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Application layer

An **application layer** is an abstraction layer that specifies the shared communication protocols and interface methods used by hosts in a communications network.[1] An *application layer* abstraction is specified in both the Internet Protocol Suite (TCP/IP) and the OSI model.[2] Although both models use the same term for their respective highest-level layer, the detailed definitions and purposes are different.[3]

Internet protocol suite

In the Internet protocol suite, the application layer contains the communications protocols and interface methods used in process-to-process communications across an Internet Protocol (IP) computer network.[4] The application layer only standardizes communication and depends upon the underlying transport layer protocols to establish host-to-host data transfer channels and manage the data exchange in a client–server or peer-to-peer networking model.[5] Though the TCP/IP application layer does not describe specific rules or data formats that applications must consider when communicating, the original specification (in RFC 1123 (https://datatracker.ietf.org/doc/html/rfc1123)) does rely on and recommend the robustness principle for application design.[6][7]

OSI model

In the OSI model, the definition of the application layer is narrower in scope.[9] The OSI model defines the application layer as only the interface responsible for communicating with host-based and user-facing applications.[10] OSI then explicitly distinguishes the functionality of two additional layers, the session layer and presentation layer, as separate levels below the application layer and above the transport layer. OSI specifies a strict modular separation of functionality at these layers and provides protocol implementations for each. In contrast, the Internet Protocol Suite compiles these functions into a single layer.[10]

Sublayers

Originally the OSI model consisted of two kinds of application layer services with their related protocols.[11] These two sublayers are the common application service element (CASE) and specific application service element (SASE).[12] Generally, an application layer protocol is realized by the use of the functionality of a number of application service elements.[13] Some application service elements invoke different procedures based on the version of the session service available.[14]

CASE

The common application service element sublayer provides services for the application layer and request services from the session layer. It provides support for common application services, such as:

- ACSE (Association Control Service Element)[12]
- ROSE (Remote Operation Service Element)
- CCR (Commitment Concurrency and Recovery)
- RTSE (Reliable Transfer Service Element)

SASE

The specific application service element sublayer provides application-specific services (protocols), such as:

- FTAM (File Transfer, Access and Manager)
- VT (Virtual Terminal)
- MOTIS (Message Oriented Text Interchange Standard)
- CMIP (Common Management Information Protocol)
- JTM (Job Transfer and Manipulation)[15]
- MMS (Manufacturing Messaging Specification)
- RDA (Remote Database Access)
- DTP (Distributed Transaction Processing)

Internet Relay Chat (**IRC**) is a text-based chat system for instant messaging. IRC is designed for group communication in discussion forums, called *channels*, but also allows one-on-one communication via

Protocols

The IETF definition document for the application layer in the Internet Protocol Suite is RFC 1123. It provid the major aspects of the functionality of the early Internet:[6]

- Hypertext documents: Hypertext Transfer Protocol (HTTP)
- Remote login to hosts: Telnet, Secure Shell
- File transfer: File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP)
- Electronic mail transport: Simple Mail Transfer Protocol (SMTP)
- Networking support: Domain Name System (DNS)
- Host initialization: BOOTP
- Remote host management: Simple Network Management Protocol (SNMP), Common Management Information Protocol over TCP (CMOT)

Examples

Additional notable application-layer protocols include the following: