**Web Systems and Technology Notes**

23 January 2017

* **Internet**
  + global information system
  + Communication Standards
    - Internet Protocol(IP)
      * A set of rules governing the format of data sent over the internet or other networks
    - TCP/IP
      * A basic communication language or protocol of the internet
  + Internet Service Provider(ISP)
    - An organization that provides service for accessing or using the internet.
* Internetwork
  + Inter – nodes
  + Nodes – interconnection
  + Interconnection(wired or wireless) – protocols
  + Protocols – standard way of representing data
* IP Address – given to a node (device).

**HISTORY**

* **1960**
  + Packet-switches(store and form)
    - An approach used by some computer network protocols to deliver data across local or long distance connection.
* **1969**
  + Birth of the internet
  + ARPANET (Advanced Research Projects Agency Network)
    - a network for sharing digital resources among geographically separated computers
  + DARPA (Defense Advanced Research Projects Agency)
    - An agency of the U.S. Department of Defense responsible for the development of emerging technologies for use by the military.
* **1972** 
  + **E-mail**
    - scripted application base
* **1989**
  + **World Wide Web(www)** 
    - Found by Tim Berners-Lee at CERN
      * Semantic Web
        + W3C’s vision of the Web of linked data. Semantic Web technologies enable people to create data stores on the Web, build vocabularies, and write rules for handling data. Linked data are empowered by technologies such as RDF, SPARQL, OWL, and SKOS.
      * **HTTP, HTML, URL, Web Server, Web Client**
        + Foundation of the World Wide Web
* **Web server 🡪 API call**
  + Sole purpose to serve the web
  + URL 🡪 IP
    - Eg. https:// s1.org/index.html
      * Addressing
* **Web Client**
  + browsers

**OTHER NOTES:**

* **Internet of Things(IoT)**
  + “The IoT links objects to the Internet, enabling data and insights never available before.” (Cisco)
  + “Is accelerating the digital world at a pace the industry has never seen. Businesses are faced with the ever increasing number of smart things interacting with their line of business (LOB) operations in a manner that was never fully realized” (Oberon)
* **Network Transciever**
  + Connects network nodes
  + Sends and receives analog or digital signals
* **Circuit switch network**
  + “ Circuit-switched is a type of network in which a physical path is obtained for and dedicated to a single connection between two end-points in the network for the duration of the connection.” (Rouse)
* **Wais (Wide Area Information Servers)**
* “An Internet system in which specialized subject databases are created at multiple server locations, kept track of by a directory of servers at one location, and made accessible for searching by users with WAIS client programs.” (Rouse)
* **GOPHER**
  + Hierarchy of information
  + “Gopher was an Internet application in which hierarchically-organized text files could be brought from servers all over the world to a viewer on your computer.” (Rouse)
* **UsNet**
  + “connects credit unions with thousands of national and international locations to give your members the convenience they want, flexibility they need and the service they deserve, no matter their location.” (UsNet)
* **FTP (File Transfer Protocol)**
  + “A protocol used for transferring files over the internet.” (Rouse)

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* **HTTP**
  + Tim Berners-Lee
  + W3C, IETF
  + **Versions:**
    - HTTP 0.9 (1991)
    - HTTP 1.0 (RFC 1945, May 1996)
    - HTTP 1.1 (RFC 2068, RFC 2616, RFC 7230-7235)
    - HTTP 2.0 (RFC 7560)
      * Backwards Compatible with HTTP 1.1
  + HTTP runs on top of TCP/IP, using TCP port 80 by default, or TCP port 443 for HTTPS (HTTP over SSL/TLS).
  + HTTP is based on a client-server architecture
    - Client – user-agents (eg. Browsers, web crawlers/spiders, other end user tools and applications)
  + HTTP is plain Text
  + HTTPS is encrypted
  + HTTP uses a request response standard protocol
    - The client sends an HTTP request message to the server
    - The server processes the request and replies with an HTTP response message
  + HTTP is a stateless communications protocol
    - Servers do not keep information about the clients in between requests
  + HTTP provides support for other functionalities, such as:
    - Cache control
    - Content media type (MIME) specification
    - Language and character set specification
    - Content/transfer encodings
    - Content negotiation
    - Client-server protocol negotiation
    - Persistent connections
    - Request Pipelining
    - Authentication/authorization

**OTHER NOTES:**

* **Network Socket:**
  + **IP Address and Port #**
* **Severs**
  + Origin server
  + Proxy Server
* **Tunnels**
  + Encryption of HTTP in HTTPS
* **IANA**
  + “The global coordination of the DNS Root, IP addressing, and other Internet protocol resources is performed as the Internet Assigned Numbers Authority (IANA) functions.” (iana)
* **ICANN**
  + “coordinates the Internet Assigned Numbers Authority (IANA) functions, which are key technical services critical to the continued operations of the Internet's underlying address book, the Domain Name System (DNS).” (ICANN)
* **Pull Protocol**
  + “The client periodically connects to the server.” (Gheysari)
* **Push Protocol**
  + “The client opens a connection to the server and keeps it alive.” (Gheysari)

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2 February 2017

* **Persistent Connection**
  + Multiple file-transfer and open connection
* **Request Pipelining** 
  + Request one-after another
* **HTTP Resource Addressing**
  + HTTP are identified using URIs (RFC 3986), or more specifically HTTP (URLs)
    - Eg http://usr:pwd@server.org:81/info/profile.php?id=1234#adr

WHERE http:// is the scheme

usr:pwd@server.org:81 is the authority

/info.profile.php is the path

And ?id=1234#adr is the query

NOTE: [file:///](NULL) or [ftp:///](NULL) is also a scheme

* + **HOST**
    - Domain name (resolved to an IP address using DNS) of the server where the resource resides (or will be created)
  + **Path to resource (resolved to an IP address using DNS)**
    - May refer to a static or dynamic resource
  + **Query**
    - Typically provided as key=value pairs, with ampersand (&) separators between key/value pairs
    - May be URL-encoded
  + **Fragment-identifier**
    - Used on the client side

**OTHER NOTES:**

* **HTTP 2**
  + The server has the ability to request files usually needed