# Survey of Data Migration from Legacy Systems

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**Summary**
The recent development in the internet world and the developing of new IT technologies with lot of challenges and recent concepts for example NoSQL which currently turns out to be a very popular as an alternate solution to the relational databases particularly when working with the large databases or data. This paper deals with the introduction of NoSQL databases and also the significant variations between conventional RDBMS and NoSQL databases.

***Key words:***
*NoSQL; relational databases; RDBMS*

## 1. Introduction

Due to rapid transformation in IT and extending scale of firms IS (information system) the resulting quantity of data becomes bigger and bigger and this will influence on database performance. Therefore firms respond rapidly to cope with the alterations and develop the performance of database by replacing or modernizing their already existing DB to a new database. A new DB is configured to be much inclusive and efficient than older DB [1]. Furthermore [2] has mentioned that the new DB evolved to replace the old database has become out of date and can't withstand further growth in the capacity and speed to be capable to manage an ever developing data amount. Further new regulatory and statutory needs acquire new applications of business that needs upgrading or replacing the already existing DB. Also economic issues in the firm lead to uninstalling costly and commercial DB and installing cheaper and open source DB. Consequently [3]has stated that the query emerges how the firm upgraded or replaced its DB while retaining the customizations and data. The response is migration of data which is moving the data from a source DB into a target DB. This involves migrating the source information and source schema into their equivalents in a target DB. According to [4] nowadays there are several kinds of databases in which huge amount of information are stored. Sometimes it is essential to migrate information from one kind of database to another or to create new DB implemented in another database and move data from old DB to new DB. The data migration process comprises of 3 steps namely Extract, Transform and Load (ETL) and the three steps are: 1) Retrieval of information from source DB; 2) Transformation information; and 3) Data migration to target DB. [5] has mentioned that in order to meet the requirements for effective storage and accesses of huge number of information the DBMS, NoSQL or Not Only SQL were suggested. The main features that differentiate Not Only SQL mode from traditional relational database management system one are data replication and data partitioning. Despite these advantages there are several barriers related with the process of migration. The first challenge is the data volume to be migrated. Another challenge is related to RDB models way of avoiding redundancy of data which is a part of the models of NoSQL. The last challenge is that in addition to all model and data migration there is cost related with acquiring applications of software to interact appropriately with the model of new database. Thus this chapter provides certain solutions that provide an automatic process of migration or adjustments in models of relation so they become capable to provide better scalability and performance when managing with huge number of information. This chapter also discusses briefly about NoSQL models used for data migration and challenges faced in data migration followed by the research gap found in the studies considered.

## 2. NoSQL:

According [6] in the past years NoSQL DB have developed enormously owing to their reduced driven structure, scalable design of schema and rapid access contrast to relational DB. The major characteristic that makes difference in NoSQL data model is that it does not utilize the table as storage data structure. Additionally its schema is effective in managing the unstructured information. The NoSQL database acquires numerous techniques of modelling namely document data model, graph and key value stores. The following techniques is explained clearly:

### 2.1 Stores of document:

The concept of this DB is based on documents is an extension type of the value/key database in which the value is indicated as a document comprising data indicated in standard formats. Entire documents are stored in collections. The benefit of documents based on database is to extract a set of hierarchically structured data from a

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distinct key. The present implementations are MongoDB and Couch DB.

### 2.2 Graph DB:

An essential perspective of the graph based on database is the index use. This means that every element comprises a pointer to its parallel element and does not need every element indexing. The present implementations are Flock DB, Neo4j and Hyper-graph DB.

### 2.3 Key value stores:

The values are stored in data with a distinct key allotted to every value. Also this kind of NoSQL DB permits for maintaining greater performance in writing and/or reading. Presently the best solutions having acquired the key value system are Redis [7].

According to [8] and [9] NoSQL database provides rapid input/output operations, easy scalability and incurs reduced cost than traditional databases. There is developing demand to use NoSQL databases to meet the needs of present applications and which raise the data migration issue from relational to NoSQL databases. [10] and [11] have mentioned that the major problem with migration is that the applications which have been evolved with relational DBs as base database have to alter the code to interact with new NoSQL databases. In relational databases the data stored is in table forms with several records which make the data accessing rate inconvenient and slower. [12] and [13] have stated that NoSQL databases do not follow specific structure and do not assist bounding of foreign key which makes it simple to access the data. The addressed issue is that the relational databases less efficiency and the developing request of present applications have developed the importance to suggest a system which can migrate the information from relational databases to NoSQL databases while handling the data integrity and allow the code of application remain unchanged.

