INFS 329:
Database Management Systems

Session 12 – The Internet Database Environment

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Session Overview

- As the use of the World Wide Web (www) has escalated, the importance of databases to this growth has become ever more evident. The public internet and the private intranets can be thought of as vast client/server architectures with very thin clients and fat servers. The servers store information in databases to be sent to the browsers on request.

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Session Overview

- Attaching a database to a web application may open up access to that database in unintended ways if the developer is not data security conscious. This session seeks to explain the importance of attaching a database to the web and also explaining basic internet database environment concepts.

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Session Overview

- At the end of the session, the student will
  - Understand the concept of Internet Database Environment
  - Understand basic Internet Database Environment concepts and terminologies as well as internet related languages
  - Understand the difference between Server Side Extensions and Client Side Extensions.
  - Identify some website security issues and how security could be enhanced in an internet database environment.

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Session Outline

The key topics to be covered in the session are as follows:

- The Internet Environment
- Internet Architecture Component

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Reading List

- Hoffer, J. A., Prescott, M. B., & Topi, H. (2009). *Modern Database Management*. Pearson Prentice Hall. (Chapter 10)

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Topic One

THE INTERNET ENVIRONMENT

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The Internet Environment

- The Internet, World Wide Web (WWW) and information super highway have penetrated into lives of millions of people all over the world. The Internet is a network made up of thousands of networks worldwide.

- Obviously, these networks are composed of computing and other intelligent and active devices. In fact, Internet is an example of self-regulating mechanism and there is no one in-charge of the Internet.

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The Internet Environment

- A wide variety of services, namely, electronic mail, file transfer, vast information resources, interest group membership, interactive collaboration, multimedia displays, real-time broadcasting, shopping opportunities, and many more are available on the Internet.

- To provide all these services, the Internet consists primarily of a variety of access protocols. Many of these protocols feature programs that allow users to search for and retrieve material made available by the protocol.

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The Internet Environment

- There are any number of businesses continuing to trade successfully without any thought of the Internet and this will be true no matter how wired up the rest of the world becomes.

- Admittedly some of these are part of larger organizations that in all probability will have a website, but only as a small part of their overall business strategy not as a means of survival. The idea that a major oil company or brewery would collapse for lack of a website is laughable.

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The Internet Environment

- On the plus side, of course, there are companies which thrive on the Internet. To be more accurate they thrive because of the Internet. These are the small companies who, for the first time ever, are able to compete on level terms with their much bigger rivals.

- No longer does the business go to the company with the biggest marketing budget. Now the possession of a website means any company has a global presence.

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The Internet Environment

- In fact it is this that makes some people claim a website is necessary for survival. If small companies can take business away from big companies, which they can, then it follows that big companies must also have a website or else forever lose business. In other words everybody needs a website.

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Sample Question

- **Individual Assignment:**
  - Identify any three (3) security threats that may affect an Internet Database Environment

- **Forum Question:**
  - Analyse the relationship between server side extensions and client side extension in an Internet Database Environment

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Topic Two

INTERNET ARCHITECTURE

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Internet Architecture

- The Internet architecture is based on a simple idea: ask all networks want to be part of carrying a single packet type, a specific format the IP protocol. In addition, this IP packet must carry an address defined with sufficient generality in order to identify each computer and terminals scattered throughout the world. This architecture is illustrated in Figure.

