Unit 3 Client-server architectures

Unit Outcomes. Here you will learn

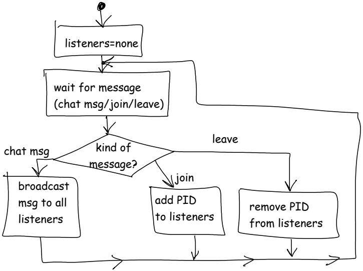
- how and why servers are usually layered in tiers
- how servers can be made more scalable

Further Reading: CDK2005 2.2

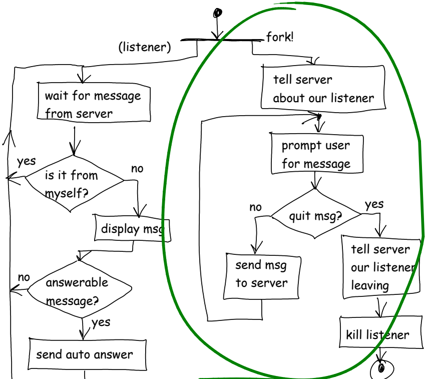
1. Client-server example
2. Multi-tiered architecture
   - Standard 3-tiered architecture
   - Almost 3-tiered system example
   - Evaluating tiered architectures
3. Improving server scalability
   - Proxies and caches
   - Replication
   - Mobile code

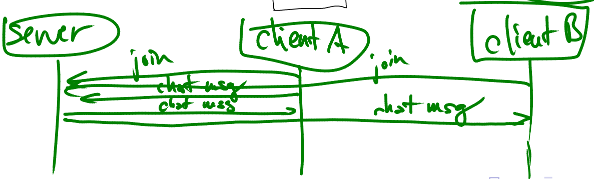
Client-server example

server activity:

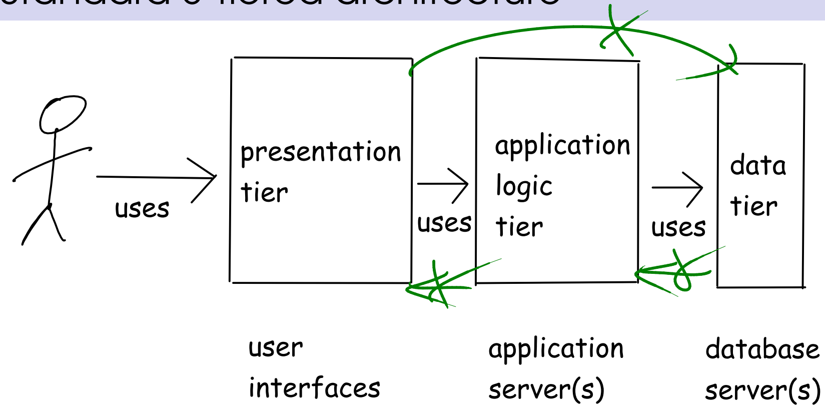


client activity:





Multi-tiered architecture
Standard 3-tiered architecture



uses

presentation tier

uses

application logic tier

uses

data tier

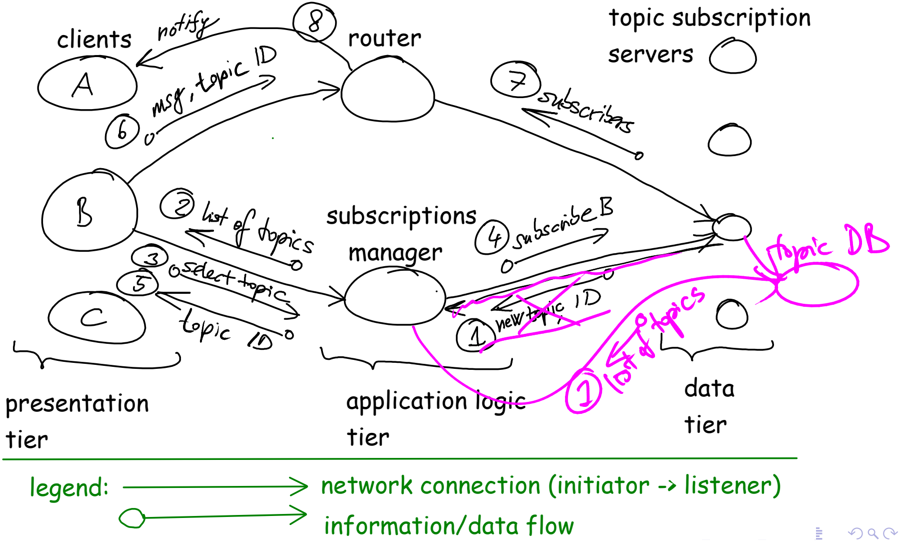
user interfaces

application server(s)

database server(s)

Almost 3-tiered system example

- why is the following not 100% 3-tiered?
- how to fix it?



