Chapter Table of Contents

Chapter 1.2

Information Management

Aim

To equip the students with the fundamentals of information management

Instructional Objectives

After completing this chapter, you should be able to:

- Outline the key challenges in managing information
- Explain information lifecycle
- Elaborate the strategy included in classifying, implementing and managing Information Lifecycle Management (ILM)
- Outline the benefits of ILM

Learning Outcomes

At the end of this chapter, you are expected to:

- Analyse the role of information over its lifecycle
- Discuss ILM strategy
- Outline the activities included in implementing ILM strategy
- Identify the advantages of implementing ILM strategy

1.2.1 Introduction

We cannot deny the importance of information in our daily lives. In this twenty-first century, we have transformed into information dependents, living in an on-command and on-demand information world. This mean that we have the access to information whenever and wherever it is required.

We access the Internet daily, perform searches, send and receive e-mail, participate in social networking, share pictures, locations and videos and what not. Today we are equipped with a growing number of content-generating devices, that is creating more and more information every second.

The importance, volume and dependency of information for both personal and business world continues to grow at an astounding rate. Businesses rely on fast and reliable access to information which is critical for the business's success. Some examples of the business applications that process the information are telephone billing system, airline reservation, credit cards and web portals.

In the previous chapter we read about how the information is stored. In this chapter, we will learn to manage the information. In the coming topics we will discuss the lifecycle of information and its management. We will also discuss and understand the need and benefits of managing information.

Let us begin with understanding the key challenges in managing information.

1.2.2 Key Challenges in Managing information

The management of information is closely related to and sometimes overlaps with, the management of processes, data, technology and system. Sometimes the availability of information becomes essentially critical for the success of the organization. In such cases, information management joins hand and proves to be a critical basis of strategy management.

Both public and private sector today have their prime focus on improving, refining and upgrading the practice of information management in their respective organisations.

Such focus on managing information is driven by a variety of factors, which include a need to upscale the regulation and efficiency of business processes, demanding compliance regulation and the desire to outshine in the crowd by delivering new and unique services.

Let us understand the key challenges in managing information that will help us structure a better information management policy.

- **Explosion of sheer volume of digital information:** The digital world has taken over almost every other medium of information and the rate of information growth has shown an exponential increase. The amount of information available today can be overwhelming for anyone. Apart from the actual piece of information, there is a huge abundance of duplicate information to meet high availability and ensure repurposing.

- **Increasing dependency on information:** Businesses today highly rely on factual information for creating strategies in order to stay number one in the marketplace. The strategic use of information provides a competitive advantage in the marketplace.

- **Time-based information:** A piece of information which is valuable today may become useless with the changing time. The value of information based on time often changes as time changes.

- **Increasing cost of storage management:** With the exponential rate of information growth, the storage of information is also becoming a huge concern. Users have to pay a huge amount that can easily burn a hole in one's pocket.

- **Complex and error-prone manual or IT processes:** The existing manual or IT processes related to information storage are either way too complex or with manual processes there always stand a chance of an error.

Refer to figure 1.2.1.

