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Secure Model for P2P File-Sharing System.

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ABSTRACT

A Peer-to-Peer computer network is one in which each computer in the network can act as a client or server for the other computers in the network, allowing shared access to various resources such as files, peripherals, and sensors without the need for a central server. Trust is required in file sharing peer-to-peer systems to achieve better cooperation among peers and reduce malicious uploads. File sharing refers to the providing and receiving of file over the network. A central server that operates a centralized data repository search engine within a peer to peer network performs authentication and authorization operation with respect to users who accesses the service. Trust mechanism and access control technology will be utilize in this work for P2P file sharing system and enhance the secure with respect to the existing one.

Keywords: P2P, HTTP, TCP, Network

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INTRODUCTION

Peer-to-Peer (P2P) technology has been widely subjected to the fields of real-time streaming media communication and sharing. P2P have gained more attention in recent years [1]. Millions of people illegally they can share the respective files over P2P networks [2]. In few decades ago, most of the college students are having shared their files through unauthorized way which is one of the major concerns for the software and entertainment industries [3]. In spite of this, Peer-to-Peer has received special attention since 2000's when the mobile and internet technology have been growing among young people. Nowadays, mobile and wireless networks have been developed significantly and there has been considerable academic interest and attention in understanding of smart phone. The application of P2P has gained interest on both industrial and academic communities [4]. Owing to the user ethical consideration and motivation, P2P gains much attention among academician. The mobile phone holders can share their various types of files via the medium of wireless technology. Ten thousand numbers of consumers are continuously trading digitalized content sharing files over P2P networks. The content of trading files including audio files, music, images, TV shows, movies, software and other documents [5]. Digital data can easily copied and replicated which may leads to revenue loss for the content of producer or owner [6].

Peer-to-Peer networks users can share their files has in the form of software, movies, image and music, with another user of the network. P2P file sharing exist when computer networks are utilized to transmit and share private or public files through the internet with single or more mobile phone or computer users [3]. P2P can also be referred to consumer-to-consumer exchange [7]. From the literature survey, P2P infers that the user has various digital media files which can be share with others. Li etal [4] proposed P2P system is the method of self-organizing distributed system in which the information can stored and highly distributed by individual peers [8]. Chavan et al. [9] explained that the P2P can be visible as an alternative to the server-client distribution model. This kind of system motivates sharing files containing data or resources via direct exchanges among peers. The behaviors of duplication, virtually costless search and swapping of digital data over the internet allowed by P2P networks are mutually shared among college students. These behaviors are referred as free rider problem [2].

Peer-to-Peer data sharing over smartphone has become a significant application owing to the fast growing number of smartphone devices [1]. In the present work, the P2P data sharing over networks gives mutual anonymity for both the trust host and the trust querying peer. The motivation behind this work is to provide secure, reliable and accountable distribution and access of ratings of peers.

SOFTWARE AND LANGUAGE DESCRIPTION

Tools: network simulator version-2
Os: Linux
Front End: TCL (Tool Command Language)
Back End: c++

SOFTWARE FEATURES

1. Cheap does not require costly equipment
2. Complex scenarios can be easily tested
3. Results can be quickly obtained – more ideas can be tested in a smaller timeframe
4. The real thing isn't yet available
5. Controlled experimental conditions
   – Repeatability helps aid debugging
6. **Disadvantages**: Real systems too complex to model

NS FEATURES

- NS is an object oriented discrete event simulator
  – Simulator maintains list of events and executes one event after another
  – Single thread of control: no locking or race conditions
- Back end is C++ event scheduler

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– Protocols mostly
– Fast to run, more control

- Front end is oTCL
  – Creating scenarios, extensions to C++ protocols
  – fast to write and change

NS PROGRAMMING STRUCTURE

- Create the event scheduler
- Turn on tracing
- Create network topology
- Create transport connections
- Generate traffic
- Insert errors

EVENT SCHEDULAR

In this Event scheduler while we processing many datas at a time it will process one by one (i.e)FIFO concept , so there is no congestion while transfering the packets.

PACKETS

It is the collection of data, whether header is called or not all header files where present in the stack registers as shown in Table 1.