Almost 3-tiered system example

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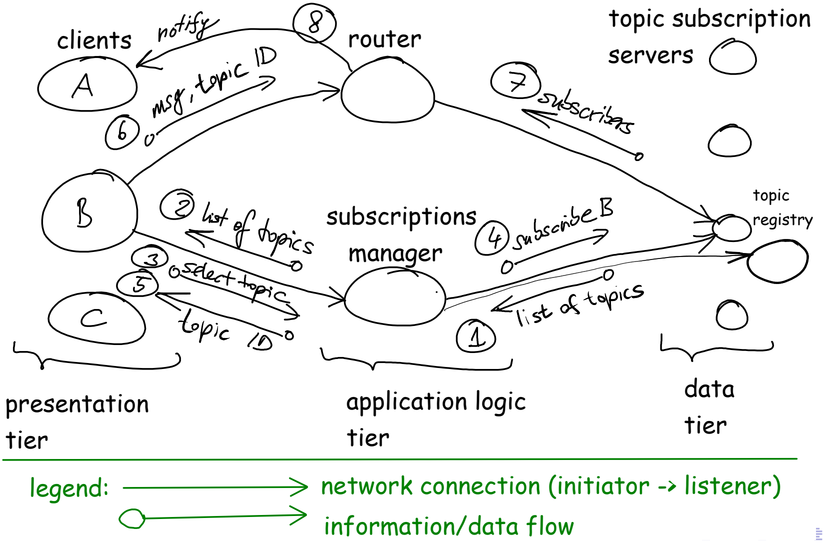


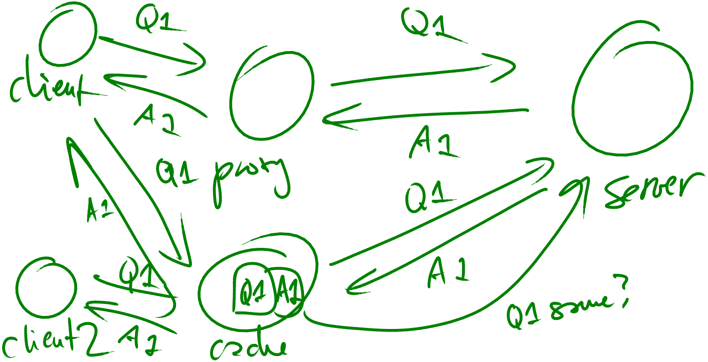
Evaluating tiered architectures

- advantages/disadvantages of extra tiers

factor	*less tiers*	*more tiers*
network load		higher
development time		initially more
scalability		should significantly improve
maintenance		should help

Improving server scalability
Proxies and caches

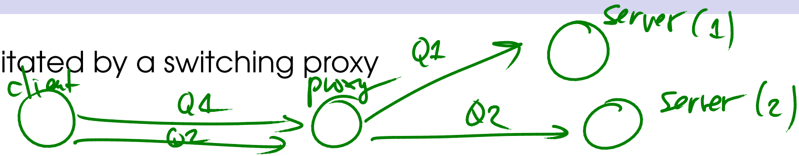
- proxy = fake server, giving all work to another one
- cache = like proxy but able to replay server interaction



- when is proxy useful? when cache? (eg in chat scenario)

Improving server scalability
Replication

- facilitated by a switching proxy

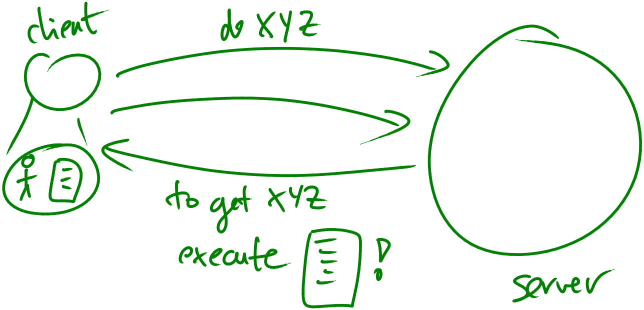


- when does it pay off to replicate? (eg in chat scenario)

component	*cache?*	*replicate?*
router	✗	✓
subscription manager	✗	✓
topic server	✗ ?	✗
topic registry	✗ !	✗

Improving server scalability
Mobile code

- eg Web server sends JavaScript to a browser
- how could it be used in the chat scenario?



Learning Outcomes

Learning Outcomes. You should now be able to

- describe the functionality of each tier in a standard 3-tiered system and how they interact
- describe the advantages/disadvantages of having more or less tiers in a client-server DS
- given an example tiered system, identify ways to improve its scalability, in particular which services can be cached, replicated and/or transferred as mobile code