According to [14] RDB and other traditional DB follow stiff structure to arrange the data produced from different applications but NoSQL DB offers flexibility in arranging the information which makes it simple to access the information. The information produced from real time applications and social networking sites requires scalable and flexible system which develops the requirement for multidimensional model and No SQL has been suggested for migration of data. The largest barrier is to migrate the already occurring information residing in data warehouse to NoSQL database while handling the features of the information. The developing use of web applications has developed the request to utilize NoSQL because the traditional databases are not able to manage the rapidly developing information. [15] have discussed that forensic examination structure has been proposed for No SQL databases due to horizontal reliability and scalability. Scalable 3 tier architecture which can assist transaction of inter database has been suggested which utilizes distributed middleware protocol and also NoSQL database decreases the time and cost in accessing data and assist scalable applications. To manage semi structured information from different applications so that it can be used for further examination NoSQL is required[16]. According to [17] the characteristics namely greater performance, reliability, scalability and flexibility has been offered by Hbase schema to migrate the information from relational to NoSQL. The techniques of cloud based data migration have been used because cloud offers services to store information in NoSQL database. In [18] have stated that an approach based on data model for reverse engineering and migration of data techniques was explained to provide a solution for relational database management system to MongoDB in 18. The relational DB and NoSQL database has been contrasted and a model has been suggested to optimize the MongoDB NoSQL. A model of schema conversion has been suggested for migration of data which can assist complicate join operations [19].

According to [20] NoSQL layer assures that the data to be migrated from relational to NoSQL databases without developing the requirement of change in the code of application. The framework performs as an interface which occurs between the application and database. The solution for the addressed issue is implemented using 2 phases namely mapping and migration. The framework comprises of two modules namely the module of migration which assures seamless migration of data from relational to NoSQL databases using the information of metadata comprised in data dictionary and another module is the mapping which offers the facility for applying the queries of MySQL to allow the code of application remain unaltered. It maintains the source database semantics and makes it simple for programmers to query the DB by permitting them to code with a relational database query. The queries occur from the application are seized by the layer of NoSQL and transformed into particular database format of NoSQL and the outcome produced by the NoSQL database is seized by the framework and transformed into the specific format of application.

In [21] have stated that mediator is a tool of open source which is utilized for interaction between the database and application and convert is a sub module of conversion which converts the entire demand existing from mediator to queries which are assisted by database MongoDB and NoSQL. The Framework has been verified by two main techniques namely the quantitative evaluation and qualitative evaluation. Quantitative evaluation estimates the overhead incurred by the layer of NoSQL in accessing

data whereas the qualitative evaluation evaluates different applications of user which access relational DB that are accessed using the layer of NoSQL with several operations. The outcomes of the evaluation mentioned that the framework is performing with the layer and the overhead experienced by the layer is essential when the data included in operation is low but it is reduced when the data amount is developed and the NoSQL layer provides effective outcomes.

## 3. Some Models used for data migration:

### 3.1 In [22]:

the work process of the movement demonstrate comprises of data extracting procedure, data changing over procedure and data stacking procedure. Procedure of Data Extracting: 1. DBA visits the inquiry creator of data extracting module at that point chooses inheritance database and target database that need to move data. 2. Query planner visits UDDI focus then recoveries and calls database association web administration of heritage database and target database to produce database association string for database association. 3. After associated with database, data tables of inheritance database and target database will be shown in the question creator. DBA picks the required data tables and data fields. 4. Query fashioner recovers the coveted data from heritage database and target database. Recovered data including organized data of data table, for example, name, property data of fields, for example, name, sort, length, and requirement data, for example, names and estimations of essential key or outside key, which were utilized for data change process when centre level makes fields mapping tenets and connections. Procedure of Data Converting: 1. Data converting module calls the data transformation web benefit that enrolled in UDDI focus, at that point interprets the reaction XML archive into good data for target database positions as per the comparing relationship library and data converting calculation. 2. During the procedure of data change, regardless of whether the task brings victory or not, data converting module will sends a reaction message to advise DBA, if the data transformation isn't well done, it will records the blunder data in database. Procedure of Data loading: 1. after got information migration guidelines, information stacking module forms the reaction XML report that returned by information changing over web benefit. 2. Information stacking module composes the handled information to target database by means of information essayist calling.

