An Innovative Approach for a Broker less Content Based Publish/Subscribe Communication Paradigm

G.Sumalatha[1]; Krishna Chaitanya Katkam[2]; M.Laxman[3]& Prof.Dr.G.Manoj Someswar[4]

1. M.Tech.(CSE) from Kshatriya College of Engineering, Affiliated to JNTUH, Telangana, India.
2. Assistant Professor, Dept. of CSE, Kshatriya College of Engineering, Affiliated to JNTUH, Telangana, India.
3. Associate Professor & HOD, Dept. of CSE, Kshatriya College of Engineering, Affiliated to JNTUH, Telangana, India.
4. Principal & Professor, Dept. of CSE, Anwar-ul-uloom College of Engineering & Technology, Vikarabad, RR District, Affiliated to JNTUH, Telangana, India.

ABSTRACT:

The problem is to define and presenting a new approach to provide authentication and confidentiality in a broker-less content based pub/sub system. The approach has to define highly scalable in terms of number of subscribers and publishers in the system and the number of keys maintained by them.

KEYWORDS: Dynamic Publish/Subscribe; Encryption; Synchronous; Public Key Infrastructure (PKI); Weil Pairing

INTRODUCTION

The publish/subscribe (pub/sub) communication paradigm has gained high popularity because of its inherent decoupling of publishers from subscribers in terms of time, space, and synchronization. Publishers inject information into the pub/sub system, and subscribers specify the events of interest by means of subscriptions. Published events are routed to their relevant subscribers, without the publishers knowing the relevant set of subscribers, or vice versa. This decoupling is traditionally ensured by intermediate routing over a broker network. In more recent systems, publishers and subscribers organize themselves in a broker-less routing infrastructure, forming an event forwarding overlay.[1] Content-based pub/sub is the variant that provides the most expressive subscription model, where subscriptions define restrictions on the message content. Its expressiveness and asynchronous nature is particularly useful for large-scale distributed applications such as news distribution, stock exchange, environmental monitoring, traffic control, and public sensing. Not surprisingly, pub/sub needs to provide supportive mechanisms to fulfill the basic security demands of these applications such as access control and confidentiality.[2]

Access control in the context of pub/sub system means that only authenticated publishers are allowed to disseminate events in the network and only those events are delivered to authorized subscribers.

Moreover, the content of events should not be exposed to the routing infrastructure and a subscriber should receive all relevant events without revealing its subscription to the system. sSolving these security issues in a content-based pub/sub system imposes new challenges. For instance, end-to-end authentication using a public key infrastructure (PKI) conflicts with the loose coupling between publishers and subscribers, a key requirement for building scalable pub/sub systems. For PKI, publishers must maintain the public keys of all interested subscribers to encrypt events. Subscribers must know the public keys of all relevant publishers to verify the authenticity of the received events. Furthermore, traditional mechanisms to provide confidentiality by encrypting the whole event message conflict with the content-based routing paradigm. Hence, new mechanisms are needed to route encrypted events to subscribers without knowing their subscriptions and to allow subscribers and publishers authenticate each other without knowing each other. [3]

In the past, most research has focused only on providing expressive and scalable pub/sub systems, but little attention has been paid for the need of security. Existing approaches toward secure pub/sub systems mostly rely on the presence of a traditional broker network. These either address security under restricted expressiveness, for example, by using only keyword matching for routing events or rely on a network of semi-trusted brokers.[4]

Furthermore, existing approaches use coarse-grain epochbased key management and cannot provide fine-grain access control in a scalable manner. Nevertheless, security in broker-less pub/sub systems, where the subscribers are clustered according to their subscriptions, has not been discussed yet in the literature.[5] Building on our results of this system, presents a new approach to provide authentication and confidentiality in a broker-less pub/sub system. Our approach allow subscribers to maintain credentials according to their subscriptions. Private keys assigned to the subscribers are labeled with the credentials. A publisher associates each encrypted event with a set of credentials. We adapted identity-based encryption (IBE) mechanisms 1) to ensure that a particular subscriber can decrypt an event only if there is a match between the credentials associated with the event and the key; and 2) to allow subscribers to verify the authenticity of received events. Furthermore, we address the issue of subscription confidentiality in the presence of semantic clustering of subscribers. A weaker notion of subscription confidentiality is defined and a secure overlay maintenance protocol is designed to preserve the weak subscription confidentiality.[6]