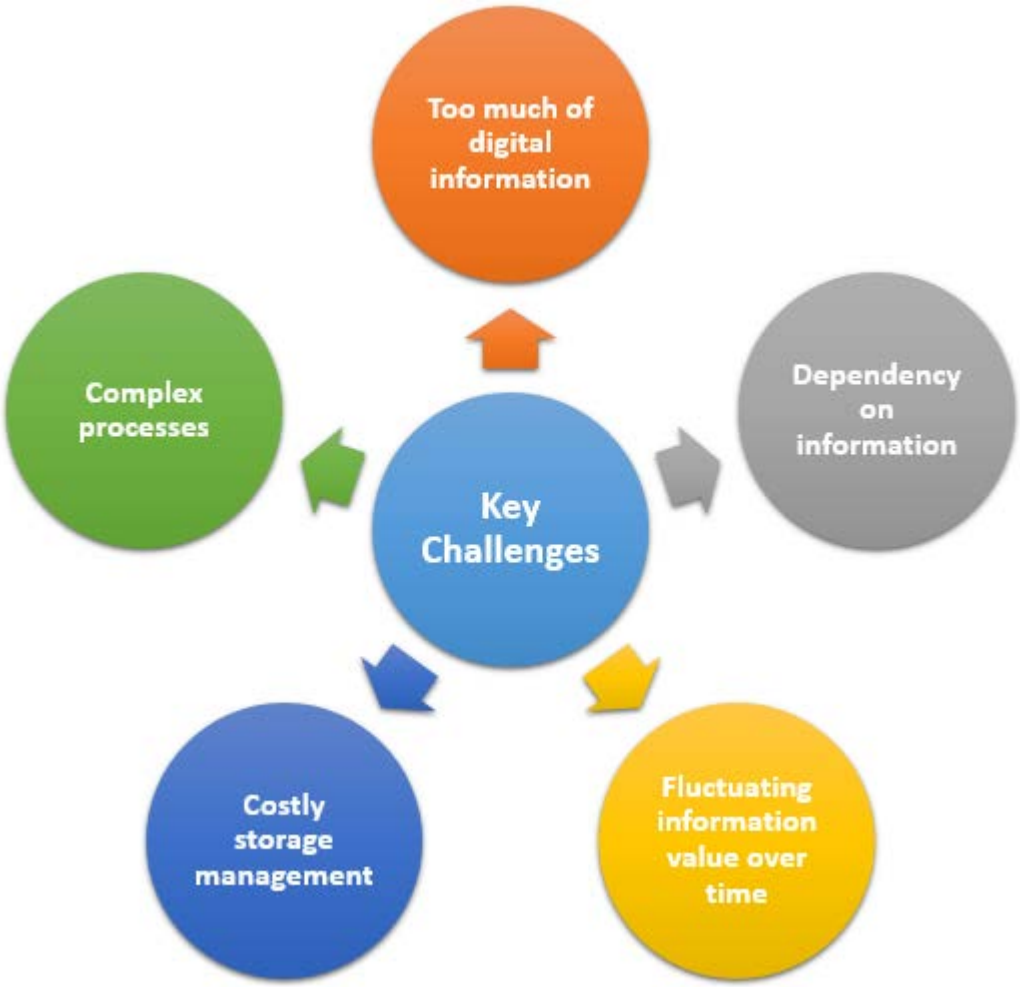

Figure 1.2.1: Key Challenges in Managing Information

Did You Know?

We create new data every second. Almost 40,000 search queries are performed every second only on Google, which makes it approx. 1.2 trillion searches per pear ("Big Data: 20 Mind-Boggling Facts Everyone Must Read", 2015).

Self-assessment Questions

1) The management of information is closely related to the management of which of the following?

   a) Data
   b) Time
   c) Resources
   d) Business

2) In which of the following ways can information provide a competitive advantage in the marketplace?

   a) Increasing rate of information
   b) Time-based information
   c) Dependency on information
   d) Strategic use of information

3) The value of information often changes with which of the following?

   a) Processes
   b) Data
   c) Time
   d) Applications

1.2.3 Information Lifecycle

As time passes by, the value of information changes. The piece of information that was more valuable yesterday becomes of lesser importance today. This change in the value of information with the course of time can be understood as information lifecycle.

From the creation of data to its disposal, the frequency of its usage changes over time. And thus, as data ages, the frequency of its access decreases and it becomes of less importance to the organisation to the point where the data is first archived and when it loses its meaning, then destroyed.

Understanding the information lifecycle helps create an appropriate storage infrastructure, keeping in mind the changing value of information.

In general, there can be three stages of information lifecycle:

- **The creation or acquisition of data:** Information can either be created or acquired from outside. In an organization, an information is either conceived within the organization by its employees or it can be pulled out or acquired through phone calls, e-mails, letters, faxes, etc.

- **The sharing of data:** The information needs to reach out to all the respective stakeholders and hence, needs to be published or distributed. The distribution can happen either in a printed form or it can be broadcasted on the web. The distribution method depends on the size of the masses at the receiver's end.

- **The archival or removal of data:** Some information might be required in the long run and hence, is archived for future use. However, some pieces of information are created for a finite purpose and once the purpose is solved, they can be discarded or removed.

Let us consider an example of a project progress data created by an organization to keep track of its ongoing projects. The data, when created, has a lot of importance and is presented in every meeting and a lot of discussions and strategies for further project advancement are based on it. However, as time passes and the project move towards its completion, the data, once very important, loses its importance and is referred seldom. After a point, when the project is over, the data is archived and is used only as a historical reference. Later, the company might choose to destroy it to make space for other high-value information.

Refer to the Figure 1.2.2 that describes an information lifecycle.

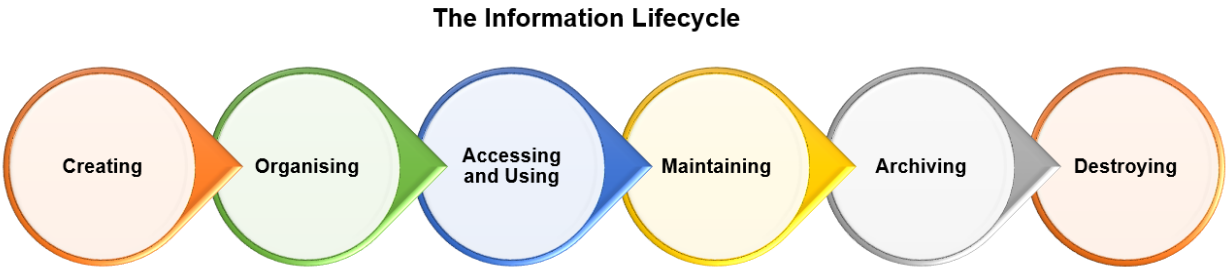

Figure 1.2.2: Information Lifecycle

All of us want our businesses to run smoothly and efficiently and for that we need fast access to the stored data. In today's business environment, there are certain challenges one has to face when it comes to storing and managing information. The challenges can range from exponentially growing rate of information leading to a sheer volume of both actual and duplicate information, increasing cost of storage management, changing value of information based on time, increasing dependency on information, strict regulatory requirements for data retention and many more.

(i) Information Lifecycle Management (ILM)

Although there has been a sheer increase in the total value of stored information, but the value of that data changes over time. This means that every data that is stored cannot be treated the same and neither can be given same priority in terms of storage and archiving.