Table 1: Stack Register

Cmn header
Ip header
Tcp header
Rtp header
Trace header

TURN ON TRACING

Trace packets on individual link Tracefile format as shown in Figure 1.

event	time	from node	to node	pkt type	pkt size	flags	fid	src addr	dst addr	seq num	pkt id

```
r : receive (at to_node)
+ : enqueue (at queue)              src_addr : node.port (3.0)
- : dequeue (at queue)              dst_addr : node.port (0.0)
d : drop    (at queue)

        r 1.3556 3 2 ack 40 ------- 1 3.0 0.0 15 201
        + 1.3556 2 0 ack 40 ------- 1 3.0 0.0 15 201
        - 1.3556 2 0 ack 40 ------- 1 3.0 0.0 15 201
        r 1.35576 0 2 tcp 1000 ------- 1 0.0 3.0 29 199
        + 1.35576 2 3 tcp 1000 ------- 1 0.0 3.0 29 199
        d 1.35576 2 3 tcp 1000 ------- 1 0.0 3.0 29 199
        + 1.356 1 2 cbr 1000 ------- 2 1.0 3.1 157 207
        - 1.356 1 2 cbr 1000 ------- 2 1.0 3.1 157 207
```

Figure 1: Trace packets on individual link Trace file format

CREATE NETWORK TOPOLOGY(PHYSICAL LAYER)

The Physical Layer is the first and lowest layer in the seven-layer OSI model of computer networking. The implementation of this layer is often termed PHY. The Physical Layer consists of the basic hardware transmission technologies of a network. It is a fundamental layer underlying the logical data structures of the higher level functions in a network. Due to the plethora of available hardware technologies with widely varying characteristics, this is perhaps the most complex layer in the OSI architecture. The Physical Layer defines the means of transmitting raw bits rather than logical data packets over a physical link connecting networking nodes. The bit stream may be grouped into code words or symbols and converted to a physical that is transmitted over hardware.

TRANSPORT CONNECTION (TRANSPORT LAYER)

Transport layers are contained in both the TCP/IP. Which is the foundation of the INTERNET and the OSI model of general networking. The definitions of the Transport Layer are slightly different in these two models. This article primarily refers to the TCP/IP model, in which TCP is largely for a convenient application programming interface to internet hosts, as opposed to the osi model of definition interface. The most well-known transport protocol is the (TCP). It lent its name to the title of the Entire internet protocol suite TCP/IP. It is used for connection-oriented transmissions, whereas the connectionless user data gran suite (UDP) is used for simpler messaging transmissions. TCP is the more complex protocol, due to its state full design incorporating reliable transmission and data stream services.

GENERATE TRAFFIC (APPLICATION LAYER)

In TCP/IP, the Application Layer contains all protocols and methods that fall into the realm of process-to-process communications via an Internet Protocol (IP) network using the Transport layer protocols to establish underlying host-to-host connections. In the OSI model, the definition of its Application Layer is narrower in scope, explicitly distinguishing additional functionality above the Transport Layer at two additional levels: session layer and presentation layer OSI specifies strict modular separation of functionality at these layers and provides protocol for each layer.

INSERT ERRORS

Start debugging of errors.

SYSTEM DESIGN AND DEVELOPMENT

FACT FINDING

Fact Finding is the methods of gathering the information required about the existing system. Some of them are as follows. Observation of the current work situation will provide clues to problems and atmosphere. Record searching, special purpose records and sampling will give quantitative information about the system which facilitates sizing of the proposed system and may also point the areas of difficulties which are being experienced. Questionnaires can be used to collect the quantifiable data about the system. All of the techniques need to be supplemented by more detailed discussion of the interview situation. The identification of the user requirements, decision areas, objectives and responsibilities for certain procedures can only be achieved for interviewing. Based on the above fact finding techniques, it is observed the current situation of the existing system. It is very helpful to finding the areas of difficulties, which are being experienced in the existing system. Thus it helps to develop the proposed system with the quantifiable data.

INPUT DESIGN

Input Design is part of overall system design, which requires very careful attention. If the data going into the system is incorrect then the processing and output will magnify these errors.

The inputs in the system are of three types:

- External : which are prime inputs for the system
- Internal : which are user communication with the system
- Interactive : which are inputs entered during a dialog with the computer

The above input types enrich the proposed system with numerous facilities that make it more advantageous in comparison with the exiting normal system. All the inputs entered are completely raw, initially, before being entered into a database, each of them available processing. The input format in this system has been designed with the following objectives in mind.

FEASIBILITY ANALYSIS

All projects are feasible, given unlimited resources and infinite time. Before going further in to the steps of software development, the system analyst has to analyze whether the proposed system will be feasible for the organization and must identify the customer needs. The main purpose of feasibility study is to determine whether the problem is worth solving. The success of a system is also lies in the amount of feasibility study done on it. Many feasibility studies have to be done on any system. But there are three main feasibility tests to be performed. They are

OPERATIONAL FEASIBILITY

During feasibility analysis operational feasibility study is a must. This is because; according to software engineering principles operational feasibility or in other words usability should be very high. A thorough analysis is done and found that the system is operational.