### 3.2 In [23]:

the process model for data migration. The business/program support starts the migration venture. She/he clears up the undertaking extension, speaks to the business needs, and guarantees the financing. Moreover, the support administers the groups' venture administrator. The client centre group takes up the customer's point of view. Numerous colleagues are business space specialists. They know the source application and see how it adds to the execution of the everyday business. Thus, they ought to be additionally utilized as analyzers. The mastery of the objective application group is the objective application. On the off chance that the last is supplanted by another one, developing a proficient target application group may turn into a test. In the event that there is as of now an objective, the application administration group and key clients must be included. Data migration group is in charge of breaking down the data migration needs, actualizing change rules, and additionally running and testing them. This paper for the most part focuses on their undertakings. The foundation and co-ordinations group gives framework administration to the general task. They assume control undertakings, for example, dealing with the system, servers, database, or access rights. Unquestionably, the data migration group may oversee particular data migration apparatuses independent from anyone else.

### 3.3 In [24]:

The migration is an occasion and the individual who moves is a vagrant. The occasion must be legitimately characterized. Any migration includes movement yet not all migrations are migrations. Migration is by and large characterized as a difference in common living arrangement (address) past authoritative limits. Migrations that don't include a difference in address don't qualify as migrations. They might be travel, driving or transitory change of home. These spatial developments may be thought about in light of the fact that they may prompt a migration. Distinctive models are related with various data writes. Harmonization of migration data and examination of migration levels in space and time require that one data compose can be changed over into another sort. Likelihood models serve that capacity. A few models foresee the quantity of vagrants amid a given interim others anticipate the likelihood that an arbitrarily watched individual is a transient, while still different models foresee the rate of migration. The parameters of the likelihood models are by and large assessed from perceptions on migration. Exact confirmation on migration is regularly missing, inadequate or of flawed quality. Parameters evaluated from insufficient data might misdirect. To get precise parameter gauges, hard confirmation might be increased by delicate

proof for example, master assessments and judgments. The technique, which is broadly utilized as a part of migration investigation, is exhibited as an exceptional instance of the EM (expectation– amplification) calculation. The EM calculation is the most across the board factual strategy for display estimation when data are deficient. The section shows that the demonstrating of migration can profit by late improvements in displaying of life occasions and life accounts.

### 3.4 In [25]:

that Data Migration is an essential action amid the change of Legacy investments in programming to contemporary models. While the procedure can be awkward and tedious, it is trusted that the advantages far exceed the inevitable expenses. A3-part Legacy data migration technique distinguished comprehension and mapping as the key contemplations in Legacy Data Migration. The model includes deciding data quality as the initial phase in its data migration, mapping the legacy framework to the objective data framework furthermore, building a data lexicon as reference. While this model considered different factors, for example, area, conditions and legitimate contemplations, it neglects to explicitly address the worries of basic affectability of the data. The exploration was gone for moderating dangers in data migration tasks and it is basically worried about a data migration process-demonstrate that rose and was consistently refined over the span of a few industry data migration ventures. The creators trusted that social databases are as yet significant in business and end-client settings despite the nearness of different strategies for envisioning steady data. Subsequently the model relocates to social data structures. Another early model is the “Big-Bang” or “Cold Turkey” approach. This is fundamentally a Forward and Reverse Migration process where the legacy framework must be closed down for an impressive time to encourage data migration before the objective framework is made accessible while one issue related with this approach is that, the proposed structure is displayed at too high a hypothetical level to be valuable by and by, no thought is offered for all intents and purposes to the real migration of the data.

### 3.5 In [26]:

migration is a mind boggling wonder that incorporates an immense measure of quantitative and subjective viewpoints, a significant number of them being interdisciplinary by nature, which must be appropriately identified, sensibly sorted out, put away and recovered when required. The favorable position goes to individuals and associations that gather, oversee, and decipher data in a legitimate, predictable and savvy way. This is particularly critical when observing migration, as a substantial scale social marvel. Migration is progressively being recognized as an issue that needs a significant and worldwide approach and facilitated reactions on a respective or territorial level, as well as on a worldwide level. Concentrate such marvels and influencing arrangements to must be founded on applicable and exact factual data, which, thusly, depend on very much planned, frequently refreshed and legitimately looked after databases. The reasonable data model of the advanced human migrations we propose catches well all important data about transients and their migrations, and is a strong establishment for advance improvements and expansions. It incorporates the static data about every transient, as well as it incorporates genealogical data (the two successors and progenitors), and in addition the applicable spatial and transitory data about vagrants' developments. Along these lines it offers a finish picture on the migration marvel.