Most commonly, the value of data shows a decrease with the advent of time showing different rates of decline. However, inactive or infrequently accessed data can become active again and become valuable as certain events occur.

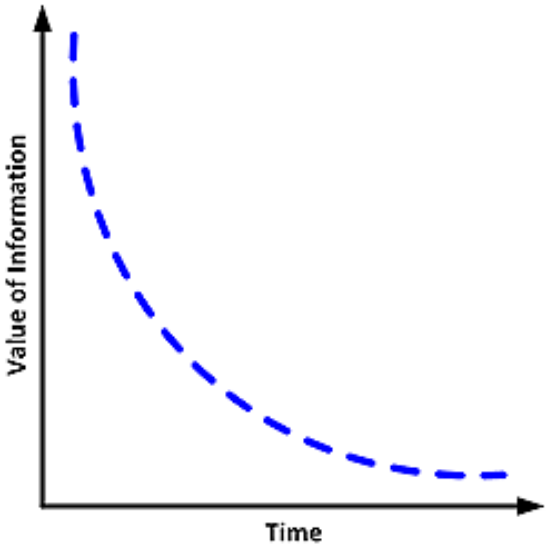

Figure 1.2.3: Time-based Value of Information

In this data-centric world, the organisation, availability and protection of data matters a lot. This can be streamlined by having a proper storage infrastructure in place. To take the best advantage of the storage infrastructure benefits, an information management policy needs to be in place.

ILM refers to the creation and management of wide-ranging set of strategies for streamlining the storage infrastructure and the data within it. It is a comprehensive approach in managing the flow of data from its creation to its disposal. All the information resting in a storage network has a specific lifecycle which we just discussed in the previous topic.

ILM revolves around keeping the data handy and accessible to its users and determining and maintaining the storage of every information based on its priority and demand at a certain point in time. At every stage in the information lifecycle, it must be determined that what are the best storage medium, hardware and software for that information at that moment in time.

How those factors differ and change as the data progresses through the lifecycle should also be taken care of.

Refer to Figure 1.2.4.

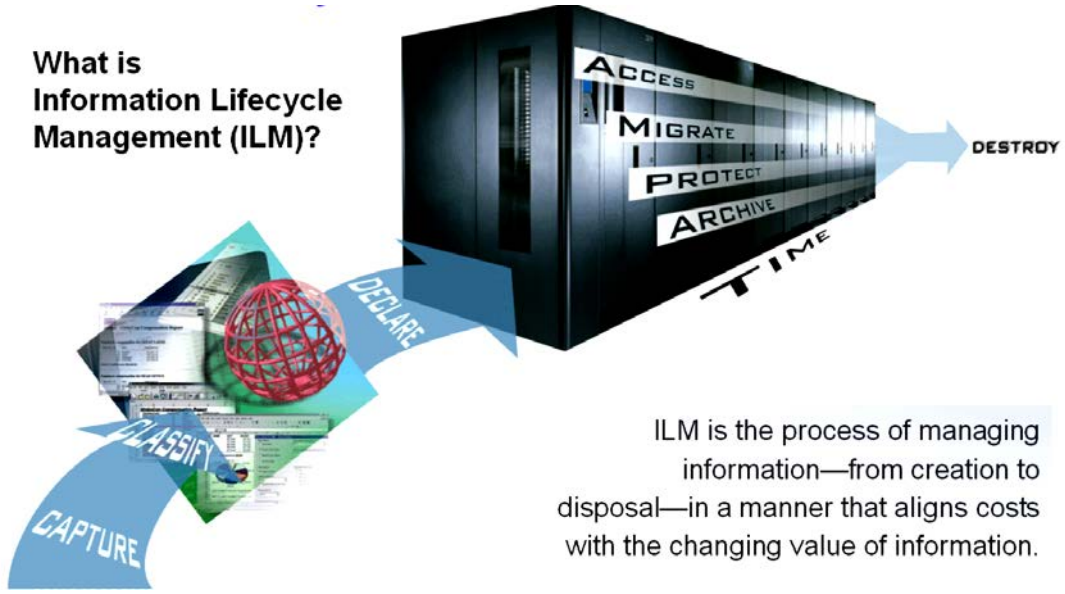

Figure 1.2.4: ILM

Did You Know?

ILM is often considered a more complex subset of data lifecycle management (DLM).

Need for ILM

Let us understand the need for having ILM in place.

Initially, the requirement to storing information within organisations resulted into a mentality of buying more and more storage for retaining information. However, this approach only resulted into an overall increase in storage management complexity and costs. Along with that, it also increased the demand for qualified personnel in managing such complexities, which were sometimes hard to find.

Today, executives are tasked with reducing overall spending while supporting an ever increasing demand in the number of application and services. As the support and management tasks increase, IT department are expected to justify their position by demonstrating business

value to the enterprise. IT should also enhance and develop the infrastructure to support business initiatives while coming across few or all of these data storage problems:

- Costs related to e-mail management may reduce employee productivity in various companies.
- As data volumes grow in an unmanaged way, the backup and recovery windows continue to expand.
- A lot of valuable and high-performance disk storage space is consumed by inactive data.
- Additional storage spaces are being consumed by duplicate data copies.
- Budget continues to be under pressure, as data continues to grow and management costs increase.

