CHAPTER 3
PROBLEM FORMULATION

3.1 Problem Formulation:
Transmission of data from one location to another location is too much time consuming process. As that, a group has bulk information which they have to transfer from primary server to secondary server in minimum time, but information migration is long approach and transfers encrypted information. So, many firms are dealing with this challenge to transfer the information in cloud. Ant colony optimization algorithm is used to decrease the time duration while migrating the data from source to other destination. Ant Colony optimization algorithm describes that if data will travel through shortest path, then less time will be consumed.

Not like real ants, however, new pheromones are usually not positioned instantly after traversing an edge. With a view to prevent cycles or paths leading to useless ends, pheromones are probably placed after an ant has observed goal node and only for edges that aren't part of a cycle on ants trail. Also, in such an artificial method quantity of pheromone positioned may base upon length of built direction, so that brief paths are rewarded more than longer paths. Such an adaptation is more often than not vital as movement of synthetic ants is usually synchronized, not like actual ants in nature, place order of ants arriving at a location is essential. Even though there are huge benefits of cloud migration, businesses are going through a number of security dangers and challenges for duration of migrating to cloud. A few of these security and challenges risks are addressed at this point.

There are some challenges which are observed to transfer the information:-

**Time and Cost it takes to transit-** Time and cost it takes to transit an accessible work load to Cloud. As per the economic points this is a main problem. Certain matters for consideration are the bandwidth, price of relocating tremendous data to Cloud and time taken to transfer information in process of migration.

**Sensitive Data**- All firms may be small, standard or significant firms perform their processes on cost of the information stored and share it to purchasers or authorized
3rd parties. Now, when users move to cloud platform, they experience a migration system, in which whole data or some part of data is transferred within server of cloud. Never the less, migration has fundamental role to play due to fact if this information leaks during migration system it may well purpose lot of harm to enterprise or institution economically or status wise. Thus, transferring of information from existing server to cloud server is an ache supportive project and have the requirement of essential skill to control and maintain the data. Once more on time of transfer user need to make a decision which services and applications will stay within public cloud and as a way to remain on web page at back of firewall or within personal cloud.

**Security of Cloud: major hazard in IT Market**- Largest problem within the present IT enterprise is of internet safety. Thus, detailed care is taken at time data is transferred from one system server to another cloud server. During the transferring of trade to cloud, user needs to transfer useful knowledge from system to cloud. On this transition corporation considers regarding safety solutions of this sensitive information.

**Interoperability**-Most imperative disorders recognize to cloud computing is the present change among person seller strategies, and contained lack of interoperability. In cloud computing environment interoperability is regarded as some of tremendous assignment in cloud migration. Interoperability is involved by potential of computers to communicate. In environment of cloud computing, this implies capability to write the code that performs operations more than one cloud supplier at same time, whatever distinct among providers. Thus if user wants to be an part of atmosphere of cloud computing process by transferring a technique to cloud then it must be suitable with additional cloud supplier.

**Portability**-Portability is capability to move accessories or computers written for specific atmosphere in another environment. Due to this, in cloud atmosphere application that user wishes to essential and ought to be convenient with different cloud environment.
Adopt to cloud computing- An association adopt cloud computing would run into alterations to task, power, financial support and enrolment of quite a lot of departments within enterprise.

Service Level Agreements – A service level agreement define interaction among a service of cloud service provider and a cloud carrier client. A service level agreement is ground work of patron's belief in supplier.

A service level agreement contains [8]:
1. A suite of SP will give, together with an entire, unique meaning of each.
2. Tasks of purchaser and supplier.
3. Set of content to examine services as per promise
4. Replying problems in cloud transferring.

