File Transfer Protocol Access and Management: A Review and Its Related Services

Meena Rao
Department of Electronic & Communication Engineering
Maharaja Surajmal Institute of Technology, C-4, Janakpuri, New Delhi 110058

Abstract— In this paper different aspects of File Transfer Access and Management (FTAM) using ISO 8571 for facilitating interconnection of computer systems. ISO 8571 defines a file service and specifies a file protocol available within the application layer of the Reference Model. It is concerned with identifiable bodies of information, which can be treated as files, and may be stored within open systems or passed between application processes. ISO 8571 basically defines a file service and provides support for file transfer and also gives a framework for file access and management. Here, file transfer access management, its allied services as well as establishment of reliable communication between different systems are discussed.
Key words: FTAM, Services, ISO 8571

I. INTRODUCTION

File Transfer Access and Management (FTAM) control involves different activities like transferring of the file from client to server, server to client and client-to-client. The file transfer can be achieved in two environments: Homogeneous as well as heterogeneous. In heterogeneous environment the concept of virtual file store is used. For heterogeneous environment the virtual file store concept is used.

Computer network usage may be divided into two broad categories – direct and indirect. Direct usage implies that the network user is logged into a remote host and uses it as a local user. The network user interacts with the remote system via a terminal (teletypewriter, graphics console) or a computer. The terminal characteristic differences are handled by host system programs, in accordance with standard protocols (such as TELNET for teletypewriter communications. On the other indirect usage does not require that the user explicitly logs into a remote system or even know how to "use" the remote system. An intermediate process makes most of the differences in commands and conventions invisible to the user.

Indirect use is not limited to file transfers. It may include execution of programs in remote hosts and the transfer of core images. The extended file transfer protocol would facilitate the exchange of programs and data between computers, the use of storage and file handling capabilities of other computers (possibly including the trillion-bit store data computer), and have programs in remote hosts operate on your input and return an output.

II. FTAM: GENERAL ASPECTS AND SERVICES

ISO 8571 is one of a set of International Standards introduced to facilitate the interconnection of computer systems [1]. The aim of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of computer systems: from different manufacturers, under different managements, of different levels of complexity, of different ages.

ISO 8571 defines a basic file service. It provides sufficient facilities to support file transfer, and establishes a framework for file access and file management [2]. ISO 8571 does not specify the interfaces to a file transfer or access facility within the local system.

FTAM protocol is used to transfer (copy); access (read, write, or modify); and manage (control) files. Files are stored differently in different systems. In a UNIX environment, a file is a sequence of characters (bytes). In an IBM VMS environment, on the other hand, a file is a collection of records. The organization of a file is a sequence of characters (bytes). The organization of a file depends on the operating system of the host.

FTAM is based on asymmetrical access of a virtual file. By asymmetrical, we mean that each transaction requires an initiator and a responder. The initiator requests the transfer of, access to, or management of a file from the responder. The responder creates a virtual file model of its actual file and allows the initiator to use the virtual model rather than the real file. Because the model is software, it can be designed to be independent of hardware and operating system constraints. The model also creates a secure separation between the file to which the initiator is allowed access and others in the same real storage.

A. Command Processing

File Transfer Protocol (FTP) uses the control connection to establish a communication between the client control process and the server control process. During this communication, the commands are sent from the client to the server and the responses are sent back from the server to the client

B. File Transfer

File Transfer occurs over the data connection under the control of the commands sent over the control connection [3][4]. File transfer in FTP means one of the three things:

1) A file is to be copied from the server to the client. This is called retrieving a file. It is done under the supervision of the RETR command.
2) A file is to be copied from the client to the server. This is called storing a file. It is done under the supervision of the STOR command.
3) A list of directory or file names is to be sent from the server to the client. This is done under the supervision of the LIST command. FTP treats a list of directory or file names as file.

III. NATURE OF FILE SERVICES

For any file transfer or access, there are three activities involved: an entity, which takes the controlling initiative, an entity, which accesses the source virtual file and an entity, which accesses the destination virtual file.

