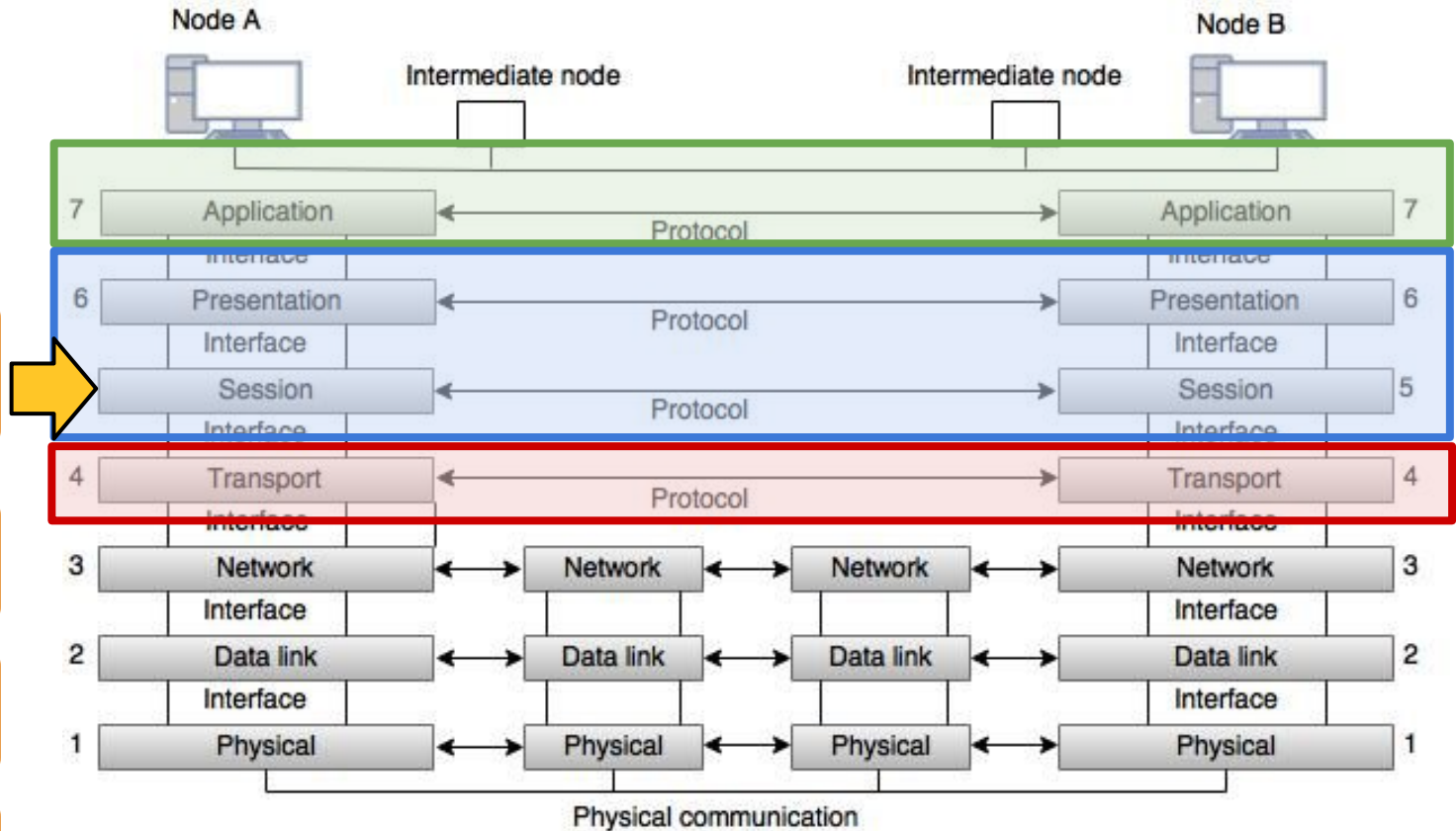


Fig: OSI Model

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Middleware

Middleware:

