



Bahria University

Discovering Knowledge

Department of Software Engineering

SEN-221-SOFTWARE DESIGN & ARCHITECTURE SPRING 2022

COURSE INSTRUCTOR
ENGR. MAJID KALEEM

Name: Abdul Quddos

Enrollment No:02-131202-033

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|-------------------------|---|
| Assignment No. | 01 |
| Assignment Title | Description of various Architectural Styles |
| Course Learning Outcome | CLO-02 <i>“Describe various architectural and design styles and patterns suitable for a given scenario.”</i> |
| Full Name | |
| Semester | BSE 4 B |
| Submission Deadline | 03 rd April 2022 |



INSTRUCTIONS:

- ☐ USE ONLY TIMES NEW ROMAN SIZE 12 FONT.
- ☐ EACH HEADING (UNDERLINED, BOLD AND IN CAPITAL LETTERS) AND EXAMPLE MUST START FROM A NEW LINE.
- ☐ UPLOAD SOFTCOPY ON LMS AS A PDF FILE.

- ☐ DO NOT EDIT (THIS) ASSIGNMENT FILE GIVEN AS A PDF FILE.
- ☐ LAST PAGE OF YOUR ASSIGNMENT MUST CONTAIN SOURCES/REFERENCES (USE IEEE REFERENCING STYLE).
- ☐ NO MAKEUP ASSIGNMENTS WILL BE GIVEN & DATE WILL NOT BE EXTENDED. ☐ VIOLATION OF ANY OF THE INSTRUCTIONS MENTIONED HERE WILL RESULT IN MARKS DEDUCTION.



BAHRIA UNIVERSITY (KARACHI CAMPUS)

Software Design & Architecture (SEN-221)

ASSIGNMENT # 1 – Spring 2022

Based on: CLO-2

Class: **BSE-4B** Submission Deadline: **03rd April 22**

Course Instructor: **ENGR. MAJID KALEEM**

Max Marks: **05**

1. Suppose you have to design & develop an online LMS System. You may consider various architectural and design style to address this situation. Keep LMS in mind, describe (separately) each of the architectural styles given below with respect to the following questions:

1. ***What*** are they?
 2. ***Where*** are they used?
 3. ***Why*** are they used?
 4. ***How*** are they used / implemented?
- a) Client/Server Architecture
 - b) Component-Based Architecture
 - c) MVC Architecture
 - d) Cloud Application Architecture

Follow the format/sample as mentioned below to answer this question:

CLIENT/SERVER ARCHITECTURE

WHAT?

.....

.....

WHERE?

.....

.....

WHY?

.....

.....

HOW?

Follow the above-mentioned format to answer a, b, c, & d. While describing/answering each of the above, you may use relevant diagrams and examples to support your answer.

G🖥️😄 Luck!

CLIENT/SERVER ARCHITECTURE :

WHAT?

Client-server architecture is a type of architectural design in which multiple clients can access the data on server through database.

e.g. In LMS system multiple students (clients) can access the LMS and check the attendance through server and data is stored in the database through which server gets it.

WHERE?

Basically, it is used for E-commerce sites, streaming application, video games, video editing software, small websites (2-tier), library management systems (3-tier), large scale systems (n-tier) Facebook, Gmail.

Why:

The client-server architecture is most useful for applications that require a separation or abstraction of concerns between the client and the server.

e.g. in LMS system we have different clients for example students and faculty but different level of abstraction on it i.e. teachers can see the assignments and access through database server but on the other hand students can submit assignments but do not access the faculty portal and see faculty activities.

How:

client-server architecture, architecture of a computer network in which many clients (remote processors) request and receive service from a centralized server (host computer). Client computers provide an interface (connect through database) to allow a computer user to request services of the server and to display the results the server returns.

e.g. In LMS students behave as clients and make requests and the request received by the server then database sends required data on the students user interface.

Component-based Architecture:

What:

It is the type of architectural design in which new components are made by using already developed components with small required changes by using standardized methods.

e.g. If we want to make LMS system of any specific organization then firstly we use the previous LMS components after integrating we made required changes according to the needs of organization.

Why:

Component-based architecture is basically used for its reusability, extensibility, maintenance.

e.g. (reusability) if we make LMS system of any institute then we reuse the components of this LMS to make LMS of another system.

e.g. (extensibility) if we want to extend our LMS system in terms of features and make module of another category i.e. we want to make alumni portal then it is easy to extend this feature.

e.g. (maintenance) if any major issues occurs in the LMS then if it is easy to repair then repaired if not take copy of the existing component and integrate in the previous system and previous component will through out of the system.

Where:

These technologies are widely used in local desktop GUI application design such as graphic JavaBean components, MS ActiveX components, and COM components which can be reused by simply drag and drop operation.

How:

In this architecture we check that the same system was previously built or not and the components are available of this system and then if available we take the similar system components and made new system through existing components.

MVC Architecture:

What:

It is a type of architectural design in which model and view are two main aspects and responsible for data.

E.g. in LMS system if we want to authenticate the login page of student then the required data is given only when it is valid and details are stored in model database otherwise it should appear a error message with view interface.

Why:

MVC architecture can be easily modifiable, provides multiple views and provides faster development process.

e.g. In covid-19 we update the LMS and made the feature of online papers which was not previously in LMS.

WHERE:

The development architecture is commonly used in Test-driven Development applications. Moreover, Scripting languages like JavaScript and JQuery integrated with MVC architecture to feature rich web applications.

HOW:

Model view architecture constitutes of three main aspects model, view and controller. The controller handles the request given by server then passed to the model which checks that data is present in the given model and then proceed to view which presents the data of given server request.

Cloud Application Architecture:

What:

It is a type of architectural design which constitutes of two main parts frontend and backend and a medium which helps communicates each other front end is what client used user interface and back end used by service provider It manages all resources required to provide cloud computing services.

e.g. In LMS system we see the user interface and see what is on the user interface and if we submit the assignment it will store in backend in the database server and all the communication occurs through the medium which is internet.

Why:

Basically it provides the solution of latency problems, and improves data processing requirements, it usually helps in scaling up and down the cloud services.

Where:

It is used in the grid computing and it is widely used in transactional applications.

How:

There are different cloud services provided by different organizations e.g. google cloud computing, azure, aws are the service providers then first of all we choose the cloud server according to our needs and then we use the frontend and the data stored in the cloud of specific organizations and internet played an important role for saving the data and act as a medium b/w fetching the data through cloud.

References:**YouTube:**

https://youtu.be/M988_fsOSWo

<https://www.youtube.com/watch?v=DUG2SWWK18I>

https://www.youtube.com/watch?v=L5BlpPU_muY&t=213s

<https://www.youtube.com/watch?v=s-MwKhkChLU>