

# Lesson 1

## Key-Terms Meanings: Web Connectivity of Devices and Devices Network

# Application

- **Application**: A software (S/W) for an application, such as, creating and sending an SMS, measuring and sending the measured data, receiving message from specified sender
- **App**: Short abbreviation for *Application* S/W in mobiles or devices

# Application Programming Interface (API)

- API: Software (S/W) component which receives messages from one end and send those to other end that execute an *Application*

# Application Programming Interface (API)

- Example: an API consisting of GUI (Button, Check Box, Text Box, Dialog Box) for input(s) and send command(s) to other end S/W for running the *Application* for graphics

# Web Service

- A service using the web protocols, web objects or webSockets
- For examples: weather-reports communication service,
- traffic-density reports communication service,
- streetlights monitoring and controlling service

# Resource

- One that can be read, written or executed.
- A path specification also a resource
- The resource is atomic (not further divisible) information which is usable during computations, for example, temperature
- A resource may have multiple instances or just a single instance

# Resource Directory

- Resource Directory (RD) maintains information and values for each resource-type.
- A resource of a resource-type accessed from an RD using a *URI* for that resource.

# Object

- A collection of resources, for example, collection of *data* and *methods* (also called *functions*; *procedures*) to operate on that data.
- Example: Time\_Date object with second, minutes, hour, day, month, and year *fields* and update methods (field means a memory address for the value)



# Object instance

- Can be just one for an object which is instance of a Class as in Java An example of object instance is weather report object for reporting the rains.

# Multiple Object instances

- **Java** uses concept of **class**
- **Class** creates one or more object-instances
- **JavaScript** creates multiple object instances from an object itself

# Communication Gateway

- Functions as communication protocol translator (converter) for provisioning the communication capabilities between two networks
- For example, ZigBee IP for communication between ZigBee and IP network

# Client

- A Software object (or an API associated with that) makes request for the data, messages, objects or resources
- A client can have one or more object instances.

# Client

- May be an API or APIs for enabling the communication to a server
- Can be at a device or *Application* on a network or Internet connected web, enterprise or cloud.

# Server

- Software which send the responses on the requests
- Sends messages, alerts or notifications
- Serve the accesses to resources, databases and objects on client's request or subscriptions

# Server

- Server can be on a device or can be on separate computer system not necessarily on Internet connected web, enterprise or cloud

# Header

- A protocol adds header word(s) when sending data to next layer or step
- Each header has fields.
- Each field is a set of bits which the receiver object interprets
- Header word and fields depend on the protocol used for sending data stack to receiver



# Web object

- One that retrieves a resource from the web object at other end using a web protocol

# URI (Universal Resource Identifier)

- Used for retrieving saved resources, such as Contacts or address book
- An URI example:  
/Contacts/First\_Character\_R/ for a set a resource directory **Contacts** having resource repository **First\_Character\_R** for the contacts with first character R

# Example of URI

- `sensorNetwork_J/sensorID_N/temperature` for a temperature value
- The value is at a resource directory `sensorNetwork_J` for a sensor network
- Identifies the stored sensors data for a sensor of the id `sensorID_N`.

# URL

- Generally used for resources retrieval at a client from the saved resources at a remote server on Internet
- Example: <http://www.mhhe.com/> for a set of resource directories, resource repositories and resources

# Datagram

- Limited size data ( $2^{16}$  Byte) used for stateless and connectionless transfer from a web object
- Stateless means each single data transfer which is independent of previous data interchanges

# Connectionless

- Means no connection establishment prior to resource exchanges between the web objects
- No connection closure for the resource exchanges after the datagram transfer ends

# Representational State Transfer (REST)

- A software architecture with following characteristics; an architecture used during design of software components
- Uses the identifiers for the resources and methods
- Specifies the access-methods and data transfer methods during interactions

# REST

- Specifies the practices, constraints, characteristics and guidelines
- Used for Creation of the scalable web services
- Scalable means can be used as per the size



# RESTful

- Means one which follows REST constraints and characteristics

# Hypertext

- Text embedded with hyperlinks
- The link embeds along with text
- **Hyperlink** means a specification of a URL for the resource path so that a link establishes between two objects.
- .

# Example of hyperlink

- For example, hyperlink for a book is through a URL which is <http://www.mhhe.com/rajkamal/iot>

# Resource Retrieval using Hyperlink

- Retrieval of a resource at a web object by the other object can be, for example, on the click at a link shown on a displayed text on browser

# HTML

- **HyperText Markup Language** which enables designing of a web page for storing at a server
- The page retrieves using usage of an URL at a Client.

# **XML**

- **Extensible markup language which enables sending and receiving messages, commands, query responses, queries, form using a set of new tags, each with new data type definitions than the standard ones at HTML**

# ROLL

- Routes Over the Low power and Lossy Network
- Routing: Transmission through a specified route
- Low Power: For example, wireless communication
- Lossy network means frequent disconnections can occur

# Summary

We learnt

- Application
- Client
- Server
- URI and URL
- XML
- Resource



# Summary

We learnt

- Datagram
- Rest and RESTful
- Hypertext, Hyperlink
- XML

End of Lesson 1 on  
Key-Terms Meanings:  
Web Connectivity of Devices and  
Devices Network