

Software Architecture

How a system should be designed
How components are { organized
communicate
constraints

+ input of dev phase of SDLC

Advantage :

1. communication bridge between stakeholders and dev team.

2. Easy analysis of non functional requirements

3. Revise the diagram in different model.

Design :

1. components — decompose into subcomponents

 Login — web login

 — phone sms login

 — code

TOPIC NAME : _____

DAY : _____

TIME : _____

DATE : / /

2. structure of system
3. Distribution across different hardware
 - └ server locations
 - └ device compatibility
4. strategy of operations
 - └ communication of components
5. structure for non functional requirements
 - └ bank app - security
 - └ game - fast load priority

TOPIC NAME: _____

DAY: _____

TIME: _____

DATE: / /

(4) Views

Each diagram shows one view

1. Diagram can't show multiple views

1. Logical view:

How classes interact

↳ class diagram

2. Process view: (Activity diagram)

Flow chart (process activity)

3. Development view: (component diagram)

How system is decomposed into components

4. Physical view:

Deploy software
Hardware comp distribution
connecting PCs

GOOD LUCK

GOOD LUCK

TOPIC NAME : _____

DAY : _____

TIME : _____

DATE : / /

Layered Architecture

System layers :

1. presentation : { UI
screen, input }
2. Business : { Data validation
calculations }
3. persistence : { R/W data
SQL }
5. Database : { location
structure } database

Monolithic software : { waterfall model
end user at the end
gets it
No separation comp }

problem : { No separation comp so changing one
affect another }

Q.

TOPIC NAME: _____

DAY: _____

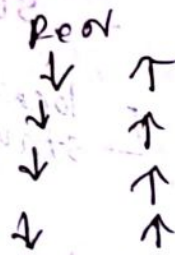
TIME: _____

DATE: / /

Layered Archi

- Organize system into separate layers
- separate changes
- Different layer different functions
- A layers can provide service to the layer above it.

Present
Business
Persistence
Database



closed layer: Only the above layer can access it. Isolated.

Open layer: If business sometimes go to

New → Persistent

new and sometimes to persistent.

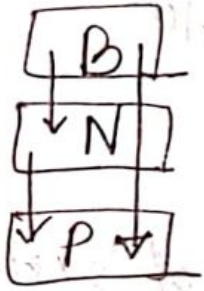
! - New layer: open (can be bypassed)

TOPIC NAME : _____

DAY : _____

TIME : _____

DATE : / /



Use : ① New func on a existing system

② When dev team is separated

③ multilevel security needed.

Advantage :

① Easy add / remove layers

② Testing is easy

Disadv :

① Can't access directly one layer to another

② Performance reduce as many layers pass each time.

③ Restart app after each change.

TOPIC NAME: _____

DAY: _____

TIME: _____

DATE: / /

data distributed to diff
subsystems

Repository

storage → distributed
sub system data

→ accessible by
all subsystem

shared data in a central repo
accessible to all components of system
components interact through repo

Use :

1. large data generated
2. Store data for long time

Adv :

1. Components can be independent
2. Manage all data consistently at the same time
3. changes can be shared to all components

Dis :

1. Single point failure (all at one place)
2. Distributing to several computers is difficult.

→ one computer fail - problem

TOPIC NAME : _____

DAY : _____

TIME : _____

DATE : / /

Client Server Pattern

server

- Provide service to client

clients

- request service to server
ex: I need a page in google
- google server provides me page

Use : ex: email, doc share, banking, video library

1. Data has to be accessed from diff locations
2. server can be cloned to accommodate more people

Advantages :

1. server can be across a network accessible
2. general service accessible to all client

Dis :

1. Performance depend on network
2. server owned by diff organization - prob
3. single point failure - each server.

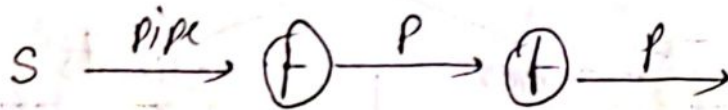
TOPIC NAME: _____

DAY: _____

TIME: _____

DATE: / /

Pipe filter pattern



Data is passed thru pipes

Data is processed by filter component

Use when process a stream of data

Each filter is discrete, carries one type of data

Uses:

Adv: ① easy to understand flow

② Workflow similar to business process

③ straightforward

④ sequential or concurrent (parallel)

Dis: ① format of data has to be same for all comps.

② each transformation has to check for format / data structure.