Apart from this, there are many other challenges faced by businesses today that demands managing information more efficiently and effectively. Some of them are:

- Rate of information and data growth is higher than the storage budget.
- Deciding on what data to store and for how long.
- Deciding on what data to remove and when.
- Figuring out the volume and storage location of duplicate copies of data.
- Value of the data is not mapped to the value of the hardware on which it is stored.
- Backing up data takes a longer time; however, the window keeps on shrinking.
- Storage performance is not as per the requirement.
- Existing assets are poorly utilised.
- There can be potential business risks due to errors in manual process.
- There are regulatory requirements in place dictating long-term retention of certain data.
- Backup, recovery and accessibility of critical data becomes hard to achieve by the businesses in some cases.

- There are numerous backup and restore approaches and processes in place.
- The requirements for storage management are not well defined.

ILM Elements

In order to smoothly manage the information lifecycle, there are four main elements of ILM that can help an organisation or business adhere to an ILM structured environment. These are as follows:

- **Tiered storage management:** Most of the organisations today seek a storage management that can provide them the ease of storing and managing the information more efficiently. Tiered storage:
  - Provides the higher performance disk storages to the most recent and most critical business data and reduces overall disk-storage cost.
  - Provides high-performance access to the most frequently-accessed and most recent data and speeds up the business process.
  - Automatically and transparently moves the older or infrequently-used data to lower-cost disk storage and reduces administrative tasks and human errors.

Typical Storage Environment

Storage environments generally possess multiple tiers of data value, such as an application data, which is required on a daily basis and archive data, which is required on an infrequent basis. A typical storage configuration provides only a single tier of storage that restricts the ability to optimize cost and performance. Refer to Figure 1.2.5.

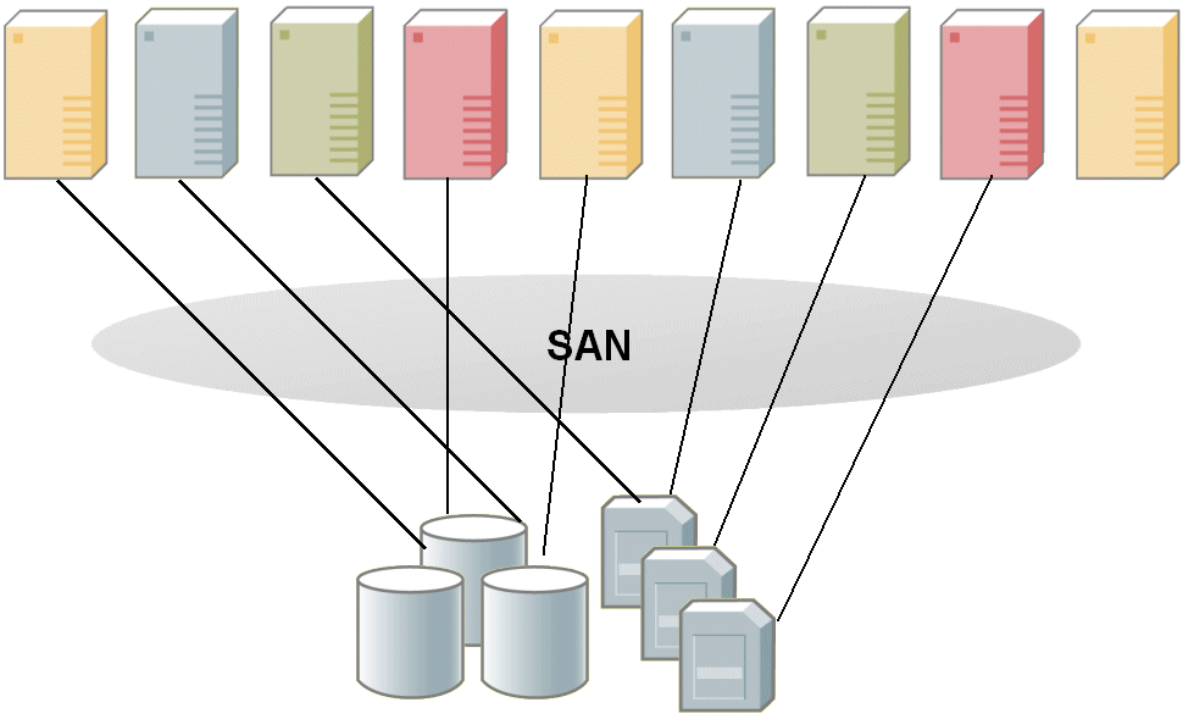

Figure 1.2.5: Single-Tiered Storage

Multi-tiered Storage Environment

To align storage cost with the changing value of information, a tiered storage environment infrastructure is required. The tiers are associated with data value. The most valuable and critical data is assigned to the high-performance disk storage. The less valuable data is assigned to the lower-cost disk storage.

Different performance matrix and disaster recovery capabilities is exhibited by each storage tier. An important step to configure a tiered storage ILM environment is to create classes and storage device groups. Refer to Figure 1.2.6.