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Internet Architecture
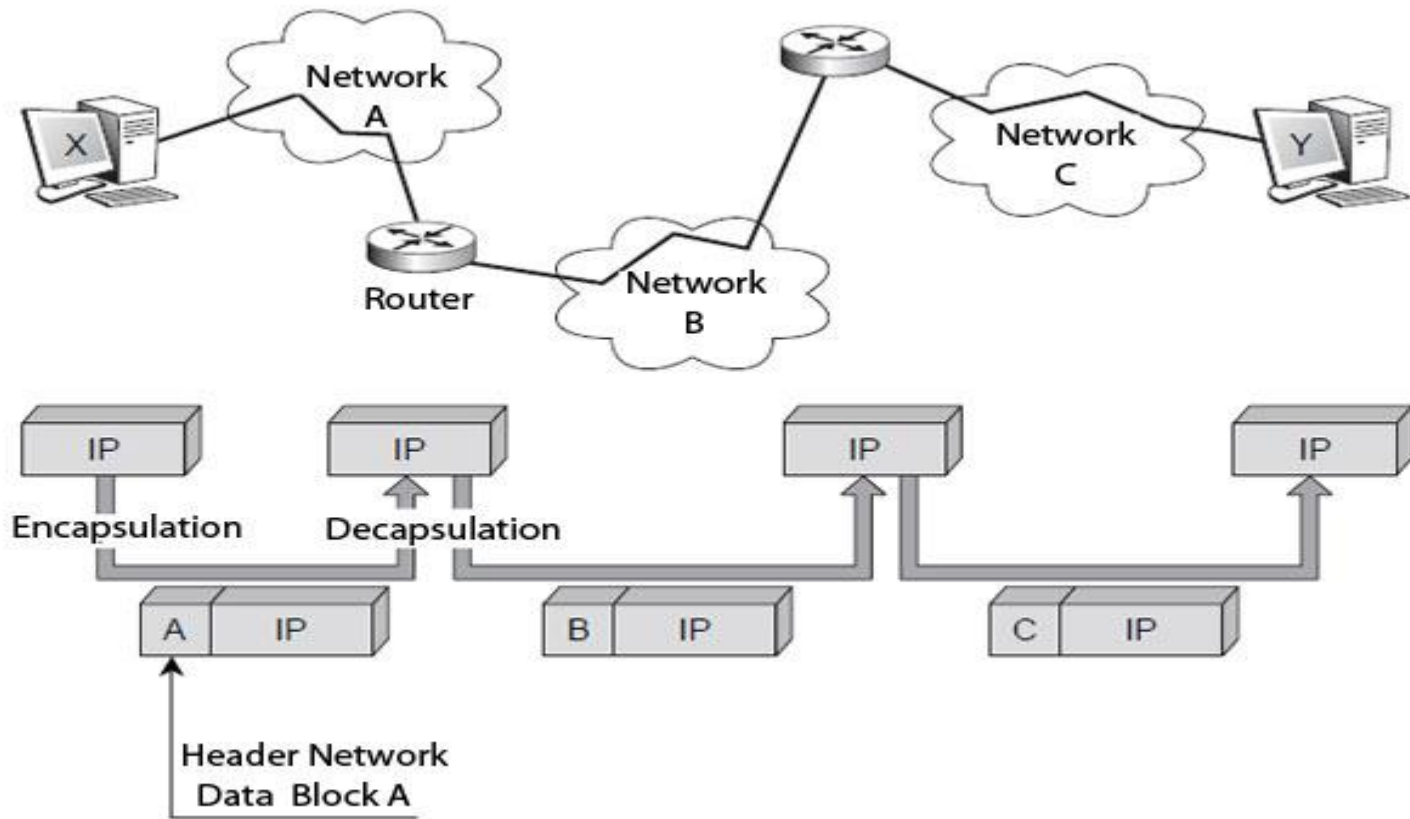
Internet Architecture

Internet Architecture

- The user who wishes to make on this internetwork must store its data in IP packets that are delivered to the first network to cross. This first network encapsulates the IP packet in its own packet structure, the package A, which circulates in this form until an exit door, where it is decapsulated so as to retrieve the IP packet.

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Internet Architecture

- To complete the IP, the US Defense added the TCP protocol; specify the nature of the interface with the user. This protocol further determines how to transform a stream of bytes in an IP packet, while ensuring quality of transport this IP packet.

