



**CIS 602 Special Topics in Web Software Development**

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**Activity 1 - Research**

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## Activity 1 – Research

### 1. What are Federated Networks? Provide examples

→ Federated Networks may be defined as a set of distinct networks sharing the same resources (such as gateways and network services) and can be viewed as a collection of networks in a model. This is made possible through the use of a centralized administration framework that assures uniform setup and policies. Being linked to other networks in a network model, every network in the federated network has the ability to transfer data and messages between parties as well have the ability to continue operating even when a connection is broken, making it such that all of the networks in the model function as if they were one.

Even though the management, control, and data planes are dispersed across numerous networks or locations, it is still possible to administer them as a single entity. In order to provide a consistent environment across all of the sites, an administrator can create rules for the entire federated network rather than applying them to each network separately, speeding up processes.

Examples:

- Federation protocols such as ActivityPub and OStatus, which are used to connect different instances of social networking platforms like Mastodon and GNU Social
- Distributed file sharing networks like Inter Planetary File System (IPFS)
- Federated identity management systems like OpenID and OAuth
- The Jabber network, an instant messaging network that allows users to communicate with each other regardless of which server they are connected to.

### 2. What does Web 2.0 refer to? What is Web 3.0?

→ Web 2.0 refers to the second generation of the World Wide Web, characterized by the ability for users to interact and collaborate with each other in a social media context, as opposed to just retrieving information from websites. It is recognized as Social Web which mainly focused around

user-generated content and social platforms such as Instagram and YouTube.

Web 3.0 is a similar technology with similar backgrounds as Web 2.0, but it approaches challenges differently when compared with approaches used by Web 2.0. Web 3.0 focuses on creating content (Semantic Web) and is considered to be much better, utilizing technology to facilitate information interchange amongst web users while simultaneously enhancing cybersecurity. Web 3.0 follows a decentralized structure and offers more privacy, better security, improved user connectivity and ubiquity. Additionally with Web 3.0 foresee the use of AI-powered features, more user control and distributed access avoiding content hoarding in its ecosystem.

### **3. What is the client-server model of communications? How does it differ from peer-to-peer?**

→ The client-server model of communications is a distributed computing architecture where any number (one or more) of client request and receive services from a centralized server. The way it works is that a client initiates a request for some service (which the requested server can provide) or resource (which the requested server has) to a server. The server then responds appropriately to the client (which initiated a request). So basically, in this model, the server is responsible for managing and distributing the resource and services, while the clients are responsible for requesting and using them.

The peer-to-peer (P2P) model, on the other hand, is a decentralized computing architecture in which each node (or "peer") acts as both a client and a server. In P2P networks, there is no centralized server that manages resources and services; instead, each node is responsible for both requesting and providing resources and services to other nodes.

Hence to summarize the difference, the client-server model is a centralized architecture, where one or more clients request and receive services from a single, centralized server whereas the peer-to-peer model, on the other hand, is a decentralized architecture where each node can act as a client and a server.

4. What is a full-stack developer? What types of companies typically hire full-stack developers?

→ A full-stack developer is a person who is a software developer/engineer who has the working knowledge and skills of all the layers of the application development stack. An application development stack typically comprises of front-end, backend and database. A full stack developer has the ability to design and completely build an application from scratch using programming languages such as HTML, CSS, JavaScript, Python, Java, SQL, etc.

Below are the types of companies that prefer hiring a full stack developer:

- Startups and small businesses that are building their first web applications.
- E-commerce and retail companies that need to build and maintain online stores.
- Healthcare and financial institutions that need to build secure, compliant web applications.
- Media and entertainment companies that need to build engaging, dynamic websites.
- Consultancy and agency firms that build custom web applications for clients across a variety of industries.

5. What are the fundamental differences between Decentralized Social Media with Conventional Social Media?

→ Below are a few of the fundamental differences:

<b>Decentralized Social Media</b>	<b>Conventional Social Media</b>
It is built on a decentralized network	It is built on a centralized network
A community of users control the network or the data that is stored on it.	A central authority or organization controls the network or the data that is stored on it.
Uses blockchain technology to enable transparency and immutability	The data is controlled and owned by the company running the platform.

More robust privacy and security features than conventional (centralized) platforms.	Less robust privacy and security features than platforms.
Has built in incentives in the form of cryptocurrency or tokens, which can be earned and spent by users	Has no built-in incentives. Third party services are required which again have their own control and constraints.