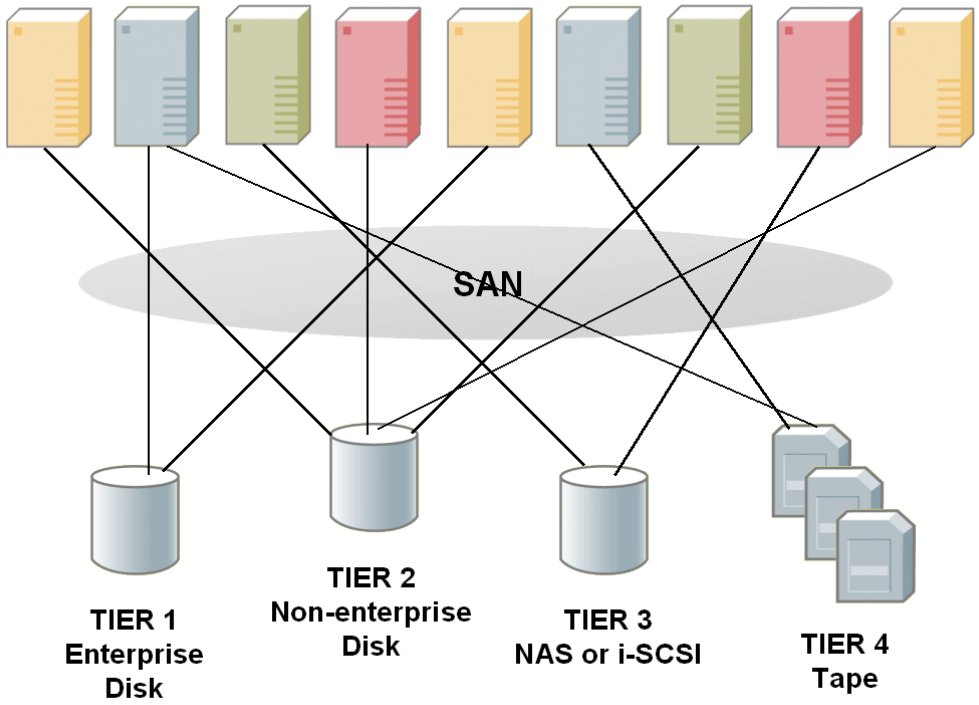

Figure 1.2.6: Multi-tiered Storage Environment

- **Long-term data retention:** The laws and regulations pertaining to secure retention of information are increasingly becoming a part of the business landscape and all the businesses must comply with this. Information, indeed, is an asset but to keep it beyond the mandated period can turn it into a liability. Organisations need to have a strategy in place to ensure that the appropriate information is stored for the correct period of time and it can be readily and easily accessible when requested for. ILM can help businesses address this particular requirement and provide them with the best solution to manage and store the information throughout its lifecycle.

- **Data lifecycle management:** ILM not only ensures proper information storage, it also encompasses scheduled deletion and regulatory compliance as well. ILM is designed in such a way that it can recognise that different information can have varying values at different points in their lifecycle.

  ILM has the potential to framework for a comprehensive information-management strategy. It helps in ensuring that the information is stored on the most cost-effective medium. This enables the administrators to make the most use of the tiered and virtual storage along with processing automation. ILM migrates unused or infrequently used data off the costly and high-performance disks and helps in reducing the cost of

managing and retaining data, streamlines data management and improves the performance of the application.

- **Policy-based archive management:** ILM works on policy-based archive management. The archive solutions for databases can help improve performance for online databases, reduce backup times and improve application upgrade time. The archive solutions for e-mail systems reduces the requirement for e-mail end-user management, improves e-mail system's performance and supports the retention and deletion of e-mails.

ILM Strategy

To ensure the efficient management of information, ILM should possess the following characteristics to obtain and maintain an ILM strategy:

- **Business-centric:** ILM should be strategized to run in parallel with the key processes of organisation, initiatives towards achieving the business goal and applications of the business to meet both the current and future information growth.
- **Policy-based:** ILM should not only be restricted to be implemented on a few departments, rather it should be treated as a policy and should hold within all the business processes, applications and resources. This can provide a holistic view of the information across multiple functional groups.
- **Optimised:** ILM should move the data at a predetermined interval on the basis of its priority, demand and requirement. Since the value of information tends to change over time, an ILM strategy should consider alternative storage requirements and should allocate different storage resources to an information based on its business value.
- **Centrally-managed:** ILM should hold and keep a check on all the information assets of an organisation or a business.
- **Heterogeneous:** An ILM strategy should cater all the different types of operating systems and storage platforms.

Did You Know?

Since decisions regarding moving, deleting, and retaining data are closely tied to the application use of data, ILM solutions are usually focused on applications.

Self-assessment Questions

4) Which of the following statements best describes information lifecycle?
   a) It refers to the change in management principles regarding information over a period of time.
   b) It refers to the change in the value of data over a period of time.
   c) It refers to the change in the value of information based on change in business goals of the organisation.
   d) It refers to the change in the value of information over a period of time.

5) ILM revolves around which of the following?
   a) Strategical goals
   b) Storage infrastructure
   c) Business milestones
   d) Information distribution

6) Which of the following is an ILM strategy?
   a) Policy-based
   b) Target-based
   c) Goal-based
   d) Processes-based

7) Which of the following storage configuration provides only a single tier of storage that restricts the ability to optimize cost and performance?
   a) Typical storage
   b) Multi-tier storage
   c) Single-tier storage
   d) One-tier storage

1.2.4 ILM Implementation

ILM is basically meant for managing information from it being conceived until destroyed. ILM does it in a manner so that storage and access can be optimised at the lowest rate.

