JAC444 - Lecture 10

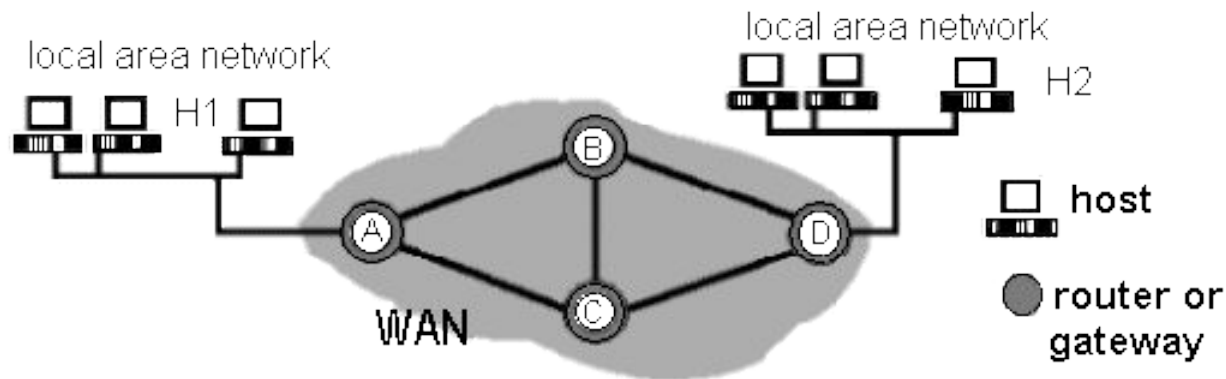## Networking Programming in Java
Segment 1- Basics

Network Programming

**In this lesson you will be learning about:**

- Layering and protocols

- Java Network Programming

- java.net Package

Elements of a Network

- Communication links:
  - point-to-point (e.g., A-to-B)
  - broadcast (e.g.,: Ethernet LAN)
- Host: computer running applications which use network (e.g.: H1)
- Router: computer routing packet from input line to output line. (e.g., C)
- Gateway: a router directly connects networks (e.g. A)

Networking Basics

Application (HTTP, ftp, telnet,…)
Transport (TCP, UDP, …)
Network (IP, …)
Link (device driver, …)
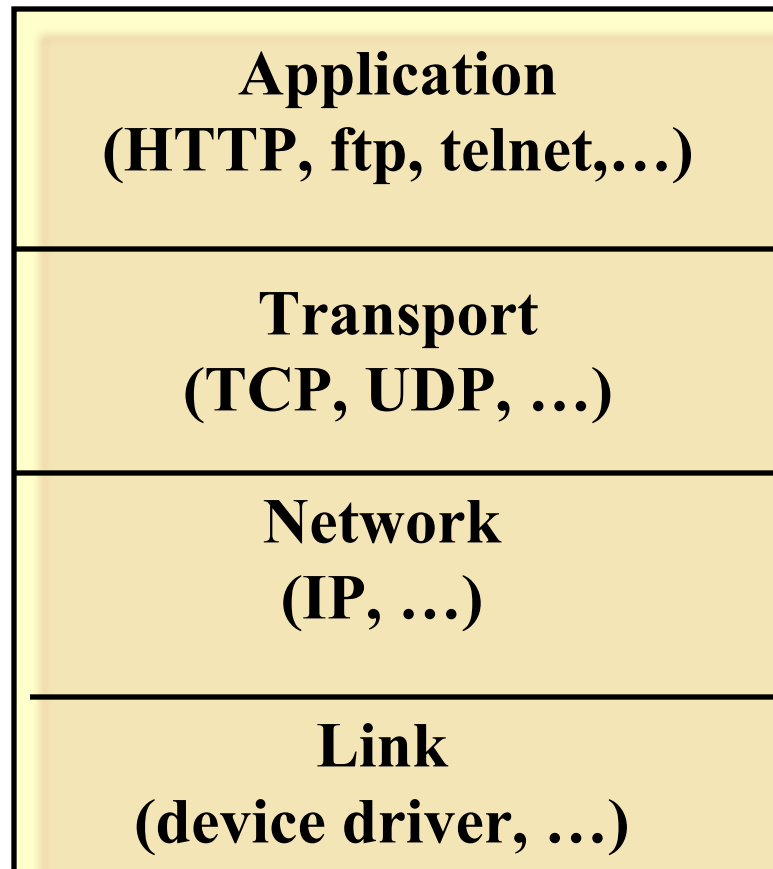
java.net.InetAddress class

```java
public static InetAddress getByName(String host)
            throws UnknownHostException
public static InetAddress[] getAllByName(String host)
            throws UnknownHostException
public static InetAddress getLocalHost()
            throws UnknownHostException

public boolean isMulticastAddress()
public String getHostName()
public byte[] getAddress()
public String getHostAddress()
public int hashCode()
public boolean equals(Object obj)
public String toString()
```
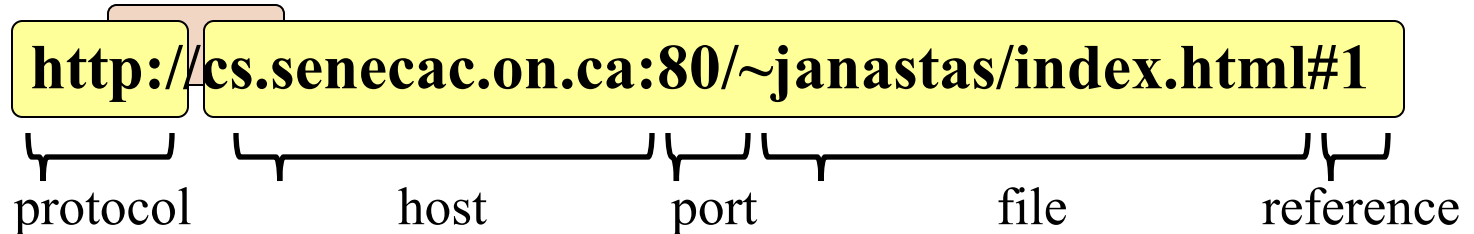
Protocol packets