From the controller, there are two flows of information: Information, concerned with the specification of the source virtual file and with constraints on the way the transfer is to be performed, sent to the entity accessing the source file, and information, concerned with the specification of the destination virtual file and with constraints on the way transfer is to be performed, sent to the entity accessing the destination file.

A. Asymmetry of Dialogue

The actions to be supported by the file protocol show some important asymmetries, which are reflected in the service Firstly, each activity is started by one file service user, the initiator, which has some established aim to achieve. The entity associated with the file store, which is the responder, merely reacts to this initiative in a passive role. The second asymmetry is the more basic one that, when transferring file access data units, one particular entity is the sender, and the other is the receiver; at any instant during data transfer there is a preferred direction of data flow.

B. External File Service and Internal File Service

In **external file service,** the user states its quality of service requirements, but has no awareness of error recovery, delegating such considerations to the service provider. Transfer of file data is modeled in the external file service as a series of error-free operations. The file error recovery protocol machine uses an **internal file service**. This service includes primitives giving its users facilities for error recovery and control of the checkpoint mechanisms.

C. Service Classes and Functional Units

Different service classes are defined by FTAM, each of which supports broad categories of use. The transfer class, which allows for the movement of files or parts of files between systems. The management class, which allows control of the virtual filestore by a series of independent confirmed service exchanges, but does not include file transfer mechanisms. The transfer and management class, which combines the features of the transfer class and the management class [5]. The access class, which allows the initiating entity to perform a sequence of operations on the file access data units, providing for the manipulation of remote data. The unconstrained class, which leaves the selection of functional units to the designer of the distributed application.

IV. Access control

The access control mechanisms are based on the concept of an access control list. Each of the entries in the list gives a set of actions and concurrency constraints, and a set of tests which an initiator needs to satisfy before these filestore actions can be performed. The actions are allowed if the conditions given by any one of the entries in the list are satisfied.

A. Asymmetry of Dialogue

The concurrency control of actions on the file is at a finer level than a simple yes or no; a finer level of access control reflects this.

An initiator may wish to perform an action while sharing the file with other accessors, or it may require exclusive access. The initiator may even request that no other entity is allowed to perform an action which it is not itself authorized to perform. This is supported by the access control file attribute, which records the ability to exercise each of the concurrency control options separately for each action.

V. Service providers supporting FTAM

A. Presentation Service

The Presentation service manages the representation of information meaningful to the application entities. Considering all the elements involved in the representation of information communicated, three representations are identified. Firstly, there is a transfer syntax, which has a representation of the information communicated between the open systems, and then for each real system there are representation s of the information used within that system. All three representations of the information represent a single common abstract syntax, corresponding for an established presentation context.

B. Session Service

The Session Service provides means of structuring the communication dialogue, which are passed on to the application entities by the presentation entities. The Presentation Service can provide by means of the underlying Session Service, synchronization point insertion and resynchronization services to support file check pointing and recovery.

These services allow the insertion of checkpoints into the flow of file user data; the purging of the session connection after an error and the resynchronization of the session synchronization point mechanisms before the data transfer is resumed.

VI. Conclusion

In this paper, FTAM as well its various services are discussed. Moreover, ISO 8571 and how it defines a basic file service is analyzed. Access control mechanism is also discussed with focus on asymmetry of dialogue. Finally, the various services that support FTAM are discussed.

References

[1] Information Processing Systems-Open Systems Interconnection-File Transfer, Access and Management-ISO 8571, Part 1,1st Edition.
[2] Information Processing Systems-Open Systems Interconnection-File Transfer, Access and Management-ISO 8571, Part 2,1st Edition.
[3] Ciampa M., "Guide to Wireless Communication", Thomson Course Technology, 2nd Edition, 2003.
[4] Yang C., Kui W., Xuhui W., "Research and Implementation of FTAM File Transfer System", Wuhan University Journal of Natural Sciences", Vol. 2, Issue 2, 1997.
[5] Stokes A.V., "Communication Standards: State of the Art Report 14:3", e-book, 2014.

