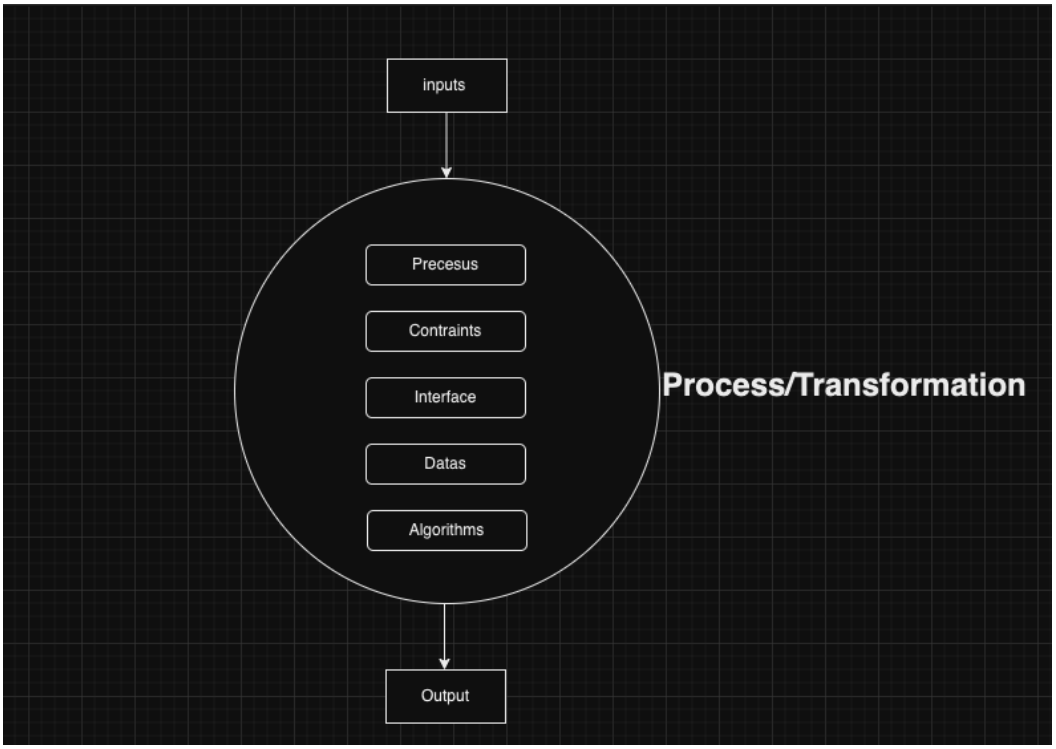
1. A system is a set of components or entities that communicate together, following specific rules and instructions, to accomplish a particular task. For example, a computer is a system composed of different components like the disk, RAM, and processor, each playing a role in executing tasks. Another example is a network, which is a system of various devices working together to transport information.

2. The essential elements of a functional system are the inputs, the process, rules, algorithms, and outputs.

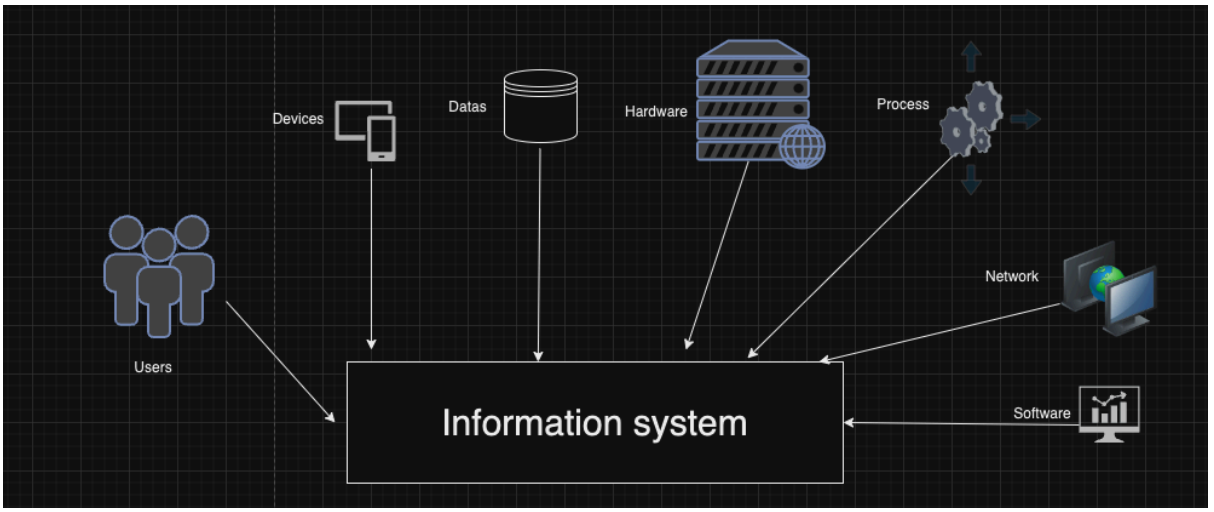


3. **Feedback in a system** is the response or input from the users of the system. It helps us make decisions, improve the system, correct issues, and adapt the system to users' needs.

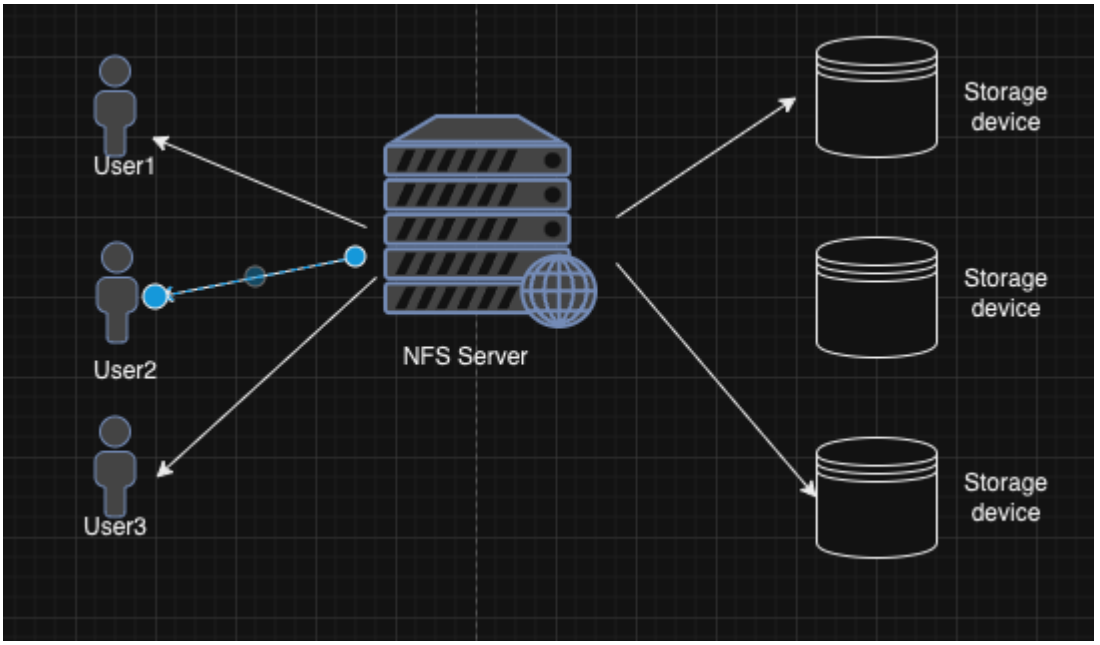
4. **An information system** is a system that processes data using its resources, following certain rules, and ultimately transforms it into useful information. For example, we can have:

- Stock Management System
- University Management System
- Database Management System

5. the essential elements of a functional information system is
    - Hardware
    - software
    - Data
    - people
    - process
    - network



6. the components of a distributed file system is client , NFS servers , storages servers



7.

	Centralized system	*Decentralized system*	*Distributed system*
characteristic	- Centralized control with a single point of management - High risk of single failure Initial - effectiveness but risk of saturation - Concentrated resource management	- Distributed control, each node operates independently - Less risk of single failure Improved - Scalability Efficient - use of resources Variable	- Shared control, nodes collaborate for common goals - Reduced risk of single failure - High scalability - Efficient use of resources
examples	central bank	Réseaux peer-to-peer (P2P)	Cloud computing

8. *transparency mean in distributed systems to hide the complexity of the system's implementation from the users*

Access Transparency:

- Example: A user accessing files on a remote server

Location Transparency:

- Example: A DNS system , Virtual machines (VMs)

Concurrency Transparency:

- Example: Multiple users accessing and editing a document

Replication Transparency:

- Example: Cloud storage systems

Failure Transparency:

- Example: load balancing , Automatic Failover

Migration Transparency:

- Example: Virtual machines can be live-migrated from one physical server to another

Scaling Transparency:

- Example: A cloud-based application

9. The structure documentation describes the composition of the system, while the behavior documentation explains how the system works and what it achieves. The first provides a static view, the second shows the dynamic evolution of the system