SENG2130/6350 Systems Analysis and Design

System Design –Workshop 6 (week 9)

1. Review: Explain: a Use case Diagram, an Activity diagram, a class diagram and a sequence diagram.

2. Older compilers were designed according to a pipe and filter architecture, in which each stage would transform its input into an intermediate representation passed to the next stage. Modern development environments, including compilers integrated into interactive development environments with syntactical text editors and source-level debuggers, use a repository architecture. Identify the design goals that may have triggered the shift from pipe and filter to repository architecture

3. Based on the architecture styles discussed in this course, decide the architecture styles for the following systems.

3.1

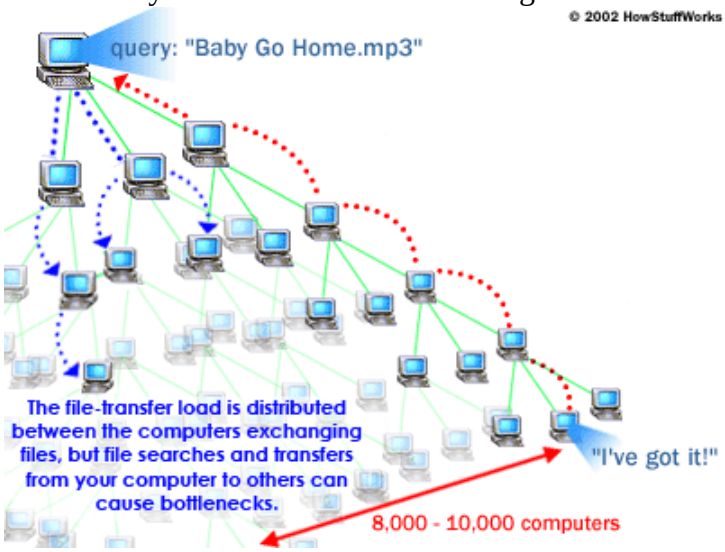
- Your application is server-based and will support many clients.
- You are creating Web-based applications exposed through a Web browser.
- You are implementing business processes that will be used by people throughout the organization.
- You are creating services for other applications to consume.
- You want to centralize data storage, backup, and management functions.
- Your application must support different client types and different devices.

3.2

- You already have suitable layers built for other applications that you can reuse.
- You already have applications that expose suitable business processes through service interfaces.
- Your application is complex, and the high-level design demands separation so that teams can focus on different areas of functionality.
- Your application must support different client types and different devices.
- You want to implement complex and/or configurable business rules and processes.

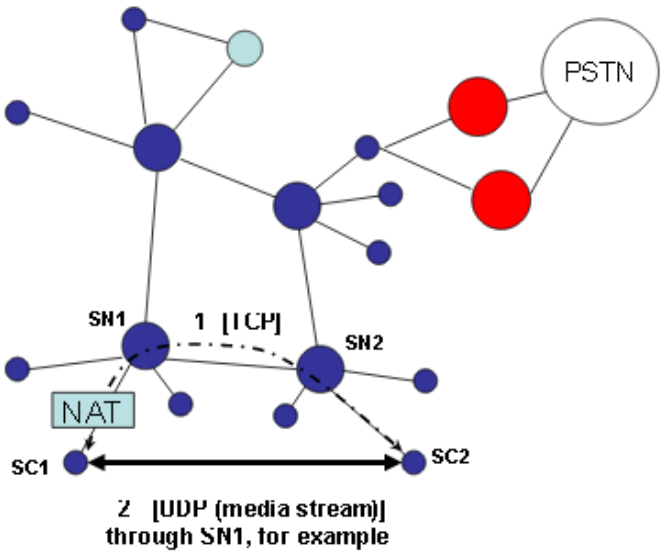
3.3

The file-transfer load is distributed between the computer exchanging files, but file searches and transfers from your computer to others can cause bottlenecks. Some people download files and immediately disconnect without allowing others to obtain files from their system.



3.4

Call setup: the “caller (who initiate the call) is behind NAT(network address translator) and the “callee” (the party called) has public IP address. TCP signaling exchange does not flow directly between the two SC 1 and SC 2 but rather through another intermediate node (SN1, for example). The media stream is transferred over UDP being encrypted but again through SN1.



4. Based on the architecture patterns discussed in this course, design the software architecture for the following three systems.

4.1 Plug-in Manager

All software has limited functionality and scope. To overcome this limitation, software applications can tap into the functionality of other programs. For example, web browsers use plug-ins to transparently extend their functionality. However, such plug-ins is browser dependent. The same is true for most of the existing plug-ins on Windows system, which are proprietary. You are asked to develop a non-proprietary application-level plug-in manager for Window operating system. This application will establish a common groundwork that will allow unrelated applications to use plug-ins written by another party to perform some task.

Functional requirements

- Plug-ins shall provide services to all other applications installed in the system.
- Plug-ins shall provide services to other plug-ins.
- Application can use a plug-in as long as there is a match in data description.
- The Plug-in Manager will provide a list of compatible plug-ins to the applications.
- The Plug-in Manager shall provide the service description standards for the plug-ins to abide by.
- The Plug-in Manager shall provide the data description standards for the applications to abide by.
- The Plug-in Manager shall provide API for developers to develop the Manager aware applications and the Manager compatible plug-ins.
- The Plug-in Manager shall provide a human readable description of the enabled/disables services.
- The Plug-in Manager shall provide a user interface for user to manage plug-ins.

Non-functional requirements

- Plug-in shall be activated within n seconds.
- Applications shall receive a plug-in list within n seconds.
- There should not be any limitations to the number of plug-ins that can be installed, except by the limitation of the memory.
- Software developers shall be able to make an application PiM aware within n number of days.
- Software developers shall be able to transform a functional procedure into a plug-in within n number of days.

4.2 OpenClinica Software

OpenClinica is a web-based software platform for managing single or multi-site clinical research studies. It facilitates protocol configuration, design of electronic Case Report Forms (eCRFs), Electronic Data Capture (EDC), data extraction, and clinical data management. OpenClinica is designed as a standards-based extensible, modular and open source platform for managing multiple clinical research studies within a centralized repository.

The Main Application Modules include:

- Manage Study: Facilitates configuration and management of studies (protocols), sites, CRFs, users and study event definitions by study directors and coordinators. You can define data elements, CRFs, and protocol events without any custom programming.
- Submit Data: Provides a user-friendly web-based interface for subject enrollment, data submission and validation. For use by clinicians and research associates involved in patient enrollment and data capture processes.
- Extract Data: Enables data extraction and filtering of datasets for use by investigators, statisticians, and study directors.
- Administer System: Allows overall system oversight, auditing, configuration, user account management, and reporting by administrators.

4.3 HelpMatch

HelpMatch is a web-based system that will provide the ubiquitous computing engine to match help to need. It will give more people a way to help those with chronic (poverty) or acute (disaster) need in a direct, meaningful way. Specifically, the envisaged system will allow:

- individuals and organizations (such as schools, community groups, etc.) who have experienced loss through a disaster to state specific needs for donated goods and services
- individuals and organizations to offer specific forms of assistance, directly by searching registered needs, or indirectly, with the system matching needs to donation offers
- match individuals and organizations with registered general needs to individuals and organizations that have made offers to collect goods and services to meet the needs expressed
- shippers to donate services to ship goods, and individuals and groups to donate funds to pay for shipping, so that it will be an option for givers to have shipping costs paid to get their donation to its destination, with shipping labels created by the HelpMatch system.