Transmission of data from one location to another location is too much time consuming process. Ant colony optimization algorithm is used to decrease the time duration while migrating the data from source to other destination. The basic function of ACO is to simulate foraging conduct of colonies of ant. When an ants group tries to seek for meals, ants utilize a special sort of element to be in contact with each and every different. That element is known as pheromone. In the beginning, ants begin searching their meals randomly. When ants find a direction to food source, ant leaves pheromone on the path. An ant may provide paths to further ants to food supply with the help of sensing pheromone on route. As this procedure is maintained, many of the ants attract to decide upon the smallest course as there has been a gigantic quantity of pheromones amassed on route [6]. Some great benefits of algorithm are utilization of optimistic suggestions method, interior extensible and parallelism. The negative aspects are overhead and the stagnation phenomenon, or searching for a distinct extent, all participants discover equal answer precisely, cannot extra search for solution space, making algorithm converge to regional most effective resolution [6]. It defines that an ant colony optimization algorithm will also be utilized to any difficulty so far as it's possible to outline:
   1. Heuristic desirability $\eta$ of edges.
2. Predicament illustration which allows ants to incrementally build/ alter options.
3. A constraint satisfaction system that compels development of possible options.

3.2 Data Migration:

With admire to migration of DB in detail, Microsoft focuses on new technology in which best database is migrated to Cloud and rest layers are hosted ordinarily.

1. Applications of web.
2. Purpose is to utilize services by specific departments and by other agencies that are smaller in size, inside organization.

Data hubs, essential data placed in the references or user can access the data easily, e.g., on the personal computers of users, and almost always synchronized with DB in the Cloud. Certainly for primary two eventualities, performance issues and complexity as a result of expertise latency challenges after migration of database layer to Cloud must be viewed.
User configures synchronization and migration provider by way of a web interface and the data migration is finished making use of in the community hooked up at ease retailers and encryption.
Time instances it takes to migration of the actual data objects and knowledge from by one DB is slightly not up to period of time it takes to finish an overall transformation from comparison to creation level. Migrations of single relational database to a different are comparatively simpler than migrations of a non-RDB to a RDB, in view that institution of object in a RDB is particularly equivalent in comparison to non-RDB equivalent to hierarchic and community databases. All principal RDB carriers also present instruments that supply amazing migration abilities in an automatic trend. Whatever the level of success processes and automation of any migration equipment, regardless mostly not automatic intervention would be required when migration from one DB to other database.

3.3 Security Challenge in Migration of Data:

3.3.1 A perception on Data Migration:

Data migration to a cloud computing environment is in many approaches an exercise in risk management. Each qualitative and quantitative motive is analyzed. Risks need to be carefully balanced in opposition to safeguards and advantages, with working out that accountability for security stays with organization. Too many controls can also be inefficient and ineffective, if advantages outweighed by cost and associated dangers. A proper stability between strength of controls and relative chance associated with exact applications and operations need to be ensured.

Data safety is a further important search topic in cloud computing. Since service vendors probably wouldn't have entry to physical safety process of information centres, they ought to depend on infrastructure provider to gain full data security. Even for a virtual exclusive cloud, provider supplier can only specify safety environment remotely, without realizing whether or not it is utterly carried out. Infrastructure supplier, on this context, has to acquire the next goals: [11]

(1) Confidentiality for privacy data entry and switch, and
(2) Audit-ability, for attesting whether or not security setting of applications has been tampered or not. Confidentiality is most of the time completed utilizing cryptographic protocols, whereas audit-ability will also be done making use of non-forgeable procedures. Far off attestation most commonly requires a relied on platform module (TPM) to generate non-forgeable process
summary (i.e. Method state encrypted making use of TPM private key) because proof of procedure security. However, in a virtualized atmosphere like clouds, VMs can dynamically migrate from one place to one other; therefore instantly utilizing far off attestation just isn't adequate. In this case, it is imperative to build trust mechanisms at every architectural layer of cloud. Firstly, hardware layer need to be depended on hardware TPM. Secondly, virtualization platform have to be trusted utilizing virtual machine monitors [16, 17]. VM migration will have to simplest allowed if both supply and vacation spot servers are depended on. Latest work has been dedicated to designing effective protocols for trust establishment and management.