### 3.6 In [27]:

the mathematical models of data migration. Human migration is one of only a handful few genuinely interdisciplinary fields of research of social forms which has broad results for both, people and the general public, and which can be considered as statistic, financial, ethnologic, geographic, political, mental or social process. Thus, it is not really shocking that the quantity of social sciences, engaged with its investigation, is ceaselessly expanding: demography, financial aspects, geology, political science, human science and others. In any case, every one of the controls recorded above has its specific introduction. For example, demography regards migration as one of the fundamental statistic forms influencing the populace elements and structure of populace, while financial aspects centers around monetary parts of migration, its effect on a country's, locale's or person's welfare. The classification of migration models are Macro models of Migration and Micro models of migration process. Macro models of Migration comprises of Interaction models of migration: Sequentially the connection models or the models of spatial collaboration were the to begin with. They depend on the possibility of relationship of the procedures experiencing inside physic what's more, social frameworks and, correspondingly, the possibility of the methodological solidarity. Gravity Models of migration, Intervening opportunities models of migration, Migration Models based on Alonso’s are also interaction model. Migration Factors Models (Pull-Push Migration Models) and Markov Chain Migration Models also comes under the macro model of migration. Micro models of migration process comprises of Diffusion Migration Models and Human capital models of migration.

3.7 In [28] :

the data representation into the metamodel. He says that the procedure of interpretation the data between the underlying JSON structure and a coveted last organization is done in particular stages, and each stage has a predefined info and yield data display. A flood of characters is gotten and the parsing procedure delivers a progression of occasions. The last procedure is the change of the data structures mapped in the past strides into a particular NoSql portrayal. This change depends on the data accessible in the portrayal made into the metamodel. Different bits of data like remarks and substance arrange are a bit much for the procedure. The thought is to speak to the data in the fundamental parts that can be extricated from a JSON question like their esteem, sort, space and connection with the other data exhibit in a similar protest. Along these lines giving a uniform and regular portrayal of every datum here called a JSON cut. Utilizing this method it end up easy to compose interpreters utilizing regular Get's and Set's activities given by the system. The interpretation is finished by getting and perusing a JSON question and afterward cutting these protest in their negligible coherent parts, the data itself, and putting away alongside the data the attributes which will be vital in the following stage of the procedure.

## 4. Challenges faced in data migration:

In [29] say that 1) Holistic methodology 2) Scalability in IaaS Close to of this There are numerous future critical difficulties in Big Data administration and investigation that - emerge from the idea of data: extensive, different, and developing. Analytics Architecture-Optimal architecture of an analytics framework ought to be to manage notable data and with continuous data in the meantime. Statistical Significance- it is important to have noteworthy statistical outcomes and not be the tricked by randomness. Distributed Mining - Distributed renditions of a few techniques, a considerable measure of research is required with down to earth and hypothetical analysis to give new strategies. With this some kind of Security and Challenges is likewise present. Network level-These difficulties are manages network conventions and network security, for example, distributed hubs, distributed data, Inter node correspondence. Authentication Level-These difficulties are classified under client authentication level manages encryption/decoding strategies, authentication techniques, for example, authoritative rights for hubs authentication of utilizations and hubs, and logging. Data Level-These difficulties are especially data uprightness and accessibility, for example, data security and distributed data. Generic Types-These are ordered under general level are conventional security apparatuses, and utilization of various advances. Other than of this cloud registering issue real piece of unanswered inquiry for finishing second steps for migration of big data is noting questions like What is the data included, how big is it and where is it found? Shouldn't something be said about persistent and rare data? And so on….There are a few difficulties for alleviating big data analytics over cloud figuring condition. Big Data Storage - A Big Data cloud must join an exceptionally versatile, effective, ease data storage stage. Boss employments of the Big Data cloud storage stage are for chronicling, administration and replication, and in addition for finding, procuring, collecting and representing multi-organized substance. Commonly, it would bolster these utilizations through reconciliation with high limit storage zone network architecture. Big-data processing - A Big Data cloud should bolster greatly parallel execution of propelled data processing, manipulation, analysis and access functions. Big-data improvement - A Big Data cloud should bolster Big Data application advancement which includes displaying, mining, investigation and analysis of profound data sets.