In addition to this system, we also present 1) extensions of the cryptographic methods to provide efficient routing of encrypted events by using the idea of searchable encryption, 2) "Multi credential routing" a new event dissemination strategy which strengthens the weak subscription confidentiality, and 3) a thorough analysis of different attacks on subscription confidentiality. Moreover, the supplemental document, which can be found on the Computer Society Digital Library presents detailed analysis of the correctness of cryptographic methods used in this research paper and a concise review of the related work.

Literature Survey

Publish/Subscribe systems provide a useful platform for delivering data (events) from publishers to subscribers in an anonymous fashion in distributed networks. These systems have many applications, including web services, stock quotes, free riding monitoring, and Internet games. Developing reliable publish/subscribe schemes for dynamic distributed systems is challenging due to the requirements for scalability for large groups of unpredictable subscribers. In this paper, we promote a novel design principle for self_ dynamic and reliable content-based publish/subscribe systems and perform a comparative analysis of its probabilistic and deterministic implementations. More specifically, we present a generic content-based publish/subscribe system, called DPS (*Dynamic Publish/Subscribe*). DPS combines classical content-based filtering with self-_ (self-organizing, self-configuring, and self-healing) subscription driven clustering of subscribers. DPS gracefully adapts to failures and changes in the system while achieving scalable events delivery. DPS includes a variety of fault-tolerant deterministic and probabilistic content-based publication/subscription schemes. These schemes are targeted toward scalability, and aim at reducing and distributing the number of messages exchanged. Reliability and scalability of our system are shown through analytical and extensive experimental evaluation.[7]

Two convincing paradigms have emerged for achieving scalability in widely distributed systems: publish/subscribe communication and role-based, policy-driven control of access to the system by applications. A strength of publish/ subscribe is its many-to-many communication paradigm and loose coupling of components, so that publishers need not know the recipients of their data and subscribers need not know the number and location of publishers.[8] But some data is sensitive, and its visibility must be controlled carefully for personal and legal reasons. We describe the requirements of several application domains where the event-based paradigm is appropriate yet where security is an issue. Typical are the large-scale systems required by government and public bodies for domains such as healthcare, police, transport and environmental monitoring. [9]

As more sensitive data is shared and stored by third-party sites on the Internet, there will be a need to encrypt data stored at these sites. One drawback of encrypting data, is that it can be selectively shared only at a coarse-grained level (i.e., giving another party your private key). We develop a new cryptosystem for ‾ne-grained sharing of encrypted data that we call Key-Policy Attribute-Based Encryption (KP-ABE). In our cryptosystem, ciphertexts are labeled with sets of attributes and

private keys are associated with access structures that control which ciphertexts a user is able to decrypt. We demonstrate the applicability of our construction to sharing of audit-log information and broadcast encryption. Our construction supports delegation of private keys which subsumes Hierarchical Identity-Based Encryption (HIBE).[10]

We propose a fully functional identity-based encryption scheme (IBE). The scheme has chosen ciphertext security in the random oracle model assuming a variant of the computational Diffe Hellman problem.[11] Our system is based on bilinear maps between groups. The Weil pairing on elliptic curves is an example of such a map. We give precise definitions for secure identity based encryption schemes and give several applications for such systems.[12]

We study the problem of searching on data that is encrypted using a public key system. Consider user Bob who sends email to user Alice encrypted under Alice's public key.[13] An email gateway wants to test whether the email contains the keyword \urgent" so that it could route the email accordingly. Alice, on the other hand does not wish to give the gateway the ability to decrypt all her messages. We define and construct a mechanism that enables Alice to provide a key to the gateway that enables the gateway to test whether the word \urgent" is a keyword in the email without learning anything else about the email. We refer to this mechanism as Public Key Encryption with keyword Search.[14] As another example, consider a mail server that stores various messages publicly encrypted for Alice by others. Using our mechanism Alice can send the mail server a key that will enable the server to identify all messages containing some specific keyword, but learn nothing else. We define the concept of public key encryption with keyword search and give several constructions.[15]