TECHNICAL FEASIBILITY

The system analyst to check the technical feasibility of the proposed system, taking account of the hardware it is used for the system development, data storage, processing and output, makes the technical feasibility assessment. The system analyst has to check whether the company or user who is implementing the system has enough resource available for the smooth running of the application. Actually the requirements for this application are very less and thus it is technically feasible.

ECONOMICAL FEASIBILITY

Before going further in to the development of the proposed system, the system analyst has to check the economic feasibility of the proposed system and the cost for running the system is composed with the cost benefit that can achieve by implementing the system. As in the case of Crypto Media development cost is not high, as it doesn't need any extra hardware and software. Thus the system is economically feasible.

System design is process of planning a new system to document or altogether replace the old system. The purpose of the design phase is to plan a solution for the problem. The phase is the first step in moving from the problem domain to the solution domain. The design of the system is the critical aspect that affects the quality of the software. System design is also called top-level design. The design phase translates the logical aspects of the system into physical aspects of the system.

PROPOSED MODULES

P2P reputation model

The reputation scores are intended to give a general idea of the peers' level of participation in the system. As a result, highly accurate reputation score computations are not necessary. However, since each peer stores its own reputation locally, for reputations to be reliable and effective, they have to be updated and stored securely to prevent malicious peers from thwarting the reputation system. An ideal solution will be light-weight, completely distributed, and compute trustworthy reputation scores.

In decentralized unstructured P2P networks like Gnutella, content retrieval involves a content search phase and a content download phase. To search for the desired content, a peer generates a query with

appropriate keywords and sends it to all the peers that it is directly connected to in the Gnutella overlay topology. The peers who process this query reply back if they have the content in their shared directory and forward the request to the peers they are directly connected to depending on the TTL (time-to-live) of the query. This forwarding continues until the TTL specified by the querying peer is exhausted. Once the querying peer receives all the replies, it selects a peer to download the content from. At that point, the content download typically uses a HTTP or a TCP connection.

Cooperation among peers is required during both content search and content download. The success of the search phase requires that the other peers be online, agree to search for the content from their shared directory, and forward the query further depending on the hop count of the query. The success of the download phase requires that the chosen peer be online and serve the content when requested. Some additional factors come into play to create an overall experience for the peers in such systems. For successful content retrieval, the type, quality, and quantity of the content each peer places in the shared directory play an important role. Further, the bandwidth at which the actual download occurs is also an important consideration. A high bandwidth querying peer is likely to have a better experience with the system if it downloads the content from another high bandwidth peer. The client-server model and P2P model has shown in Figure 2.