3.3.2 Secure data by migration process:
Cloud Migration is considered a major platform to manage the cloud that face severe problems on time of data transferring from an enterprise server to a server which make cloud in different places. Cloud acts as an interface via that businesses can access information in a digital atmosphere. For that reason, soft functioning of it is dependent basically on how will prepare and expert cloud vendors in this field.

Furthermore, if knowledge transferring would not be executed methodically and safely, it can produce the problems concerning cloud security and knowledge of enterprise property that specifically incorporate of knowledge. As a consequence, hiring of cloud supplier with very rich experience concerning discipline via plentiful advantage and ability units for maintaining cloud extra with ease and successfully.

Example: think an ABC corporation wishes to shifting of data to cloud database for elevated scalability and uptime, it goes to cloud supplier to perform the services. Cloud supplier begins initial steps for information move to cloud, during this face issues like crash of data or unauthorized entry by using 3rd events. That is where issues lie. Owner of information that hired cloud manager will not only face popularity losses but in addition financial losses. Identical case used to be experienced when another cloud failure occurred and a few corporations undergo great losses due to this.
As a result, protecting data remains a highest precedence of cloud manager to preclude overall cloud safety viruses that additionally comprise cross-border protection regarding.

### 3.3.3 Feature of Data Shifting:
- Industrial relationship exists among clouds
- Broadcasting of huge information
- More employees that complete broadcasting procedure at the same time.

### 3.4 Problem Statement:
In this fast moving world of digitization, cloud computing is becoming an essential part of the daily life, especially related to the business. Keeping the data secure on the server has become one of the major issues. To overcome this problem Cloud Computing has emerged into the world but it is quite expensive. As of now, one protocol architecture does not allow another protocol architecture to communicate directly, so there is a need to find a unique crossbreed application architecture which can convert one protocol architecture into an intermediate architecture which is completely understandable by another service architecture so that anyone can move up the entire data architecture along with the data from one server end to another without any data loss.

#### 3.4.1 Objective:
- To convert existing server architecture protocol into reference of middle service.
- To move the service provider reference from one platform of cloud to different platform of cloud to ensure the conversion of architecture.
- To generate service reference in line with GoDaddy protocol architecture for information transfer from home server to cloud.
- To ensure information or data protection at home level and GoDaddy level before and after transfer of information.
- To keep a back at local server for any sort of failure within transaction.
- To design and develop GoDaddy scripting language for removal of architecture and information from home server.
3.5 Methodology of Proposed Research:
To ensure the successful migration of the data along with the architecture, there is a need to develop a platform which can interact with both the platforms simultaneously. It will be ensured by successful implementation of the TCP-IP protocol service into the local server so that its configuration can be merged into the second server. To create an intermediate service for the communication, SOAP protocol service would be used and will check whether that service is working properly with the SAAS service of the cloud platform or not. Then the architecture would be fetched first from the home server with the use of XML soap service to ensure the creation of the basic building block of the architecture to the another server. This schematic has been depicted in figure 3.2.

![Figure 3.2: Process of TCP/IP Protocol]
The XML-fetched architecture would be executed on the GoDaddy platform to check whether implemented service (intermediate) is able to communicate with GoDaddy or not. If yes then the data contract service of WCF would be wooed to fetch the data and to merge it into the existing XML architecture. Then a final service will run to ensure safe removal of the data along with the architecture from home server to cloud. ACO algorithm is used to find the shortest path while migrating the data from source to other destination. Ant Colony optimization algorithm describes that if data will travel through shortest path, then less time will be consumed and ultimately cost will also decreased. The architecture is proposed to be kept at the local server to ensure the recovery in case of any failure. This proposed work is a new framework for the migration of data from one server to another server.

3.5.1 Flow Chart:

The proposed work will go as according to the diagram shown in figure 3.2:
Migration of Data From One Cloud Server to another Cloud Server using the TCP-IP Protocol

Figure 3.3 Proposed Flow Diagram of Data Migration Process