ILM is not merely any other kind of hardware or software launched in the market, rather it includes policies and processes for managing the information. The design of ILM has been done in a way so that different types of information can possess different set of values at different moment in time of their lifecycle.

As the business grows and expands, it can be a challenging task to predict the storage requirements and control costs. The main objective of implementing ILM to manage information is to:

- Help minimize the total cost of ownership (TCO).
- Implement compliance-related policies and data retention.

The procedure to develop an ILM strategy includes the following four activities:

- **Classification** of information and applications based on business rules and policies so that differentiated treatment of information can be enabled.
- **Implementation** of policies using the information management tools, ranging from the creation of data to its disposal.
- **Management** of the environment by using integrated tools so that the operational complexity can be reduced.
- **Organisation** of storage resources in tiers to appropriately align relevant resources with data classes and storage of information in the appropriate kind of infrastructure on the basis of the current value of the information.

To ensure the effective implementation of ILM, the data owners are required to determine and answer the following:

- How is the information created?
- How does the information age?

- How does modification take place in information?
- When or if the information should be safely removed or deleted?

Data segmentation in ILM takes place according to value. This can help align the storage costs with business objectives and information value and create an economical balance and sustainable strategy.

When you plan to implement ILM, you need to be prepared so that everything falls in place. There are certain set of actions that should be taken care of while planning to implement ILM.

1. You need to define your ILM strategy:
2. Rules for classification and data retention should be defined.
3. You should talk to your vendors.
4. You should identify, classify and index the data
5. Implement ILM

Across an enterprise, the implementation of ILM is an ongoing process. Refer to the Figure 1.2.7 that represents a three-step road map to an enterprise-level ILM. Let us look at the first two steps, step 1 and 2 that aim at a limited ILM implementation across a few enterprise-critical applications.

When we look at Step 1, we can see that the goal of performing the step is to implement a storage networking environment. Varying layers of protection and performance are offered by storage architectures and this acts as a foundation for future policy-based information in Steps 2 and 3.

When we allocate appropriate storage resources to the applications based on the value of the information processed, then we can appropriately exploit the value of the tiered storage platforms.

If we look at Step 2, then we can see that by linking storage infrastructure to business policies and detailing applications or data classifications, it takes ILM to the next level. These classifications and the resultant policies can be executed automatically using tools for one or more applications. This results in better management and optimal allocation of storage resources.

Step 3 in ILM implementation automates more of the applications or data classifications and activities related to policy management in order to scale to a wider set of enterprise applications.

Let us look at the Table 1.2.1 to quickly summarize the steps in ILM implementation.

Steps	Applies to	Function
Step 1	Network-tiered storage	• Enables storage networking. • Classifies the data or applications. • Moves data across the tier manually.
Step 2	Application-specific ILM	• Defines business policies for numerous types of information. • Deploys ILM into principal applications. • Automates the process.
Step 3	Enterprise-wide ILM	• ILM implementation is done across applications. • Automation is policy-based. • Complete visibility into all information.