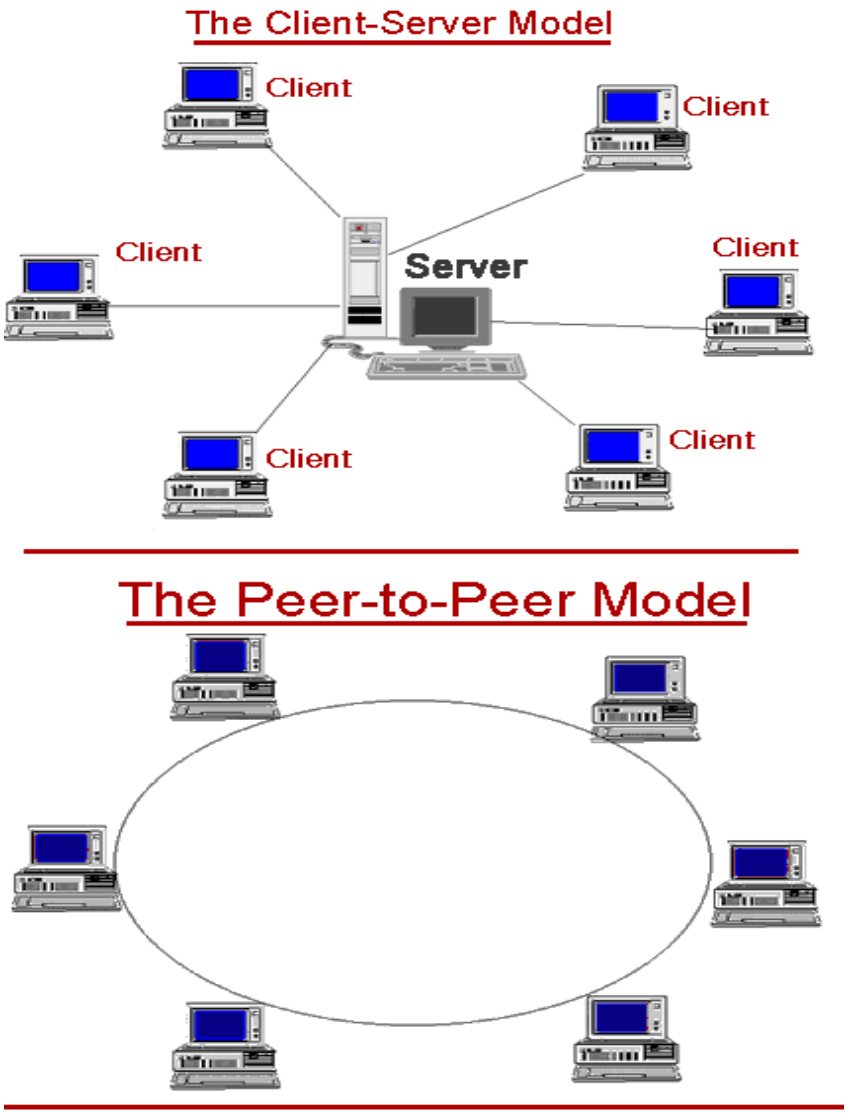

Figure 2: Client Server Model and Peer-to-Peer Model

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Peers who enroll can enhance their scores by being good citizens of the P2P network. They can also save their reputation scores across sessions. Thus, a cooperative peer can maintain benefits of its participation in the system in spite of being off-line for a while. In a perfect world, each peer's local software can update and store its reputation score. However, this simple mechanism could be thwarted by the peers by altering the score computations to their benefit or by tampering with the value of the stored counter as shown in Figure 3.

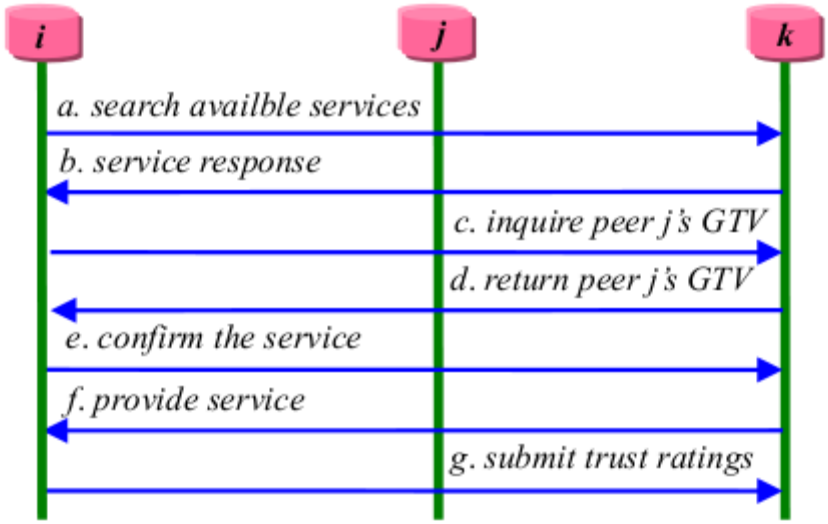

Figure 3: P2P network

Trusting peer

In this model we are introducing the method to accept the trust based peer selection. If the peer doesn't have sufficient score than other peer here we can select that peer to download the file by own trust

Evaluate peer

In this model each peer having the trust table, if any peer want to download the content from any peer then that peer can ask to all other peer about peer which wants to download from. Figure 4 and 5 represents the information query and reply comparison.