- Both protocols, assembled under the TCP / IP abbreviation, are in the form of a layered architecture. They correspond to the packet level and message-level reference model.

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Internet Architecture

- The Internet model is completed with a third layer, called the application level, which includes different protocols on which to build Internet services. Email (SMTP), the file transfer (FTP), the transfer of hypermedia pages, transfer of distributed databases (World Wide Web), etc., are some of these services. Figure shows the three layers of the Internet architecture.

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Internet Architecture

The Three Layers of the Internet

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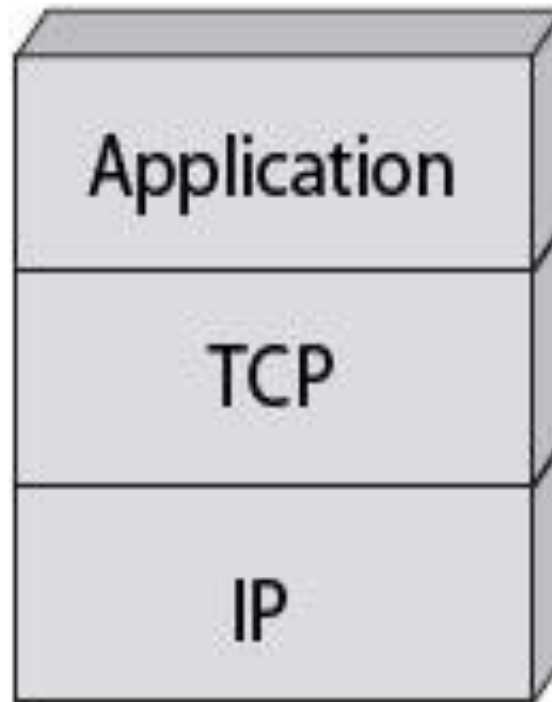
Internet Architecture

- IP packets are independent of each other and are individually routed in the network by interconnecting devices subnets, routers. The quality of service offered by IP is very small and offers no detection of lost or possibility of error recovery packages.

- TCP combines the functionality of message-level reference model. This is a fairly complex protocol, which has many options for solving all packet loss problems in the lower levels. In particular, a lost fragment can be recovered by retransmission on the stream of bytes. TCP uses a connection-oriented mode.

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Internet Architecture

- The flexibility of the Internet architecture can sometimes be a default, to the extent that global optimization of the network is carried out by sub-network subnet, by a succession of local optimizations.

- This does not allow a homogeneous function in different subnets traversed. Another important feature of this architecture is to place the entire control system, that is to say, intelligence and control of the network, in the terminal machine leaving virtually nothing in the network, at least in the current version, IPv4, the IP protocol.

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Internet Architecture

- The new generation of IP, IPv6, introduces new features that make the nodes of the network smarter. The new generation of routers comes with QoS management algorithms, which allow them to provide transportation that can meet time constraints or packet loss.

- We expect the arrival of IPv6 for ten years, but it's still IPv4 IP that governs the world. The reason for this is that every new need achievable with IPv6, IPv4 has been able to find the algorithms needed to do as well.

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Internet Architecture

- In IPv4, each new customer is treated the same way as those already connected with resources being distributed equitably among all users. The resource allocation policies of telecom operator's networks are totally different, since, on these networks, a customer who already has a certain quality of service does not suffer any penalty because of the arrival of a new customer.

- The IP world growth comes from the simplicity of its protocol, with very few options, and it's free.

References

- Helman, P. (2000). *The Science of Database Management*. IRWIN. Boston, Massachusetts. R. R. Donnelly and Sons Company.

- Hoffer, J. A., Prescott, M. B., & Topi, H. (2009). *Modern Database Management*. Pearson Prentice Hall.

- Silberschatz, A., Korth, H. F., & Sudarshan, S. (2010). *Database System Concepts.* Boston, Massachusetts. WCB: McGraw-Hill.

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