Table 1.2.1: Steps in ILM Implementation

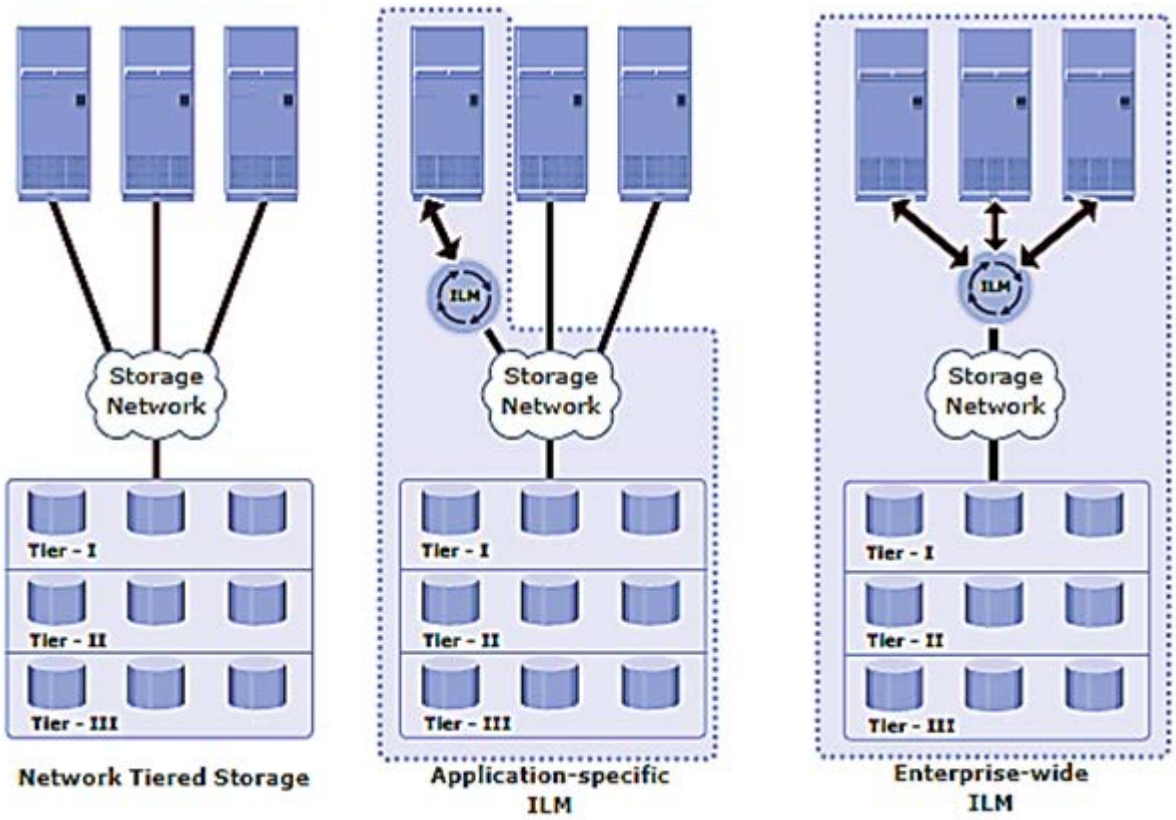

Figure 1.2.7: ILM Implementation

Self-assessment Questions

8) The procedure to develop an ILM strategy consists of how may activities?

a) One b) Eight

c) Four d) Three

9) On what basis does the data Segmentation in ILM takes place?

a) Information b) Time

c) Data d) Value

10) Which of the following activities is a part of the procedure to develop an ILM strategy?

a) Demonstration b) Implementation

c) Retention d) Distribution

1.2.5 ILM Benefits

ILM has been designed in a way to help ease the management of information lifecycle. Businesses today are adopting ILM wholeheartedly to efficiently manage information across the enterprise. ILM is enabling businesses to achieve competitive advantage by protecting, classifying and leveraging information.

The aim of ILM strategies is to ensure that the data is reassessed continuously throughout its lifecycle. It also keeps a check on the costs of storage management and assists in keeping it under control.

Let us outline some of the benefits of ILM:

- It reduces the cost of managing and retaining data.
- It helps in the improving the performance of the applications.
- It reduces backup windows and eases the system upgrades.
- It helps in streamlining the information management.
- It allows the enterprise to respond in real-time to the demands.
- It supports and promotes a sustainable management strategy.
- It scales as the business grows and develops.

There are many benefits of ILM. To understand ILM better, let us discuss some of the other benefits of ILM in detail.

- **Information retrieval is quick:** ILM is an organization-level process that holds within all the processes and resources contributing to the data flow in the organization. By using ILM, it is actually possible to categorise, evaluate and locate all through its lifecycle. The ensures the cost-effective and quick retrieval of data any given point in time.

- **Management is simplified:** ILM implementation is policy-based that is implemented across the company irrespective of the departments. This helps the IT managers to better manage the information flow within the organization. This reduces the need hiring new IT professionals or purchasing expensive infrastructure. ILM integrates process steps and interfaces with individual tools and also increases automation in order to simplify management.

- **Compliances and governance is managed:** ILM offers a wide approach with regards to data management. It can be used by the organisations for implementing crucial IT compliances and governance requirements. It also manages compliance by knowing what data needs to be protected for what period of time.

- **Operations cost is lowered:** ILM helps in reducing the overall cost of running a business in various ways. It ensures that the data is well utilized from its creation to its disposal. It also maximises storage utilisation and reduces the operation expenses. Since, the enterprises storage needs are growing day-by-day, organisations are looking forward to ILM as a means of efficiently managing different types of data across its lifecycle.

- **Utilisation is improved:** ILM uses tiered storage platforms and increases visibility of all enterprise information.

- **Provides wide range of options:** ILM provides a variety of options for backup and recovery and balances the need for business continuity.

- **TCO is lowered:** ILM aligns the information value with infrastructure and management costs and reduces the chance of resource wastage. It also ensures that there is no complexity in managing low-value data at the expense of high-value data.

Let us consider an example to better understand the benefits of having ILM in place.

For most companies, their Microsoft Exchange database represents one of the largest amount of storage data. It mostly consists of e-mails, calendars and attachments. Most of this data enters the system on high-performance disk storage for faster access and resides on it unless it is manually archived; however, not all of this information is required by the user immediately. If at all users seek this data, then it is likely to be only a small portion of it, such as attachments. However, the high-performance disk storage remains occupied with this inactive data, unless moved manually.

With ILMs in place, it automatically moves the inactive data from high-performance tier-1 to lower-cost drives. This brings up the performance of tier-1 storage and hence accessing of new e-mails becomes easy and more quick. All of this data movement is transparent to the user, so at the user's end there is no disturbance in accessing the data. They can anytime access any of their old e-mails or attachments without knowing that it has been stored on low-performance storage disks.

With distributing the storage on multiple tiers and reducing the storage of high-performance disk, we get to reduce disk expenditure and save a lot on the hardware costs. Also, by eliminating manual data classification and movement, ILM helps reduce the storage administration time and increases the disk performance, dramatically.