Unit of data exchanged between protocol entities in a given layer.
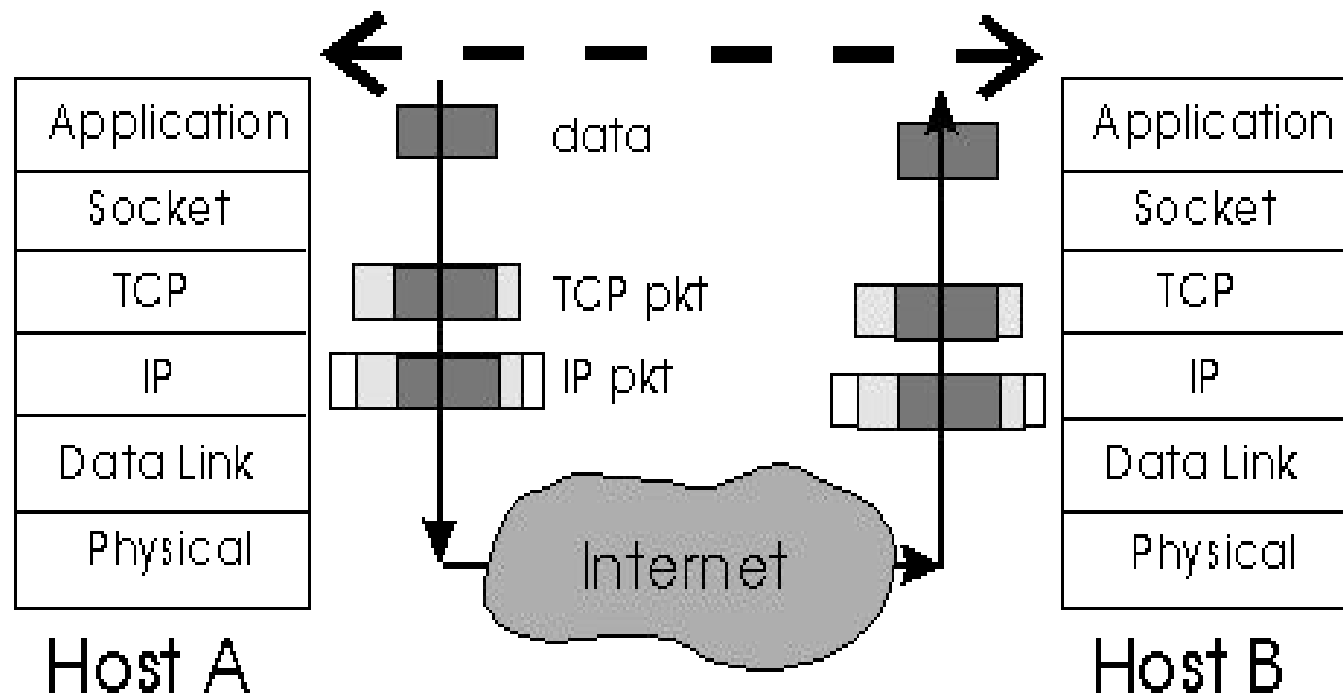
Uniform Resource Locator

URL is an acronym for *Uniform Resource Locator* and is a reference (an address) to a resource on the Internet.

$$\underbrace{\text{http://}}_{\text{protocol}} \underbrace{\text{cs.senecac.on.ca}}_{\text{host}} : \underbrace{\text{80}}_{\text{port}} / \underbrace{\text{~janastas/index.html}}_{\text{file}} \underbrace{\text{#1}}_{\text{reference}}$$

```java
import java.net.*; import java.io.*;

public class ParseURL {

  public static void main(String[] args) throws Exception {
    URL aURL = new URL("http://cs.senecac.on.ca:80/~janastas/index.html#1");
    System.out.println("protocol = " + aURL.getProtocol());
    System.out.println("host = " + aURL.getHost());
    System.out.println("filename = " + aURL.getFile());
    System.out.println("port = " + aURL.getPort());
    System.out.println("ref = " + aURL.getRef());
  }
}
```

Read URL Content

```java
import java.net.*;
import java.io.*;
public class ReadSites {

    public static void main(String[] args) {

        for (int i = 0; i < args.length; i++) {
            try {
                URL u = new URL(args[i]);
                InputStream is = u.openStream();
                InputStreamReader isr = new InputStreamReader(is);
                BufferedReader br = new BufferedReader(isr);
                String s;
                while ((s = br.readLine()) != null) {
                    System.out.println(s);
                }
            } catch (MalformedURLException e) {
                System.err.println(e);
            } catch (IOException e) {
                System.err.println(e);
            }
        }
    }
}
```

Conclusion

After completion of this lesson you should know:

- How to write Java Programs using `java.net.*`
- Networking solution using Java packages.
- Client Server Paradigm.
- Socket, ServerSocket and URL Classes.