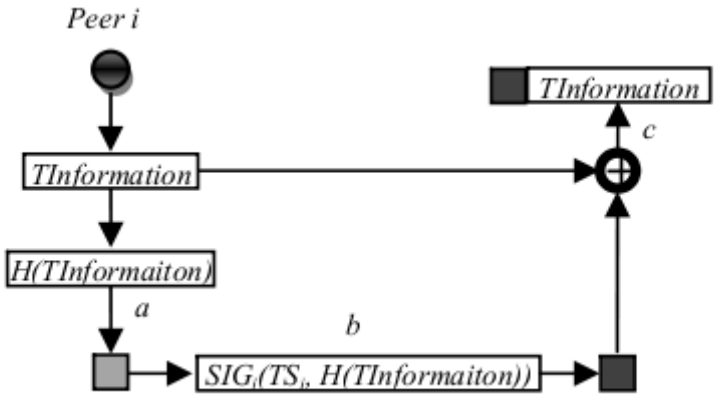

Figure 4: Information query

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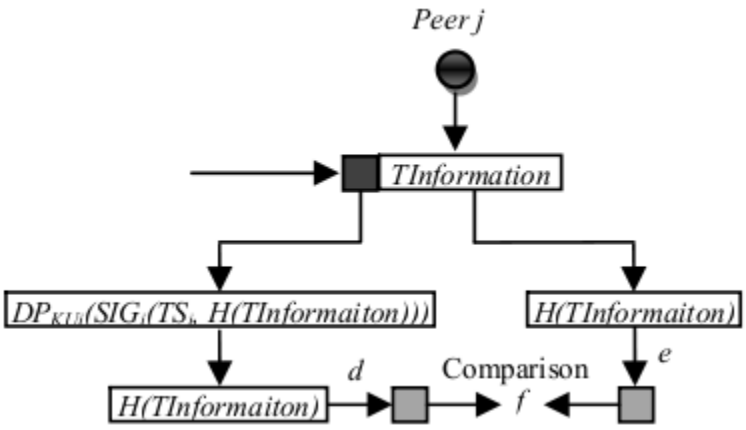

Figure 5: Reply comparison

SYSTEM TESTING

BLACK BOX TESTING

Black box testing also called behavioral testing focuses on the functional requirements of the software. That is black box testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing attempts to find errors in the following categories. Incorrect or missing functions, interface errors. Errors in data structures or external data base access Behavior or performance errors, initialization and termination errors

Functional Testing and black box type testing geared to functional requirements of an application. This type of testing should be done by testers. Our project does the functional testing of what input given and what output should be obtained. System Testing-black box type testing that is based on overall requirements specifications; covers all combined parts of a system. The system testing to be done here is that to check with all the peripherals used in the project.

Stress Testing-term often used interchangeably with 'load' and 'performance' testing. Also used to describe such tests as system functional testing while under unusually heavy loads, heavy repletion of certain actions or inputs, input of large numerical values.

Performance Testing-term often used interchangeably with 'stresses' and 'load' testing. Ideally 'performance' testing is defined in requirements documentation or QA or Test Plans.

WHITE BOX TESTING

White box testing sometimes called glass box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing methods, the software engineer can derive test cases that guarantee that all independent paths within a module have been exercised at least once. Exercise all logical decisions on their true and false sides. Execute all loops at their boundaries and within their operational bounds. Exercise internal data structures to ensure their validity.

UNIT TESTING

The most 'micro' scale of testing to test particular functions or code modules. Typically, it is done by the programmer and not by tester, as it requires detailed knowledge of the internal program design and code. Not always easily done unless the application has a well designed architecture with tight code; may require developing test modules or test harnesses.

QUALITY ASSURANCE

Software Quality Assurance involves the entire software development process-monitoring and improving the process, making sure that any agreed-upon standards and procedures are followed, and ensuring that problems are found and dealt with. It is oriented to 'prevention'.

SOFTWARE LIFE CYCLE

The life cycle begins when an application is first conceived and ends when it is no longer in use. It includes aspects such as initial concept, requirements analysis, functional design, internal design, documentation planning, test planning, coding, document preparation, integration, testing, maintenance, updates, retesting, phase-out, and other aspects.

VERIFICATION AND VALIDATION

Verification refers to the set of activities that ensure that software correctly implements a specific function. Validation refers to a different set of activities that ensures that the software has been built is traceable to customer requirements.

Verification and validation encompasses a wide array of SQA activities that include formal technical reviews, quality and configuration audits, performance monitoring, simulation, feasibility study, documentation review, database review, algorithm analysis, development testing, qualification testing and installation testing.

SYSTEM IMPLEMENTATION

System implementation is a stage in a stage in the project where the where the theoretical designs turned into working system. The most crucial stage the user confidence that the new system will work effectively and efficiently

The performance of reliability of the system was tested and it gained acceptance. The system was implemented successfully. Implementation is a process that means converting a new system into operation.

Proper implementation is essential to provide a reliable system to meet organization requirements. During the implementation stage a live demon was undertaken and made in front of end-users.

Implementation is a stage of project when the system design is turned into a working system. The stage consists of the following steps.

- Testing the developed program with sample data.
- Detection and correction of internal error.
- Testing the system to meet the user requirement.
- Feeding the real time data and retesting.
- Making necessary change as described by the user.

RESULT AND DISCUSSION

Intelligent output design will improve systems relationships with the user and help in decision making. Outputs are also used to provide a permanent hardcopy of the results for latter consultations. The most important reason, which tempts the user to go for a new system is the output. The output generated by the system is often regarded as the criterion for evaluating the usefulness for the system. Here the output requirements use to be predetermined before going to the actual system design.

The output design is based on the following:

- Determining the various outputs to be presented to the user.
- Differentiating between inputs to be displayed and those to be printed.
- The format for the presentation of the outputs.

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SIMULATION OUTPUT FOR PROPOSED P2P MODEL

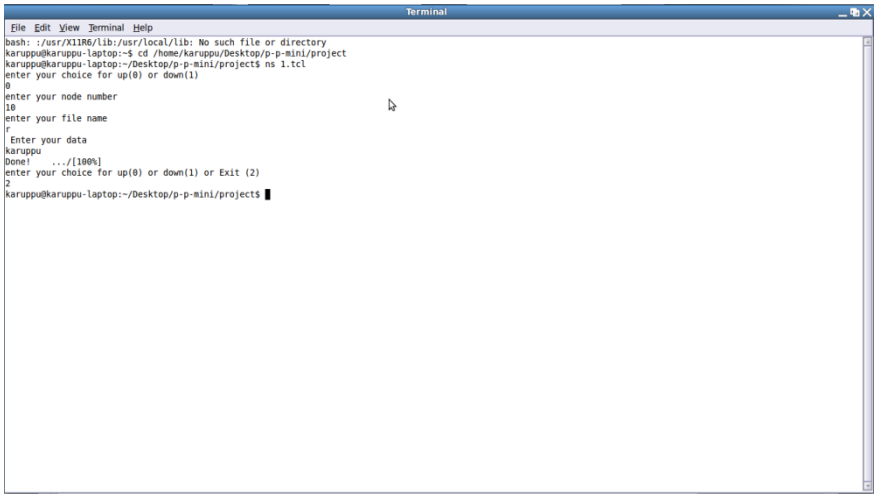

Figure 6: Uploading model

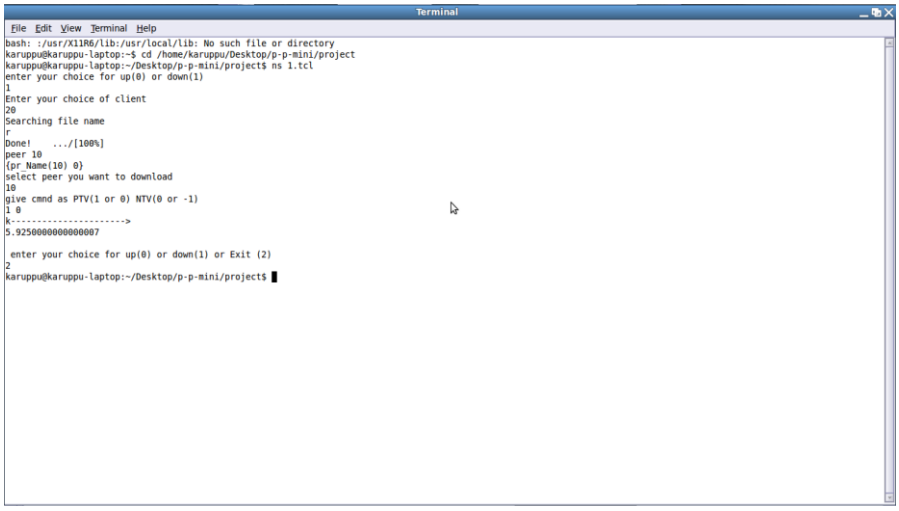

Figure 7: Downloading model