SYSTEM STUDY

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ♦ ECONOMICAL FEASIBILITY
- ♦ TECHNICAL FEASIBILITY
- ♦ SOCIAL FEASIBILITY

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

PRELIMINARY INVESTIGATION

The first and foremost strategy for development of a project starts from the thought of designing a mail enabled platform for a small firm in which it is easy and convenient of sending and receiving messages, there is a search engine ,address book and also including some entertaining games. When it is approved by the organization and our project guide the first activity, ie. preliminary investigation begins. The activity has three parts:

Request Clarification

Feasibility Study

Request Approval

REQUEST CLARIFICATION

After the approval of the request to the organization and project guide, with an investigation being considered, the project request must be examined to determine precisely what the system requires.

Here our project is basically meant for users within the company whose systems can be interconnected by the Local Area Network(LAN). In today's busy schedule man need everything should be provided in a readymade manner. So taking into consideration of the vastly use of the net in day to day life, the corresponding development of the portal came into existence.

FEASIBILITY ANALYSIS

An important outcome of preliminary investigation is the determination that the system request is feasible. This is possible only if it is feasible within limited resource and time. The different feasibilities that have to be analyzed are

Operational Feasibility

Operational Feasibility deals with the study of prospects of the system to be developed. This system operationally eliminates all the tensions of the Admin and helps him in effectively tracking the project progress. This kind of automation will surely reduce the time and energy, which previously consumed in manual work. Based on the study, the system is proved to be operationally feasible.

Economic Feasibility

Economic Feasibility or Cost-benefit is an assessment of the economic justification for a computer based project. As hardware was installed from the beginning & for lots of purposes thus the cost on project of hardware is low. Since the system is a network based, any number of employees connected to the LAN within that organization can use this tool from at anytime. The Virtual Private Network is to be developed using the existing resources of the organization. So the project is economically feasible.

Technical Feasibility

According to Roger S. Pressman, Technical Feasibility is the assessment of the technical resources of the organization. The organization needs IBM compatible machines with a graphical web browser connected to the Internet and Intranet. The system is developed for platform Independent environment. Java Server Pages, JavaScript, HTML, SQL server and WebLogic Server are used to develop the system. The technical feasibility has been carried out. The system is technically feasible for development and can be developed with the existing facility.

REQUEST APPROVAL

Not all request projects are desirable or feasible. Some organization receives so many project requests from client users that only few of them are pursued. However, those projects that are both feasible and desirable should be put into schedule. After a project request is approved, it cost, priority, completion time and personnel requirement is estimated and used to determine where to add it to any project list. Truly speaking, the approval of those above factors, development works can be launched.

SYSTEM DESIGN AND DEVELOPMENT

INPUT DESIGN

Input Design plays a vital role in the life cycle of software development, it requires very careful attention of developers. The input design is to feed data to the application as accurate as possible. So inputs are supposed to be designed effectively so that

the errors occurring while feeding are minimized. According to Software Engineering Concepts, the input forms or screens are designed to provide to have a validation control over the input limit, range and other related validations.

This system has input screens in almost all the modules. Error messages are developed to alert the user whenever he commits some mistakes and guides him in the right way so that invalid entries are not made. Let us see deeply about this under module design.

Input design is the process of converting the user created input into a computer-based format. The goal of the input design is to make the data entry logical and free from errors. The error is in the input are controlled by the input design. The application has been developed in user-friendly manner. The forms have been designed in such a way during the processing the cursor is placed in the position where must be entered. The user is also provided with in an option to select an appropriate input from various alternatives related to the field in certain cases.

Validations are required for each data entered. Whenever a user enters an erroneous data, error message is displayed and the user can move on to the subsequent pages after completing all the entries in the current page.

OUTPUT DESIGN

The Output from the computer is required to mainly create an efficient method of communication within the company primarily among the project leader and his team members, in other words, the administrator and the clients. The output of VPN is the system which allows the project leader to manage his clients in terms of creating new clients and assigning new projects to them, maintaining a record of the project validity and providing folder level access to each client on the user side depending on the projects allotted to him. After completion of a project, a new project may be assigned to the client. User authentication procedures are maintained at the initial stages itself. A new user may be created by the administrator himself or a user can himself register as a new user but the task of assigning projects and

validating a new user rests with the administrator only.

The application starts running when it is executed for the first time. The server has to be started and then the internet explorer in used as the browser. The project will run on the local area network so the server machine will serve as the administrator while the other connected systems can act as the clients. The developed system is highly user friendly and can be easily understood by anyone using it even for the first time.

SYSTEM TESTING

TESTING METHODOLOGIES

The following are the Testing Methodologies:

- o **Unit Testing.**
- o **Integration Testing.**
- o **User Acceptance Testing.**
- o **Output Testing.**
- o **Validation Testing.**

Unit Testing

Unit testing focuses verification effort on the smallest unit of Software design that is the module. Unit testing exercises specific paths in a module's control structure to ensure complete coverage and maximum error detection. This test focuses on each module individually, ensuring that it functions properly as a unit. Hence, the naming is Unit Testing.

During this testing, each module is tested individually and the module interfaces are verified for the consistency with design specification. All important processing path are tested for the expected results. All error handling paths are also tested.

Integration Testing

Integration testing addresses the issues associated with the dual problems of verification and program construction. After the software has been integrated a set of high order tests are conducted. The main objective in this testing process is to take unit tested modules and builds a program structure that has been dictated by design.

The following are the types of Integration Testing:

1. Top Down Integration

This method is an incremental approach to the construction of program structure. Modules are integrated by moving downward through the control hierarchy, beginning with the main program module. The module subordinates to the main program module are incorporated into the structure in either a depth first or breadth first manner.

In this method, the software is tested from main module and individual stubs are replaced when the test proceeds downwards.

2. Bottom-up Integration

This method begins the construction and testing with the modules at the lowest level in the program structure. Since the modules are integrated from the bottom up, processing required for modules subordinate to a given level is always available and the need for stubs is eliminated. The bottom up integration strategy may be implemented with the following steps:

- The low-level modules are combined into clusters into clusters that perform a specific Software sub-function.
- A driver (i.e.) the control program for testing is written to coordinate test case input and output.
- The cluster is tested.
- Drivers are removed and clusters are combined moving upward in the program structure

The bottom up approaches tests each module individually and then each module is module is integrated with a main module and tested for functionality.

User Acceptance Testing

User Acceptance of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required. The system developed provides a friendly user interface that can easily be understood even by a person who is new to the system.

Output Testing

After performing the validation testing, the next step is output testing of the proposed system, since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated or displayed by the system under consideration. Hence the output format is considered in 2 ways – one is on screen and another in printed format.

Validation Checking

Validation checks are performed on the following fields.

Text Field:

The text field can contain only the number of characters lesser than or equal to its size. The text fields are alphanumeric in some tables and alphabetic in other tables. Incorrect entry always flashes and error message.

Numeric Field:

The numeric field can contain only numbers from 0 to 9. An entry of any character flashes an error messages. The individual modules are checked for accuracy and what it has to perform. Each module is subjected to test run along with sample data. The individually tested modules are integrated into a single system. Testing involves executing the real data information is used in the program the existence of any program defect is inferred from the output. The testing should be planned so that all the requirements are individually tested.

A successful test is one that gives out the defects for the inappropriate data and produces and output revealing the errors in the system.

Preparation of Test Data

Taking various kinds of test data does the above testing. Preparation of test data plays a vital role in the system testing. After preparing the test data the system under study is tested using that test data. While testing the system by using test data

International Journal of Research

Available at https://edupediapublications.org/journals

p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 02 Issue 11
November 2015

errors are again uncovered and corrected by using above testing steps and corrections are also noted for future use.

Using Live Test Data:

Live test data are those that are actually extracted from organization files. After a system is partially constructed, programmers or analysts often ask users to key in a set of data from their normal activities. Then, the systems person uses this data as a way to partially test the system. In other instances, programmers or analysts extract a set of live data from the files and have them entered themselves.

It is difficult to obtain live data in sufficient amounts to conduct extensive testing. And, although it is realistic data that will show how the system will perform for the typical processing requirement, assuming that the live data entered are in fact typical, such data generally will not test all combinations or formats that can enter the system. This bias toward typical values then does not provide a true systems test and in fact ignores the cases most likely to cause system failure.

Using Artificial Test Data:

Artificial test data are created solely for test purposes, since they can be generated to test all combinations of formats and values. In other words, the artificial data, which can quickly be prepared by a data generating utility program in the information systems department, make possible the testing of all login and control paths through the program.

The most effective test programs use artificial test data generated by persons other than those who wrote the programs. Often, an independent team of testers formulates a testing plan, using the systems specifications.

The package "Virtual Private Network" has satisfied all the requirements specified as per software requirement specification and was accepted.

USER TRAINING

Whenever a new system is developed, user training is required to educate them about the working of the system so that it can be put to efficient use by those for whom the system has been primarily

designed. For this purpose the normal working of the project was demonstrated to the prospective users. Its working is easily understandable and since the expected users are people who have good knowledge of computers, the use of this system is very easy.

MAINTAINENCE

This covers a wide range of activities including correcting code and design errors. To reduce the need for maintenance in the long run, we have more accurately defined the user's requirements during the process of system development. Depending on the requirements, this system has been developed to satisfy the needs to the largest possible extent. With development in technology, it may be possible to add many more features based on the requirements in future. The coding and designing is simple and easy to understand which will make maintenance easier.

TESTING STRATEGY :

A strategy for system testing integrates system test cases and design techniques into a well planned series of steps that results in the successful construction of software. The testing strategy must co-operate test planning, test case design, test execution, and the resultant data collection and evaluation .A strategy for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high level tests that validate major system functions against user requirements.

Software testing is a critical element of software quality assurance and represents the ultimate review of specification design and coding. Testing represents an interesting anomaly for the software. Thus, a series of testing are performed for the proposed system before the system is ready for user acceptance testing.

SYSTEM TESTING:

Software once validated must be combined with other system elements (e.g. Hardware, people, database). System testing verifies that all the elements are proper and that overall system function performance is

achieved. It also tests to find discrepancies between the system and its original objective, current specifications and system documentation.

UNIT TESTING:

In unit testing different are modules are tested against the specifications produced during the design for the modules. Unit testing is essential for verification of the code produced during the coding phase, and hence the goals to test the internal logic of the modules. Using the detailed design description as a guide, important Conrail paths are tested to uncover errors within the boundary of the modules. This testing is carried out during the programming stage itself. In this type of testing step, each module was found to be working satisfactorily as regards to the expected output from the module.

In Due Course, latest technology advancements will be taken into consideration. As part of technical build-up many components of the networking system will be generic in nature so that future projects can either use or interact with this. The future holds a lot to offer to the development and refinement of this project.

SYSTEM TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the

Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

TYPES OF TESTS
Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application

.it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

Functional test

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields,

International Journal of Research

Available at https://edupediapublications.org/journals

p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 02 Issue 11
November 2015

predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the

configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

White Box Testing

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

Unit Testing:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.

- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

Integration Testing

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

Acceptance Testing

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

SYSTEM TESTING

TESTING METHODOLOGIES

The following are the Testing Methodologies:

- **Unit Testing.**
- **Integration Testing.**
- **User Acceptance Testing.**
- **Output Testing.**
- **Validation Testing.**

Unit Testing

Unit testing focuses verification effort on the smallest unit of Software design that is the module. Unit testing exercises specific paths in a

International Journal of Research

Available at https://edupediapublications.org/journals

p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 02 Issue 11
November 2015

module's control structure to ensure complete coverage and maximum error detection. This test focuses on each module individually, ensuring that it functions properly as a unit. Hence, the naming is Unit Testing.

During this testing, each module is tested individually and the module interfaces are verified for the consistency with design specification. All important processing path are tested for the expected results. All error handling paths are also tested.

Integration Testing

Integration testing addresses the issues associated with the dual problems of verification and program construction. After the software has been integrated a set of high order tests are conducted. The main objective in this testing process is to take unit tested modules and builds a program structure that has been dictated by design.

The following are the types of Integration Testing:
1)Top Down Integration

This method is an incremental approach to the construction of program structure. Modules are integrated by moving downward through the control hierarchy, beginning with the main program module. The module subordinates to the main program module are incorporated into the structure in either a depth first or breadth first manner.

In this method, the software is tested from main module and individual stubs are replaced when the test proceeds downwards.

2. Bottom-up Integration

This method begins the construction and testing with the modules at the lowest level in the program structure. Since the modules are integrated from the bottom up, processing required for modules subordinate to a given level is always available and the need for stubs is eliminated. The bottom up integration strategy may be implemented with the following steps:

- The low-level modules are combined into clusters into clusters that perform a specific Software sub-function.

- A driver (i.e.) the control program for testing is written to coordinate test case input and output.
- The cluster is tested.
- Drivers are removed and clusters are combined moving upward in the program structure

The bottom up approaches tests each module individually and then each module is module is integrated with a main module and tested for functionality.

OTHER TESTING METHODOLOGIES

User Acceptance Testing

User Acceptance of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required. The system developed provides a friendly user interface that can easily be understood even by a person who is new to the system.

Output Testing

After performing the validation testing, the next step is output testing of the proposed system, since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated or displayed by the system under consideration. Hence the output format is considered in 2 ways – one is on screen and another in printed format.

Validation Checking

Validation checks are performed on the following fields.

Text Field:

The text field can contain only the number of characters lesser than or equal to its size. The text fields are alphanumeric in some tables and alphabetic in other tables. Incorrect entry always flashes and error message.
Numeric Field:

The numeric field can contain only numbers from 0 to 9. An entry of any character flashes an error messages. The individual modules are checked for accuracy and what it has to perform. Each module is subjected to test run along with sample data. The individually tested modules are integrated into a single system. Testing involves executing the real data information is used in the program the existence of any program defect is inferred from the output. The testing should be planned so that all the requirements are individually tested.

A successful test is one that gives out the defects for the inappropriate data and produces and output revealing the errors in the system.

Preparation of Test Data

Taking various kinds of test data does the above testing. Preparation of test data plays a vital role in the system testing. After preparing the test data the system under study is tested using that test data. While testing the system by using test data errors are again uncovered and corrected by using above testing steps and corrections are also noted for future use.

Using Live Test Data:

Live test data are those that are actually extracted from organization files. After a system is partially constructed, programmers or analysts often ask users to key in a set of data from their normal activities. Then, the systems person uses this data as a way to partially test the system. In other instances, programmers or analysts extract a set of live data from the files and have them entered themselves.

It is difficult to obtain live data in sufficient amounts to conduct extensive testing. And, although it is realistic data that will show how the system will perform for the typical processing requirement, assuming that the live data entered are in fact typical, such data generally will not test all combinations or formats that can enter the system. This bias toward typical values then does not provide a true systems test and in fact ignores the cases most likely to cause system failure.

Using Artificial Test Data:

Artificial test data are created solely for test purposes, since they can be generated to test all combinations of formats and values. In other words, the artificial data, which can quickly be prepared by a data generating utility program in the information systems department, make possible the testing of all login and control paths through the program.

The most effective test programs use artificial test data generated by persons other than those who wrote the programs. Often, an independent team of testers formulates a testing plan, using the systems specifications.

The package "Virtual Private Network" has satisfied all the requirements specified as per software requirement specification and was accepted.

USER TRAINING

Whenever a new system is developed, user training is required to educate them about the working of the system so that it can be put to efficient use by those for whom the system has been primarily designed. For this purpose the normal working of the project was demonstrated to the prospective users. Its working is easily understandable and since the expected users are people who have good knowledge of computers, the use of this system is very easy.