*Presentation
Layer
Responsibilities:*

Translation

Compression

Encryption

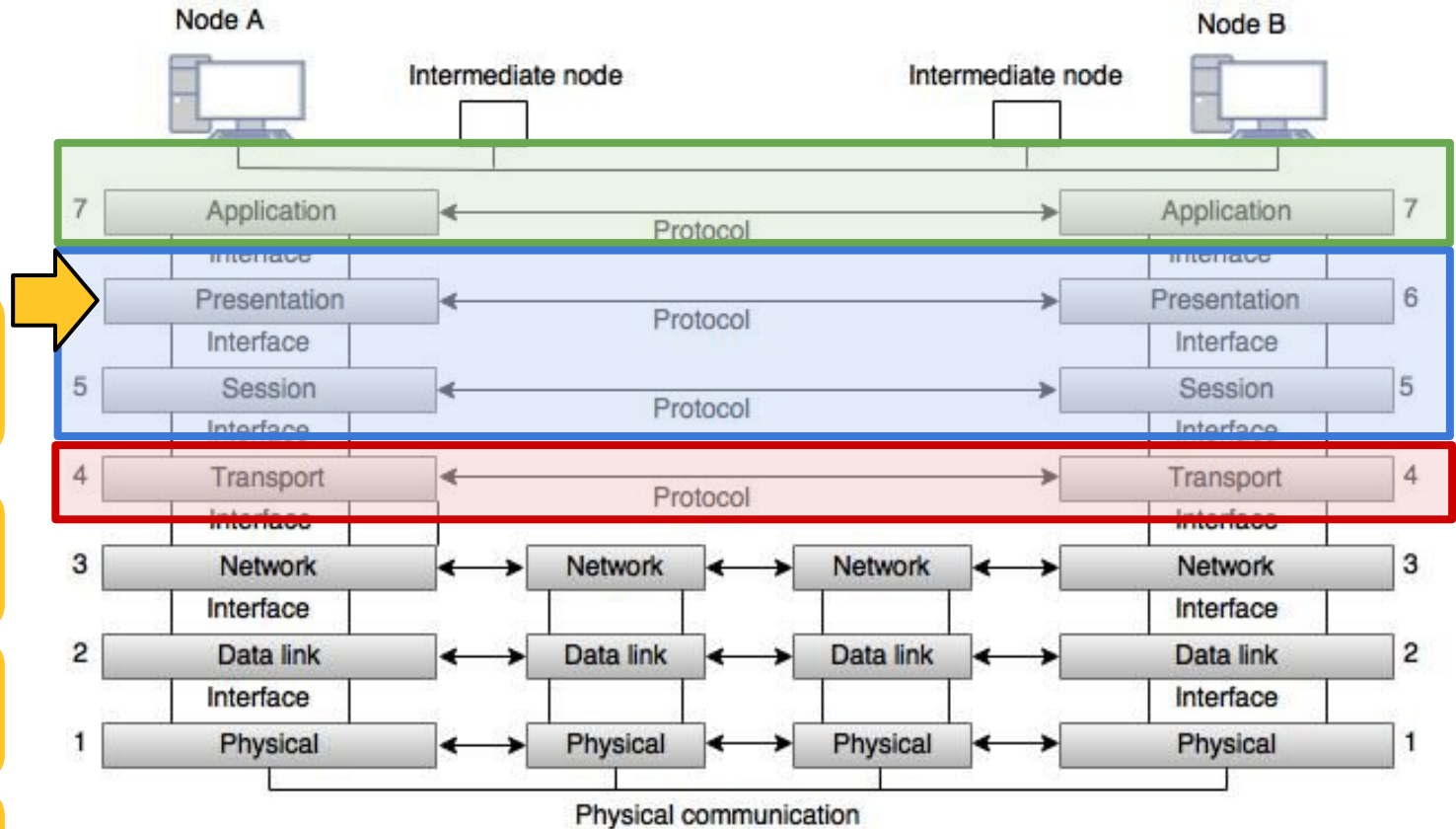


Fig: OSI Model

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Scratch Space

Questions?

Survey:

<http://bit.ly/ASN2324>



Upcoming Events

SI Sessions:

- Monday, April 22nd at 7:00 pm MST - **Q&A SESSION**
- ~~Thursday, April 25th at 7:00 pm MST~~ - **CANCELLED**
- Sunday, April 28th at 7:00 pm MST

Review Sessions:

- This Session! 😁

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-

[Need help using Zoom?](#)

[View the tutoring schedule](#)

[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

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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.

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- Any -

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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

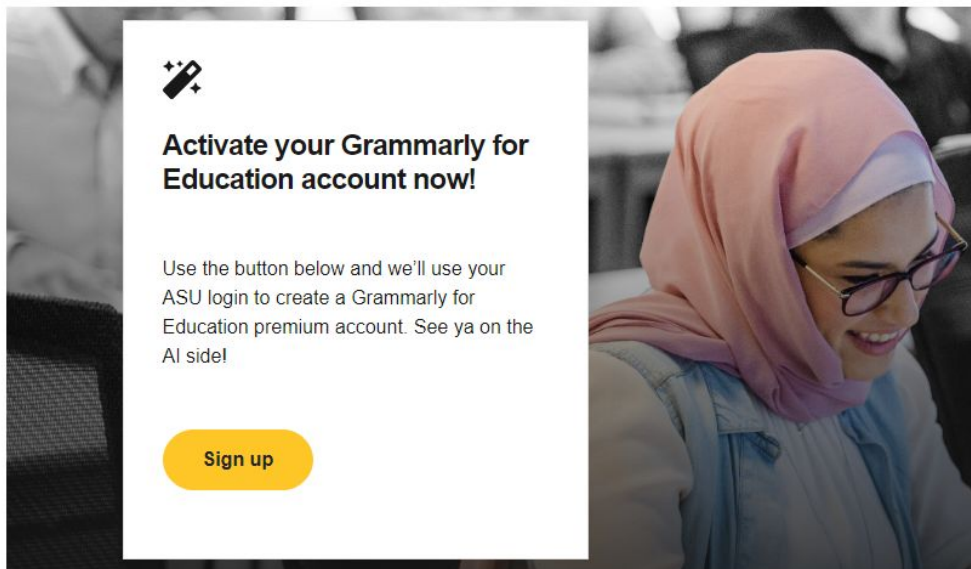
Computer Applications and Information Technology

 [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](#)