In [30] had explained the unique challenges of a Data migration Leader. The author says that Data mitigation is like “A Solar Eclipse of the project management world”. At a current occasion, one of the speakers remarked that data migration ventures were compared to a sun powered shroud. Most task pioneers may just observe one in their whole lifetime however when they do it is a really vital affair. The issue is exacerbated obviously on the grounds that not exclusively does the venture pioneer regularly have no understanding of an extensive, complex data migration however their supporting group may have constrained mastery moreover. Companies Struggle to Retain Specialist knowledge and Skills. Data migration aptitudes maintenance is a major issue for associations and again this is because of the way that data migration isn't generally observed as a train in its own particular right. Not very many organizations construct a focal point of perfection for data migration or even archive the systems and best practices which they discovered useful on a task. Another test is that especially with the source (inheritance) frameworks there is frequently an absence of mastery. A considerable lot of the heritage specialists or designers may have proceeded onward through steady loss throughout the years leaving a noteworthy gap in the aptitudes required to convey the undertaking. Acting as a buffer between Business, IT (and the Rest of the World): The conflicts are Systems Integrators need to make a benefit and will be transparently impervious to handle things like data quality issues or anything that falls outside of their transmission. Business clients and inheritance specialists need to be allowed to sit unbothered and get on with their normal everyday employment, they may respond

severely to being advised to surrender their opportunity to help the task. Target innovation suppliers need to get the undertaking finished quickly so they can get paid.

In [31] say that migration of a relational database into its counterparts is generally refined between two databases. The primary database is a relational database, called the source, and the second, called the objective, which speaks to the consequence of the migration procedure. What's more, the procedure is done with or without the assistance of a transitional theoretical portrayal, e.g., an ER demonstrated as a phase of improvement. The information source diagram is enhanced semantically and converted into an objective mapping. Data put away in the source database are changed over into target database in light of the objective diagram. For the most part, relations and traits are converted into comparable target objects. Outside keys might be supplanted by another space or relationship properties. Powerless element relations might be mapped into part classes, multi-esteemed or composite traits inside their parent class/substance. Different connections, for example, affiliations and legacy, can likewise be extricated by examining data conditions or database cases. In data transformation, characteristics that are not outside keys turned out to be strict quality estimations of articles, components or sets of components. Outside keys acknowledge connections among tuples, which are changed over into esteem based or protest references in an objective database. The test in this procedure is that the data of one connection might be changed over into an accumulation of strict/references as opposed to into one comparing compose. This is a direct result of the heterogeneity of ideas and structures in the source and target data models.

According to [32], Data migration does not have the consideration it merits since it is dependably a subset of a more extensive exertion. A solitary data migration miscue can have emotional and expansive results. Every datum migration venture is one of a kind, with its own particular arrangement of business drivers, specialized challenges and operational issues. Over 60% of data migration ventures have time as well as cost overwhelms. Over 75% of data migrations neglect to meet set up courses of events, and a critical rate fizzle. Most associations do not have a data migration master regularly on the grounds that data migration is viewed as a dull, deadlock work that no one needs. Data structures in target systems are advancing amid the outline and improvement of the migration procedure. Data migrations are frequently performed in conjunction with another system being created and sent in the undertaking, and the migration forms must be adjusted to these adjustments in target system.

According to Integrity on [33], the three biggest challenges in the data migration process are 1. The size, complexity, and condition of the data: A standout amongst the most focal challenges is the sheer volume of the data that should be moved. Capacity used to be costly, yet this is not true anymore. Given the generally minimal effort of data stockpiling contrasted with the dangers of not keeping data, program administrators will more often than not fail of the side of putting away more data and keeping it longer. Accordingly, government organizations regularly keep up tremendous amounts of data in the greater part of the systems they work. Contingent upon the office, that may mean various terabytes of data that need to be moved from heritage systems into another system. The sheer measure of data that can be included amid modernization makes requests on transmission capacity, storage room, work force, and numerous different variables. 2. Understanding the technology platform (both new and old): A moment territory of test can be the innovation stage — of both the inheritance and target systems. An association might not have staff available with imperative information or nature with either or both of these systems. A related concern is that the restrictive idea of numerous more seasoned heritage systems can make it exceptionally hard to utilize standard tooling to interface with data vaults, comprehend the data that is housed there, and proficiently maneuver the data into the new stage. 3. Blind spots in planning and scheduling: A third potential region of test in data migration is when there isn't adequate time dispensed to basic advances. This isn't completely astonishing, since an organization may embrace a noteworthy data change just rarely. The individuals who dealt with the last data migration exertion may have proceeded onward to different organizations or parts, or may have even resigned.