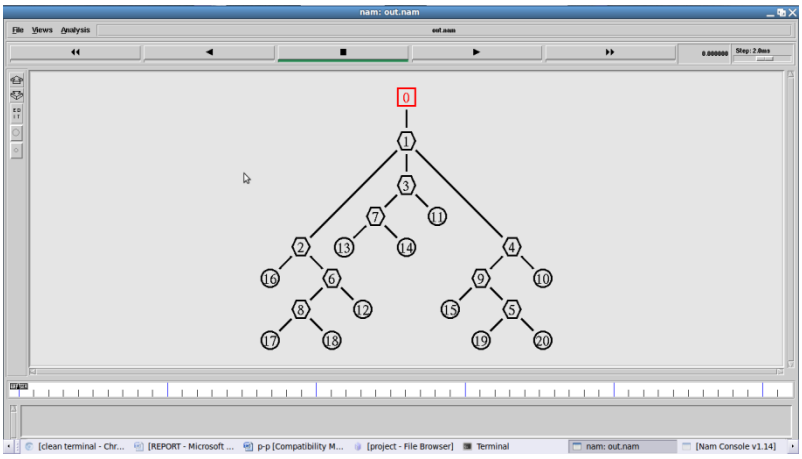

Figure 8: Network model

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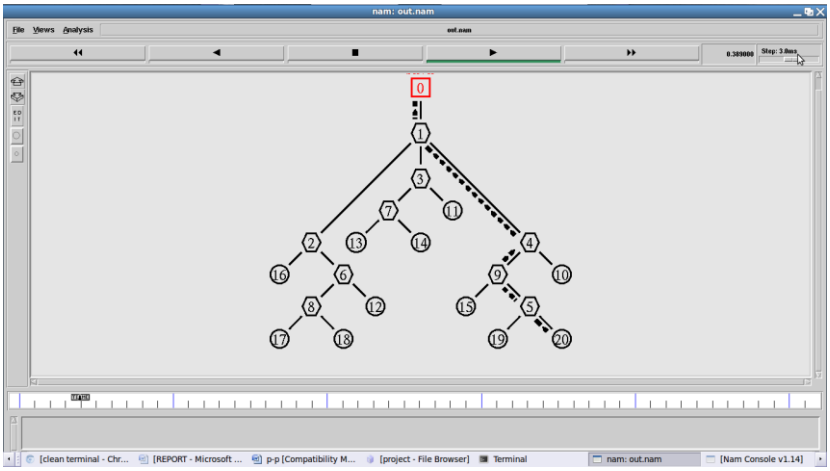

Figure 9: Request for file search

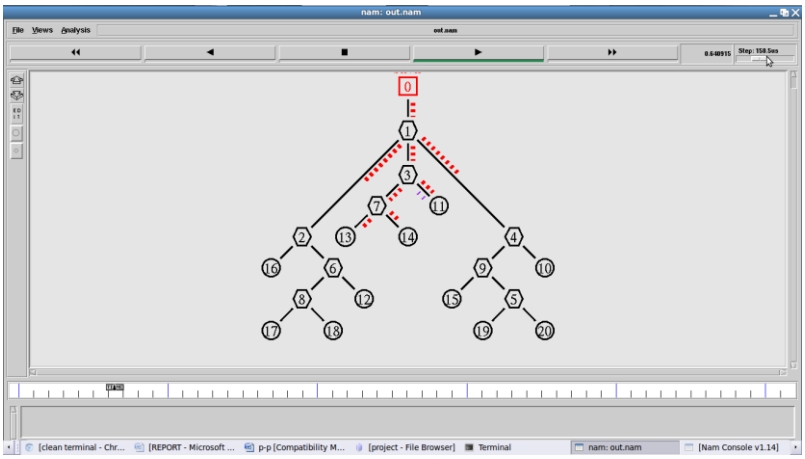

Figure 10: Service provider search the *file*

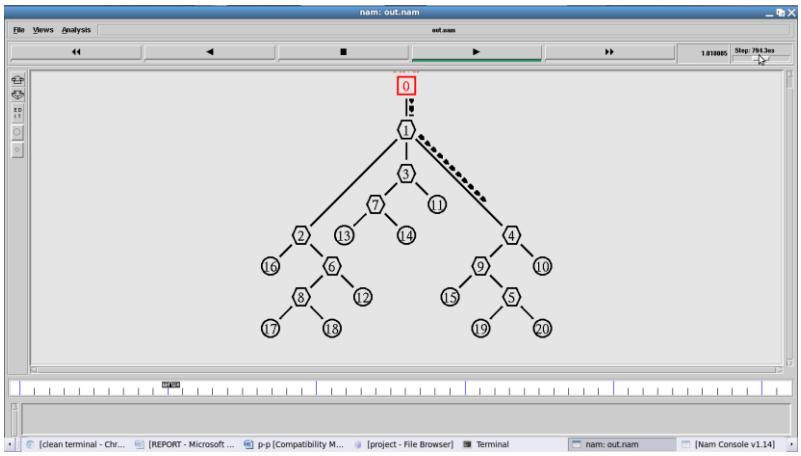

Figure 11: Reply back to source

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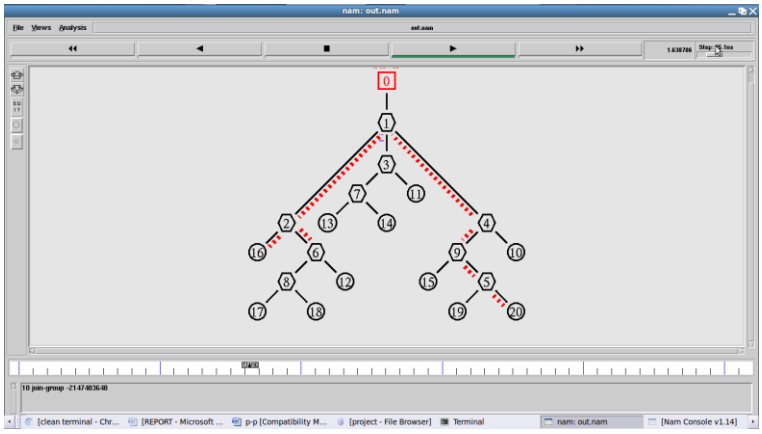