Self-assessment Questions

11) Which of the following is a benefit of ILM? Choose all that apply.

a) Simplified management
b) Improved utilisation
c) Lower TOC
d) Lower operations cost

12) ILM enables businesses to achieve competitive advantage by performing which of the following? Choose all that apply.

a) Protecting information
b) Classifying information
c) Shredding information
d) Leveraging information

Summary

- Explosion of sheer volume of digital data, increasing dependency on information, time-based information, increasing cost of storage management, complex or error-prone manual or IT processes are some of the key challenges in managing information today.
- The change in value of information with the change in time is called information lifecycle.
- The value of data shows a decrease with the advent of time showing different rates of decline.
- The three stages of information lifecycle are: creation or acquisition of data, sharing of data and the archival or removal of data.
- ILM refers to the creation and management of wide-ranging set of strategies for streamlining the storage infrastructure and the data within it.
- ILM is a comprehensive approach in managing the flow of data from its creation to its disposal.
- ILM elements are tiered storage management, long-term data retention, data lifecycle management and policy-based archive management.
- ILM strategies are business centric, policy-based, optimised, centrally managed and heterogeneous.
- ILM is basically meant for managing information from it being conceived until destroyed. It is done in a manner so that storage and access can be optimised at the lowest rate.
- The main objective of implementing ILM to manage information is to help minimize the total cost of ownership (TCO) and implement compliance-related policies and data retention.
- The procedure to develop an ILM strategy includes classification, implementation, management and organisation.

- The aim of ILM strategies is to ensure that the data is reassessed continuously throughout its lifecycle. It also keeps a check on the costs of storage management and assists in keeping it under control.
- ILM reduces the cost of managing and retaining data, lowers TCO, improves utilisation, simplifies management, etc.

Terminal Questions

1. Discuss the information lifecycle with an example.
2. Discuss the problems faced by the IT industry in managing and storing information and how ILM can be of any help to them.
3. List the benefits of using ILM and discuss ILM implementation.

Answer Keys

Self-assessment Questions	
Question No.	Answer
1	a
2	d
3	c
4	d
5	b
6	a
7	a
8	c
9	d
10	b
11	a, b, c, d
12	a, b, d

Activity

Activity Type: Offline **Duration:** 45 Minutes

Description:

Divide the class into two groups.

Both the teams should prepare a presentation on the topics “Information Lifecycle” and “Types of Information lifecycle” and present for 15 minutes each, on their outcomes.

Case Study

Simco IT is a large IT company that maintains over 90,000 media files that are accessed by the communication designers and reused in their current projects. The media files are modified or updated as per the requirement. The communications design team wants to instantly access the media files for their current projects. However, there is an infrastructure constraint that does not allow scaling to meet the response time requirements.

The team has classified the media files as “most frequently accessed”, “frequently accessed”, “occasionally accessed” and “archive.”

1. Suggest a strategy for the communications design department that optimizes the storage infrastructure with the help of ILM.
2. Explain how you will use “tiered storage” based on access frequency.
3. Research products and solutions currently available to meet the solution you are proposing.

Bibliography

e-References

- *Big Data: 20 Mind-Boggling Facts Everyone Must Read*. (2015). *Forbes.com*. Retrieved 17 June 2016, from http://www.forbes.com/sites/bernardmarr/2015/09/30/big-data-20-mind-boggling-facts-everyone-must-read/#1741e0646c1d

- Karp, M. (2006). *Six steps to ILM implementation*. *Network World*. Retrieved 20 June 2016, from http://www.networkworld.com/article/2300188/data-center/six-steps-to-ilm-implementation.html

- Rouse, M. (n.d.). *Information life cycle management (ILM)*. *SearchStorage*. Retrieved 20 June 2016, from http://searchstorage.techtarget.com/definition/information-life-cycle-management

Image Credits

- Figure 1.2.3: http://1.bp.blogspot.com/-kZ6wRsp3DkQ/Uk5IaXBwIAI/AAAAAAAAB4c/MUM1jEBUEGo/s1600/value+of+information.png
- Figure 1.2.4: ILM Library: Information Lifecycle Management Best Practices Guide
- Figure 1.2.5: ILM Library: Information Lifecycle Management Best Practices Guide
- Figure 1.2.6: ILM Library: Information Lifecycle Management Best Practices Guide
- Figure 1.2.7: Information Storage and Management: Storing, Managing and Protecting Digital Information

External Resources

- Haeusser, B., Osuna, A., Bosman, C., Jahn, D., & Tarella, G. (2007). *ILM Library: Information Lifecycle Management Best Practices Guide* (1st ed.). International Business Machines Corporation.
- Somasundaram, G. & Shrivastava, A. (2009) *Information storage and management* - Storing, managing and protecting digital information. *Indianapolis, Ind.: Wiley Pub.*
- *Kimball, R. & Ross, M. (2013).* The data warehouse toolkit - The definitive guide to dimensional modelling. *Indianapolis, Ind.: Wiley Pub.*

Video Links

Topic	Link
The information lifecycle	https://www.youtube.com/watch?v=5XHpzrNAOlk
Understanding the information lifecycle	https://www.youtube.com/watch?v=lTXrBa5L78g
Information lifecycle management	https://www.youtube.com/watch?v=LjiUqDDDlqs
Benefits of ILM	https://www.youtube.com/watch?v=KgnAejX2ttM

Notes: