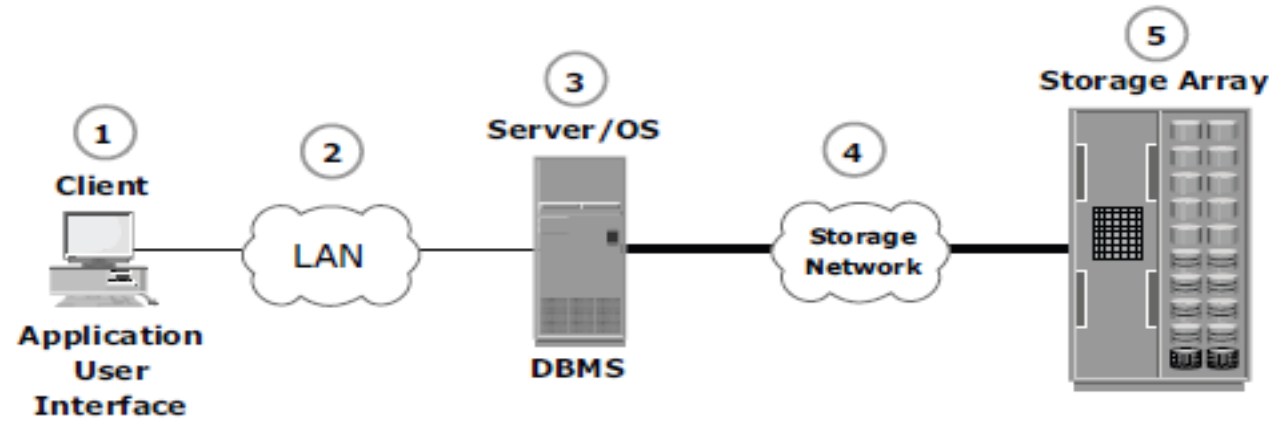


Data Center Infrastructure

- Organizations maintain data centers to provide centralized data processing capabilities across the enterprise.
- Data centers store and manage large amounts of mission-critical data.
- The data center infrastructure includes computers, storage systems, network devices, dedicated power backups, and environmental controls (such as air conditioning and fire suppression).
- Large organizations often maintain more than one data center to distribute data processing workloads and provide backups in the event of a disaster
- The storage requirements of a data center are met by a combination of various storage architectures.

Core Elements

- Five core elements are essential for the basic functionality of a data center:
- **Application:**
- **Database:**
- **Server and operating system:**
- **Network**
- **Storage array:**



- 1** A customer places an order through the **AUI** of the order processing application software located on the client computer.
- 2** The client connects to the server over the **LAN** and accesses the **DBMS** located on the server to update the relevant information such as the customer name, address, payment method, products ordered, and quantity ordered.
- 3** The **DBMS** uses the server operating system to read and write this data to the database located on physical disks in the storage array.
- 4** The **Storage Network** provides the communication link between the server and the storage array and transports the read or write commands between them.
- 5** The storage array, after receiving the read or write commands from the server, performs the necessary operations to store the data on physical disks.

Key Requirements for Data Center Elements

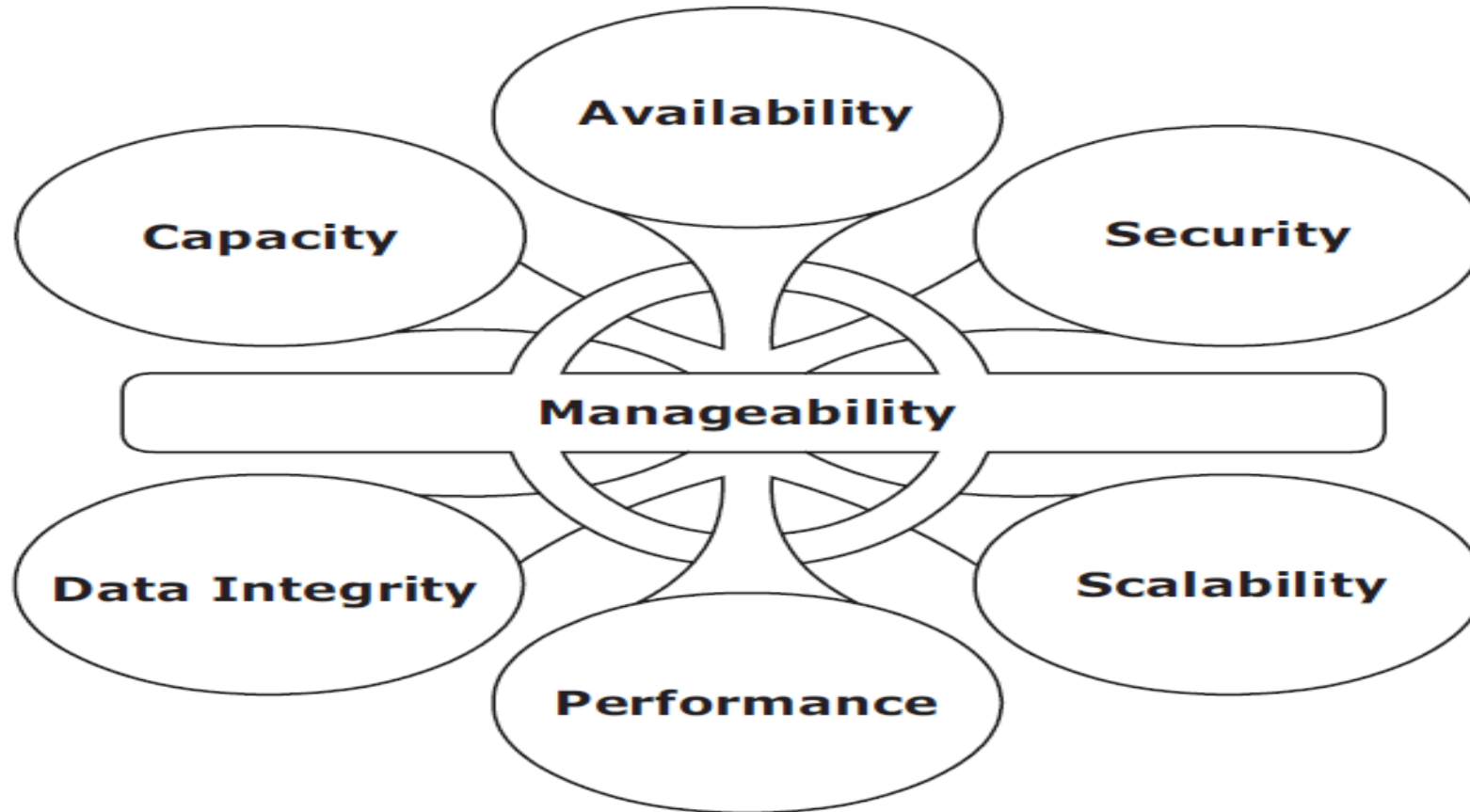


Figure 1-6: Key characteristics of data center elements

Key Requirements for Data Center Elements

- **Availability:** All data center elements should be designed to ensure accessibility.
- The inability of users to access data can have a significant negative impact on a business.
- **Security:** Policies, procedures, and proper integration of the data center core elements that will prevent unauthorized access to information must be established.
- In addition to the security measures for client access, specific mechanisms must enable servers to access only their allocated resources on storage arrays.
- **Scalability:** Data center operations should be able to allocate additional processing capabilities or storage on demand, without interrupting business operations.

Business growth often requires deploying more servers, new applications, and additional databases. The storage solution should be able to grow with the business.

- **Performance:** All the core elements of the data center should be able to provide optimal performance and service all processing requests at high speed. The infrastructure should be able to support performance requirements.
- **Data integrity:** Data integrity refers to mechanisms such as error correction codes or parity bits which ensure that data is written to disk exactly as it was received. Any variation in data during its retrieval implies corruption, which may affect the operations of the organization.
- **Capacity:** Data center operations require adequate resources to store and process large amounts of data efficiently. When capacity requirements increase, the data center must be able to provide additional capacity without interrupting availability, or, at the very least, with minimal disruption. Capacity may be managed by reallocation of existing resources, rather than by adding new resources.
- **Manageability:** A data center should perform all operations and activities in the most efficient manner. Manageability can be achieved through automation and the reduction of human (manual) intervention in common tasks.

Key Challenges in Managing Information

- **Exploding digital universe**
- **Increasing dependency on information**
- **Changing value of information**

Information Lifecycle

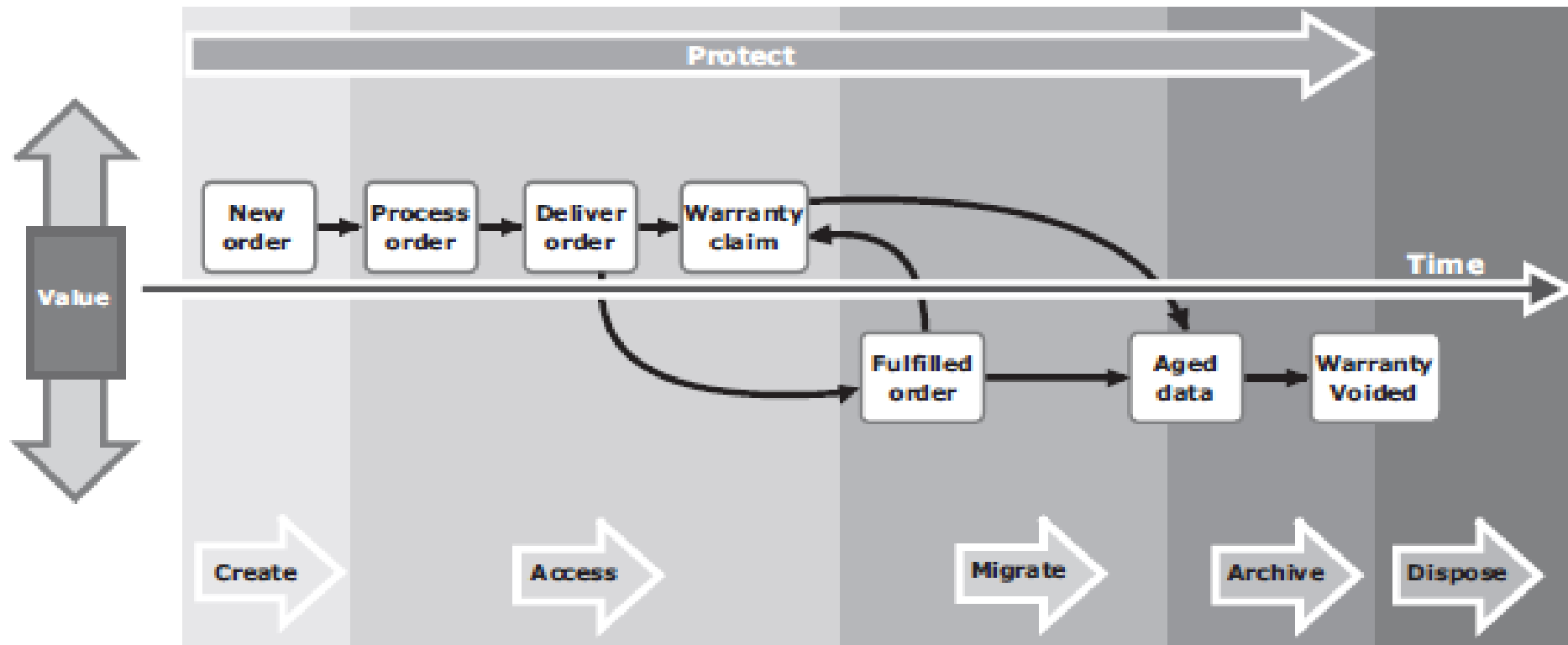


Figure 1-7: Changing value of sales order information

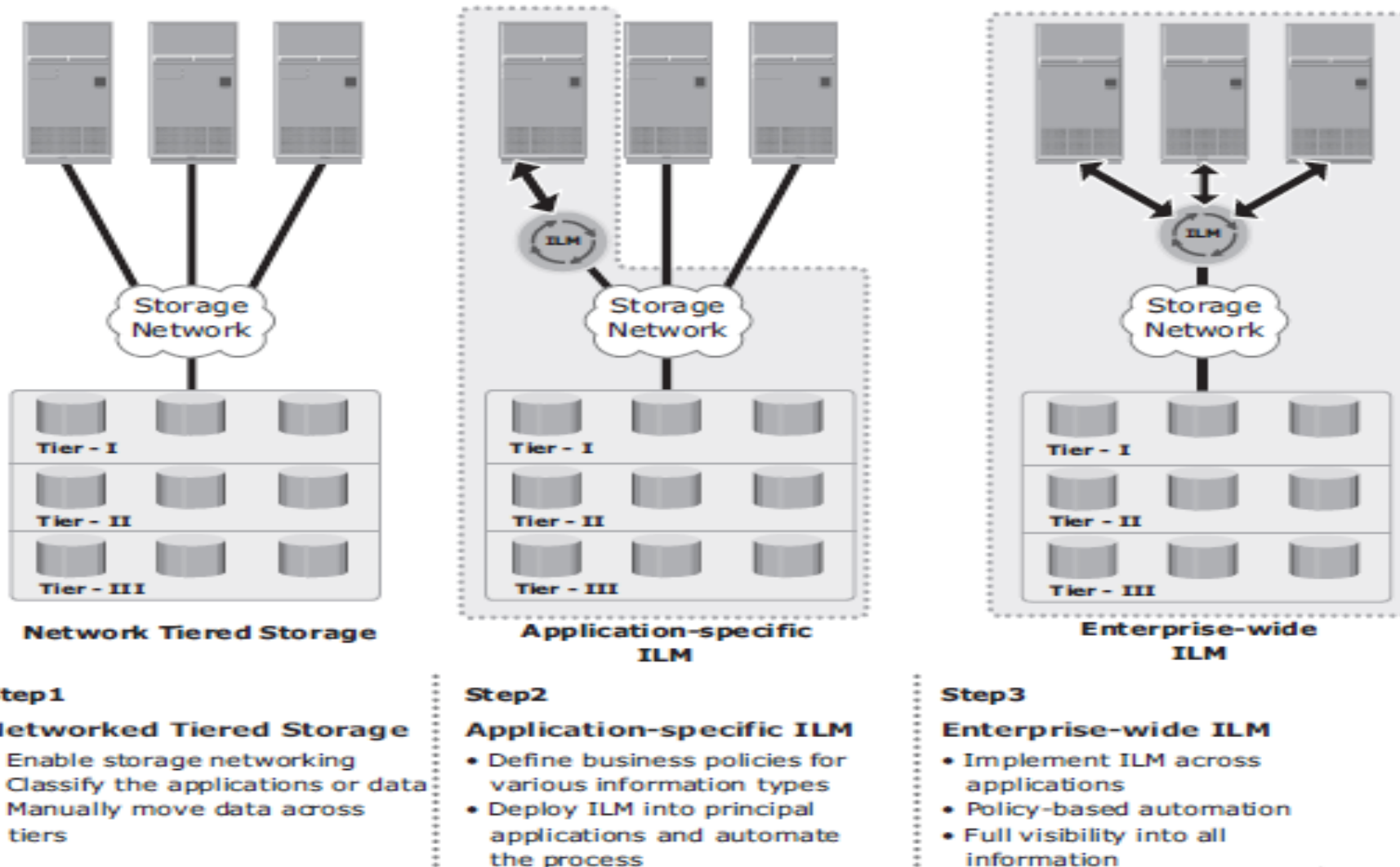
Information Lifecycle Management

- *Information lifecycle management (ILM)* is a proactive strategy that enables an IT organization to effectively manage the data throughout its lifecycle, based on predefined business policies.
- An ILM strategy should include the following characteristics
 - **Business-centric:**
 - **Centrally managed**
 - **Policy-based**
 - **Heterogeneous:**
 - **Optimized**

ILM Implementation

- ***Classifying*** data and applications on the basis of business rules and policies to enable differentiated treatment of information
- ***Implementing*** policies by using information management tools, starting
 - from the creation of data and ending with its disposal
- ***Managing*** the environment by using integrated tools to reduce operational
 - complexity
- ***Organizing*** storage resources in tiers to align the resources with data
 - classes, and storing information in the right type of infrastructure based
 - on the information's current value

ILM Implementation



Step1

Networked Tiered Storage

- Enable storage networking
- Classify the applications or data
- Manually move data across tiers

Step2

Application-specific ILM

- Define business policies for various information types
- Deploy ILM into principal applications and automate the process

Step3

Enterprise-wide ILM

- Implement ILM across applications
- Policy-based automation
- Full visibility into all information

Lower cost through tiered networked storage and automation

ILM Benefits

- *Improved utilization* by using tiered storage platforms and increased visibility
- of all enterprise information.
- ■■ *Simplified management* by integrating process steps and interfaces with
- individual tools and by increasing automation.
- ■■ *A wider range of options* for backup, and recovery to balance the need for
- business continuity.
- ■■ *Maintaining compliance* by knowing what data needs to be protected for what length of time.