In [34] explored the challenges looked in data migration by organizations recorded at Nairobi Stock Exchange (NS). There are a scope of down to earth challenges and inhibitors around data migration that makes data migration to be viewed as unsafe and complex process and because of this, data migration ventures are maintained a strategic distance from or postponed. A portion of these challenges include: Poor understanding of source data: understanding source data is proficient by actualizing a two-advance process, data profiling and data mapping. Data profiling includes contemplating the source data altogether to comprehend its substance, structure, quality and uprightness. When data profiled, an exact arrangement of data determination is produced on the profile, a procedure called data mapping. Absence of appropriate data profiling, dissecting and mapping of devices have been a hindrance to fruitful data migration. Incompatibilities caused by migration of data between arrays from different vendors: The present venture processing condition contains an unpredictable blend of utilization servers, working systems, stockpiling gadgets and systems. Consequently fruitful data migration from heterogeneous undertaking conditions requires proficient

administration groups to keep up definite learning of all accessible registering setups and communication among all parts. Invasive migration software: Migration programming used to keep away from downtime related with data exchanges, introduces another arrangement of test. IT managers in charge of the everyday accessibility and execution of big business application servers are justifiably reluctant to oblige new programming introduces on generation has. Choice of data migration tools: Data migration issues regularly wreck important application extends and incite accuse storms that influence even the most talented and honest business and IT staff. Associations can conquer data migration challenges by setting a higher need on data migration, and getting instruments or a toolset that backings abnormal state system data specialized engineering outline, specialized process plan, and process justification.

In [35] say that data migrations for the most part result from the presentation of another system. This may include an application migration or solidification in which at least one inheritance systems are supplanted or the sending of an extra system that will sit nearby the current applications. Whatever the particular idea of any data migration, a definitive point is to enhance corporate execution and convey upper hand. Exact data is the crude material that augments the estimation of big business applications. Nonetheless, while existing data is relocated to another objective application, it can wind up obvious that it contains mistakes, questions, and repetitive and copy material. What's more, in spite of the fact that the data in the source system might be impeccably satisfactory for its present utilize, it might be entirely insufficient, as far as substance and structure, for the goals of the objective system. Without an adequate comprehension of both source and target, moving data into a more refined application will intensify the negative effect of any off base or immaterial data, sustain any concealed heritage issues, and increment presentation to hazard. A data migration venture regularly begins with an expansive brief from the business to the IT group that prompts an in fact centred migration in which a larger number of data is moved than would normally be appropriate, at a more prominent cost over a more drawn out timeframe than was gauge, bringing about various amendments at various stages.

In [36] say that data Migration is a critical occasion that devours noteworthy spending plan and work and happens frequently. The blend of the recurrence of and resources devoured in a data migration brings about data migration taking a lot of the IT spending plan. As capacity foundations end up bigger and more intricate, data migrations are ending up more perplexing, dangerous and work escalated. Associations must start dealing with this developing segment of their IT spending plans all the more viably. Data migration ventures are basic to the accomplishment of the activities that the migrations bolster; they affect business-basic data, applications and systems, and result in huge cost. The data migration venture itself has noteworthy dangers and requires legitimate arranging and consideration regarding guarantee achievement of the data migration and the activities that it bolsters, which could be an endeavour wide application overhaul, a data focus union or a foundation update.

## 5. Research Gap:

In [22] studied about the data migration model and algorithm between heterogeneous databases based on web service. In [23] made a study on a detailed process model for large scale data migration projects. In [24] studied the model of migration. In [25] studied about the re-engineering legacy data migration methodologies in critical sensitive systems. In [26] studied the conceptual data modeling of modern human migration. In [29] studied the opportunities and challenges for migrating big data analytics in cloud. In [34] made a survey of challenges faced in data migration by companies quoted at the Nairobi stock exchange. In [35] had made a study on the migration of legacy information systems.

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