MAINTAINENCE

This covers a wide range of activities including correcting code and design errors. To reduce the need for maintenance in the long run, we have more accurately defined the user's requirements during the process of system development. Depending on the requirements, this system has been developed to satisfy the needs to the largest possible extent. With development in technology, it may be possible to add many more features based on the requirements in future. The coding and designing is simple and easy to understand which will make maintenance easier.

TESTING STRATEGY :

A strategy for system testing integrates system test cases and design techniques into a well planned series of steps that results in the successful construction of software. The testing strategy must co-operate test planning, test case design, test execution, and the resultant data collection and evaluation .A strategy

for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high level tests that validate major system functions against user requirements.

Software testing is a critical element of software quality assurance and represents the ultimate review of specification design and coding. Testing represents an interesting anomaly for the software. Thus, a series of testing are performed for the proposed system before the system is ready for user acceptance testing.

SYSTEM TESTING:

Software once validated must be combined with other system elements (e.g. Hardware, people, database). System testing verifies that all the elements are proper and that overall system function performance is achieved. It also tests to find discrepancies between the system and its original objective, current specifications and system documentation.

UNIT TESTING:

In unit testing different are modules are tested against the specifications produced during the design for the modules. Unit testing is essential for verification of the code produced during the coding phase, and hence the goals to test the internal logic of the modules. Using the detailed design description as a guide, important Conrail paths are tested to uncover errors within the boundary of the modules. This testing is carried out during the programming stage itself. In this type of testing step, each module was found to be working satisfactorily as regards to the expected output from the module.

In Due Course, latest technology advancements will be taken into consideration. As part of technical build-up many components of the networking system will be generic in nature so that future projects can either use or interact with this. The future holds a lot to offer to the development and refinement of this project.

IMPLEMENTATION

- **Publisher**

In this module, the Publisher provides the user name, file name and generates the key a publisher contacts the key server along with the credentials for each attribute in its advertisement. If the publisher is allowed to publish events according to its credentials, the key server will generate separate private key and public key for each credential. Publisher Sends their data files to the Subscribers (S1, S2……S9) in a network (N1, N2, N3).

- **Key Server**
  In this model, a key server maintains a single pair of public and private master keys. The master public key can be used by the sender to encrypt and send the messages to a user with any identity The Master Private key is only known to the key server. The master private key is used for generating private keys for publishers and subscribers. The Key Server is Responsible for view the credentials like view attackers and View keys with their tags (User Name, File Name, Public key, Private key, Status) . The key server will perform the revocation and un revocation of the remote user.

- **Server**
  In this module, The Server consists of Data Center and back up system. This is responsible of storing the files in Data Center and keeping a back up copy of the contents and forwards to respective subscriber in the router via network. We describe two strategies to route events (from publishers to the relevant subscribers) in the pub/sub overlay network without violating the weak subscription confidentiality. If attacker injects fake key in key server can be update the original key from backup server and Datacenter.

- **Router**
  The Router consists of multiple Networks (N1, N2, N3) and subscribers (S1, S2, S3, S4, S5, S6, S7, S8, S9), In Router each Network consist of three Subscribers. A subscriber with more than one credentials can be handled by running multiple virtual peers on

a single physical node, each virtual peer maintaining its own set of tree links. Access control in the context of sub system means that only authenticated publishers are allowed to disseminate events in the network and only those events are delivered to authorized subscribers. The Router is responsible to view credentials like Log Details with their tags File Name, Network, Subscriber 1, Subscriber 2, Subscriber 3, sent time and Subscriber status with their tags Subscriber name, Ip, Current status, Joined network.

- **Attacker**

    In this module, the Attacker injects the fake key to the particular file in the Key server. The key server will capture the attacker details like file name, injected fake key, attacker name, time and date.

