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Bachelors of Information Technology

INTERNET PROGRAMMING

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Types of Architecture

Minimally distributed

Standalone Application

[Diagram of Minimally distributed architecture]

[Diagram of Standalone application]
Application of two client-server Layers

Application n-layers
Web-centric application

Layers of Integration and Resources

Integration Layer
- JDBC
- JavaMail
- JTA / JTS
- JMS
- JNDI
- J2EE Connector

Resource Layer
- Databases
- Legacy Systems
- Directory Services
Internet-related concepts

What is a computer network?

- **Concept**: set of computers interconnected by physical structures following communication rules set by programs.
- **Objective**: To allow sharing resources: files and peripherals.

The Internet

- It is a worldwide network of computers. A network that allows communication of different networks.
- WAN network (International) WAN network (International)

The Internet is based on the concept (architecture) client-server.

Every transaction between client and server involves a protocol, a set of rules that controls the communication being them.

**Internet X web**

Differences being that hardware infrastructure and this software (email, web servers, ftp ...).

**Protocol**

Set of rules that control communication.

Other concepts

**Website**

Set of pages that can go from a simple page containing information in HTML format to complex enterprise systems.

**Intranet**

Internet technology within companies.

**Web server**

Sites are stored on web servers, also known as *host*.

It has the function of sending relevant pages to customers connected to the *site*, as requested.
Examples of market web servers

- Enterprise Web Server (Netscape);
- Internet Information Server (Microsoft);
- Tom Cat;
- Personal Web Server;
- WebSphere.

Protocols (logical part of a network)

- Are laid down to be a communication between computers on a network.
- A computer communicates with another through these rules.
- The computers on a network must use the same protocol to communicate.
- There are several protocols, and each plays its role within a network.

Example

Needing to borrow a book in the library, the client asks the librarian book passing it:
- Book's name.
- Author's name.
- Publishing company.
- Language.
- Edition, if applicable.

This would be part of the protocol (set of rules that controls communication) library referring to the Request for Information, in this example, loan application from a book.

In order to finalize the loan, the library also performs procedures that are also part of the protocol:
- Checks if the person can actually borrow books.
- Check if the book is available.

In affirmative case:
- Write down the loan data (date of return, book data, ...).
- Record a copy unless the number of available of the requested type books.
- Others....

These procedures would be performed by the server as part of the protocol.
The Internet also works with protocol, TCP / IP (Transfer Control Protocol / Internet Protocol).

The information is sent over the Internet in packets of approximately 200 bytes containing information about the sender and the recipient.

TCP is responsible for dividing the information into packets, send them by network, receive them, check them and regroup them, while IP has the function of find the best path through the network to send these packages (the packages, being independent, may take different paths to reaching a destination).

Notion of IP addresses in Local Area Networks

Main means of access

- Dial Up
- ADSL
- Cable Modem
- Radio
- Satellite
- Optical access
- Wireless
Current physical structure of the Internet

Backbone

Considered the spine of the internet, where all the networks are through the physical structure that interconnects various telecommunications companies.

Standard TCP / IP protocol

Are the rules of communication used in the Internet, which allows communication of different networks worldwide.

Packages (bit group)

All information transmitted on the Internet is separated into portions. Each installment of this file is what we call packages...

Top Protocols TCP / IP

- TCP
- IP
- HTTP
- POP3
- IMAP
- SMTP
• FTP
• UDP
• DHCP
• TELNET

TCP (Transmission Control Protocol)
• Transmission Control Protocol
• Responsible for shipping packages
• Efficient

IP (Internet Protocol)
• Protocol Interconnect Networks
• Used to assign stations, allowing them to communicate over a network.
• It also has the function to address the packages before being sent on the network.

Dynamic IP and Static IP
A computer can receive an IP in two ways:
• **Static IP**: Manually configured naturally by the network administrator, and remain fixed.
• **Dynamic IP**: Configured automatically by a protocol called DHCP. Dynamic IP is rotating.

Examples of IP Dynamic and Static
• **Static**: Used in LANs, ISPs, web hosting servers that also associate one static IP to the sites.
• **Dynamic**: Most Internet users use dynamic IP, for the provider that offers the Internet, change the IP for each new connection.

IP addresses and URL

**Example IP address**

192.5.6.7 - format of four numbers from 0 to 255 and separated by dots.

**Example URL address**

www.aiu.edu
DNS servers

It is a translator / URL address translator to IP and vice versa.

- It can be considered a database

Website

A website is simply a set of pages in HTML format, which can range from a simple page containing information to complex enterprise systems.

At the beginning the Internet was used for text and data transfer without the use of graphical user interfaces.

Soon it was realized that it would be extremely interesting if it were possible to insert programs in the pages available on the sites and HTML is a markup language, not programming, bringing up several solutions to this problem as the scripts are small programs embedded to the pages.

More powerful technologies like Java, Java Server Pages and Active Server Pages have also been proposed.

These transform the sites before static to dynamic information systems, accessing real-time database.

Using these technologies, we can develop sites on the fly to respond in real time to the user depending on the actions and requests of it.

Intranet → Internet technology within companies.
Web server

Sites are stored on web servers, also known as host.

The function of these servers is to send the relevant pages to customers connected to the site, as requested.

Servers are computers with large storage capacity, which are connected to the Internet through dedicated phone lines.

A web server must have installed a specific type of software known as web server, which allows even understand the demands of the pages that you receive via the Internet and send them to the requesting users connected to the Internet.

There are several web servers on the market, including:

• Enterprise Web Server (Netscape).
• Internet Information Server (Microsoft).
• Apache Tomcat.
• Personal Web Server.
• WebSphere.

Servlets and JSP

SUN technology for developing web applications from Java components;

• Executed on the server.
• They are part of the J2EE platform
Process Software Development Waterfall

**Systems Development Stages**

- Requirements gathering
- Analysis
- Architecture
- Design
- Construction
- Tests
- Complete system

Characteristics of the Cascade method

- Traditional Process
- A phase only started when the previous one is 100% complete
- The development process is performed only once through all stages of development
- Each phase must be completed documented before moving to the next stage
- If problems are detected at later stages, it is difficult to return to previous stages
- It spent much time and effort by the team to ensure that steps are being performed with 100% compliance.
Analysis

1. Analyze scenarios Use Case to find out more details
2. Refine cases diagram based on the analysis
3. Set Activity Diagram for Use Cases
4. Identify key abstractions and how they are used by other objects
5. Representing relationships of abstractions in the domain model
6. Check the domain model using diagram objects from scenarios Use Case
Architecture

1. Select architecture for the system
2. Create detailed deployment diagram
3. Refine the architecture model to meet non-functional requirements
4. Documenting technology selections layered diagram
Design

1. Create design templates for Use Cases
2. Create solution model through the design and architecture models
3. Refine the domain model to meet the solution model
4. Apply design patterns to the domain models and solution
5. Identify and model complex states of objects through State Diagrams
Construction

1. Create Development Plan
2. Create structure for developing
3. Implement the software solution using the solution model
4. Test the software solution in scenarios Use Case
5. Deploy software solution using Deployment Diagram
Some tips:

What is Web Development and Programming Desktop?

Software development began with desktop applications, i.e., that could be used directly on the computer without relying on Internet connection. With the advent of internet, web applications have gained importance. Examples of desktop applications are Word, Excel, Media Player, etc. Examples of web applications are the electronic trades, social media, etc.

By definition, a desktop application is any software that can be installed on a computer and used to perform specific tasks. Some desktop applications can also be used by multiple users in a networked environment.

Web application development, however, soon began to replace or complement the desktop applications that were difficult to be sold, kept, bought, updated.

Web applications using a web browser such as Mozilla Firefox, Internet Explorer, Google Chrome, among others, as an interface. This is one of the reasons why web applications are so popular nowadays, after all computer has browsers and internet, and you can access the same application from any operating system (Linux, Windows, Android, MacOS), which does not occur with desktop applications, which normally operate in one or another operating system.

10 tips novice web developers should know

- **Decide what skills you want**

  When starting web developer career, you really need to focus on something and accept the fact that you cannot be a "generalist". Believe me, even giving a strong desire to act in many, many fields of web development, this is impossible! Moreover, usually the market value more an expert in an area than a "do everything web".

  There is nothing wrong with wanting to be excellent in various fields, but you really cannot do this in the beginning. What you can do is focus your efforts on learning a skill and become an expert in that field. Can be PHP, Ruby, ASP.net or C#, but it has to be good at it ... Very good! Once you master one, you can move on, but do not do it until you have great knowledge in this field.

  This tip is also good for front-end designers, who always start with HTML and CSS, then move to JavaScript, jQuery, AJAX, or any others who are interested. Of course, you can learn HTML and CSS at the same time, but that's because they kind of work together. You cannot really master PHP and ASP.net at the
same time - unless you spend 20 hours of study a day, which is definitely not recommended - therefore you have to get your skills one by one.

Just a little research on what each language can do and start learning. And in this way, you will certainly learn what you can do the same thing using different languages...

- **Learn right**

Another tip for beginners is, regardless of the language you choose, learn right! If you learn HTML coding layouts with tables, that's nothing right - and I'm sure other experts agree with me. Code using the latest web standards seem useless to some, but it is really important and it is highly recommended to learn as well, since this will not only improve their designs loading speed, but will also be easier and make more sense.

- **Google is your best friend**

It really does not matter what kind of problem you have, I'm sure Google can solve it (in most cases, at least).

Programming forums are highly recommended, too, but, before posting a question on a forum, try to find a solution on Google because most of the time, you will find an answer to your question - or at least an answer that will guide you to solve the issue.

- **Analyze other people's code**

This applies particularly to designers, but sometimes developers have front-end design expertise and make your own layouts before you start encoding them. It is important to look at other sites to understand how they are encoded. If you like any style or element of a site, look at the source code and analysis! Firebug works wonderfully well in these cases. This is the way most people learn to code.

What is not recommended is to steal the alien design. This is inexcusable and worthy of a "What inelegant", in addition to showing a lack of respect and tremendous lack of professionalism, but generally the developer community sees no major problem "borrow" some code snippets (if it does not infringe any law or patent, of course).

So is the "rule of thumb": you can even copy some code here and there - this is the way to learn how to do things - but never steal a design!
Enter a network of knowledge

Another important thing is to participate in a network within their field of knowledge. You’re never too meet other developers and designers. A not very interesting scenario is you have to return back and get things on Google; a better scenario is to have interesting discussions and be able to get help through discussions with people from the same area. You can even collaborate with your fellow developers on larger projects, which almost always is good for everyone involved.

You are close to getting a project but are not sure if you can handle the type of work required? Tell one of your fellow developers! He (s) will probably (will) do the job better than you - if (in) expert (s) in this specific area - and you can close some kind of partnership at some future time. Part of a network keep active and always around. There is always demand for a developer who is "around".

Understand designers

It is highly advisable that you understand the designers, if you have no idea of how they work. And this is as true for graphic designers and for front-end designers.

It is always good to learn how they work and why they can deliver static pages that do not really correspond to the latest web standards. Learn to talk to them and explain what is wrong and know how to ask to correct their own mistakes. Thus, their working relationship will be closer and the result much better.

Use professional tools

Although HTML and CSS can be made up with Notepad, this is not recommended. And if that is not suitable for HTML and CSS is also not recommended for PHP, ASP.net or Ruby. Work with professional tool like Eclipse, Aptana, NetBeans or any other, but use what the pros use, otherwise you will not be one of them!

This type of tool checks for errors, has autocomplete and gives suggestions for coding. There is a reason why Eclipse and NetBeans are two IDEs (Integrated Development Environment or Integrated Development Environment) most used in the world: they do the job in style!
Let cool things last

Each language has its own "cool" version. For example, HTML is HTML5, CSS has CSS3, JavaScript and AJAX has jQuery and so on. It is much better if you learn the basic language and then study more to get the cool stage. And also the "cool" things work from the basics, then you will not be able to develop and understand a slider with jQuery if you do not understand the basic JavaScript.

Stay informed and updated

It is always good to keep informed and updated about what is happening in the world of web development, especially the (s) area (s) you operate. You can do this by reading feeds, books "real" blogs and screencasts. Stay up to date and make sure that you are one of the first to offer products developed with the latest technology.

At first, it may not work too (people may want to keep the "old" until new technologies to there are also those people product, developed with the latest technologies - and this will give you an advantage and will make you known in the art.

Continue with the process of learning

Once you become an expert in the chosen field, pinch their way to learning other languages and / or areas. Keep an eye on the most important languages and learn those it deems to be the most interesting. When you master two, go to the third and so on.

And continue until there is not much more to learn - although, as has been said, this is impossible. This is the way to success!
Bibliography

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