Figure 12: Source sending the request for peer reputation

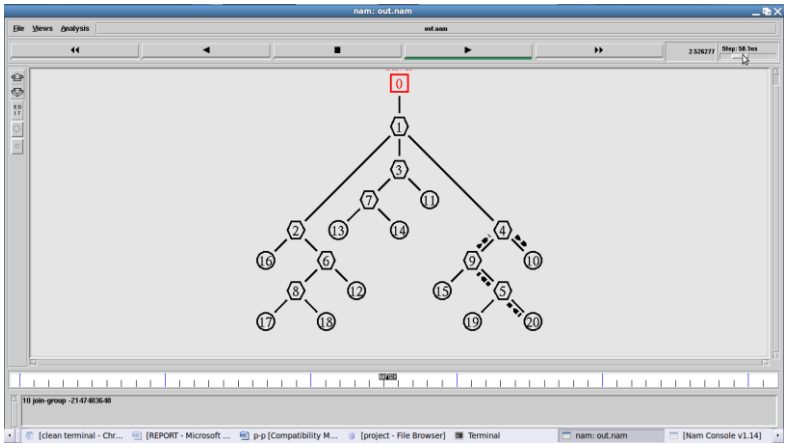

Figure 13: After confirmation source sending the direct request to file manager

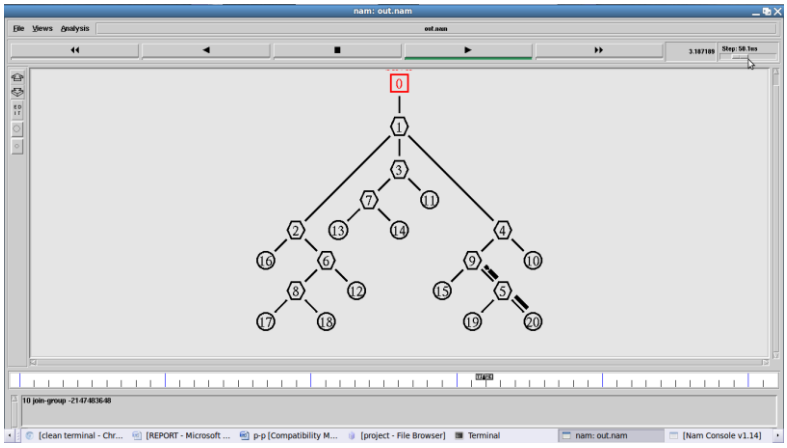

Figure 14: Download from peer

CONCLUSION

In conclusion, our proposed method provides mutual anonymity for both the trust host and the trust querying peer, aiming at providing secure, reliable, and accountable distribution and access of ratings of peers.A central server that operates a centralized data repository search engine within a peer to peer network performs authentication and authorization operation with respect to users who accesses the service. Trust mechanism and access control technology has been utilizedwith the help of network simulated version 2 in the present work for P2P file sharing system and enhanced the secure with respect to the existing one.

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REFERENCES

[1] Hwang RH, Hoh CH. Telecommunication Systems 2009; 42: 47-61.
[2] Goel S, Miesing P, Chandra U. California Management Review 2010; 52 (3): 6-33.
[3] Cuevas F, Student awareness of institutional policy and its effect on peer to peer file sharing & piracy behaviour, Dissertation, Florida State University 2010, pp. 1-136.
[4] Li C, Yu B, Sycara K. Electronic Commerce Research and Applications 2009; 8: 315-326.
[5] Hughes J, Lang KR,Vragov R. Electronic Commerce Research and Applications 2008; 7 (1): 105-118.
[6] Arora G, Hanneghan M,Merabti M. Electronic Commerce Research and Applications 2005; 4 (3):250-263.
[7] Plouffe CR. European Journal of Marketing 2008; 42 (11/12):1179-1202.
[8] Feng Y, Guo Z, Chiang WK. Journal of Management Information Systems 2009; 25 (4): 241-270.
[9] Chavan G, Design and analysis of a mobile file sharing system for opportunistic networks, Master of Science in Computer Science, University of Texas at Arlington, 2009, pp. 1-84.