RESULTS & CONCLUSION

In this system, we have presented a new approach to provide authentication and confidentiality in a broker-less content based pub/sub system. The approach is highly scalable in terms of number of subscribers and publishers in the system and the number of keys maintained by them. In particular, we have developed mechanisms to assign credentials to publishers and subscribers according to their subscriptions and advertisements. Private keys assigned to publishers and subscribers, and the ciphertexts are labeled with credentials. We adapted techniques from identity based encryption 1) to ensure that a particular subscriber can decrypt an event only if there is a match between the credentials associated with the event and its private keys and 2) to allow subscribers to verify the authenticity of received events. Furthermore, we developed a secure overlay maintenance protocol and proposed two event dissemination strategies to preserve the weak subscription confidentiality in the presence of semantic clustering of subscribers. The evaluations demonstrate the viability of the proposed security mechanisms and analyze attacks on subscription confidentiality.

REFERENCES

[1] E. Anceaume, M. Gradinariu, A.K. Datta, G. Simon, and A. Virgillito, "A Semantic Overlay for Self- Peer-to-Peer Publish/ Subscribe," Proc. 26th IEEE Int'l Conf. Distributed Computing Systems (ICDCS), 2006.

[2] J. Bacon, D.M. Eyers, J. Singh, and P.R. Pietzuch, "Access Control in Publish/Subscribe Systems," Proc. Second ACM Int'l Conf. Distributed Event-Based Systems (DEBS), 2008.

[3] W.C. Barker and E.B. Barker, "SP 800-67 Rev. 1. Recommendation for the Triple Data Encryption Algorithm (TDEA) Block Cipher," technical report, Nat'l Inst. of Standards & Technology, 2012.

[4] J. Bethencourt, A. Sahai, and B. Waters, "Ciphertext-Policy Attribute-Based Encryption," Proc. IEEE Symp. Security and Privacy, 2007.

[5] D. Boneh, G.D. Crescenzo, R. Ostrovsky, and G. Persiano, "Public Key Encryption with Keyword Search," Proc. Int'l Conf. Theory and Applications of Cryptographic Techniques on Advances in Cryptology (EUROCRYPT), 2004.

[6] D. Boneh and M.K. Franklin, "Identity-Based Encryption from the Weil Pairing," Proc. Int'l Cryptology Conf. Advances in Cryptology, 2001.

[7] S. Choi, G. Ghinita, and E. Bertino, "A Privacy-Enhancing Content-Based Publish/Subscribe System Using Scalar Product Preserving Transformations," Proc. 21st Int'l Conf. Database and Expert Systems Applications: Part I, 2010.

[8] V. Goyal, O. Pandey, A. Sahai, and B. Waters, "Attribute-Based Encryption for Fine-Grained Access Control of Encrypted Data," Proc. ACM 13th Conf. Computer and Comm. Security (CCS), 2006.

[9] M. Ion, G. Russello, and B. Crispo, "Supporting Publication andSubscription Confidentiality in Pub/Sub Networks," Proc. Sixth Int'l ICST Conf. Security and Privacy in Comm. Networks (SecureComm), 2010.

[10] H.-A. Jacobsen, A.K.Y. Cheung, G. Li, B. Maniymaran, V. Muthusamy, and R.S. Kazemzadeh, "The PADRES Publish/ Subscribe System,"

Principles and Applications of Distributed Event-Based Systems. IGI Global, 2010.

[11] M. Jelasity, A. Montresor, G.P. Jesi, and S. Voulgaris, "PeerSim: A Peer-to-Peer Simulator," http://peersim.sourceforge.net/, 2013.

[12] H. Khurana, "Scalable Security and Accounting Services for Content-Based Publish/Subscribe Systems," Proc. ACM Symp. Applied Computing, 2005.

[13] A. Lewko, A. Sahai, and B. Waters, "Revocation Systems with Very Small Private Keys," Proc. IEEE Symp. Security and Privacy, 2010.

[14] B. Lynn, "The Pairing-Based Cryptography (PBC) Library," http://crypto.stanford.edu/pbc/, 2010.

[15] F.P. Miller, A.F. Vandome, and J. McBrewster, Advanced Encryption Standard. Alpha Press, 2009.