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Chapter 3: Means of Dependability

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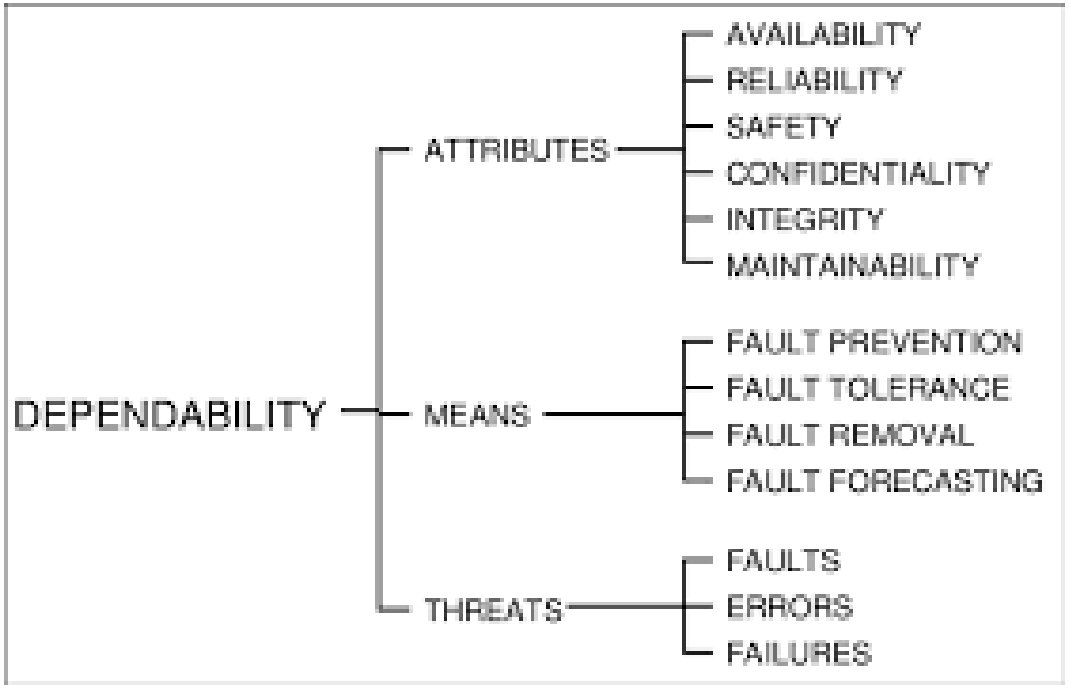
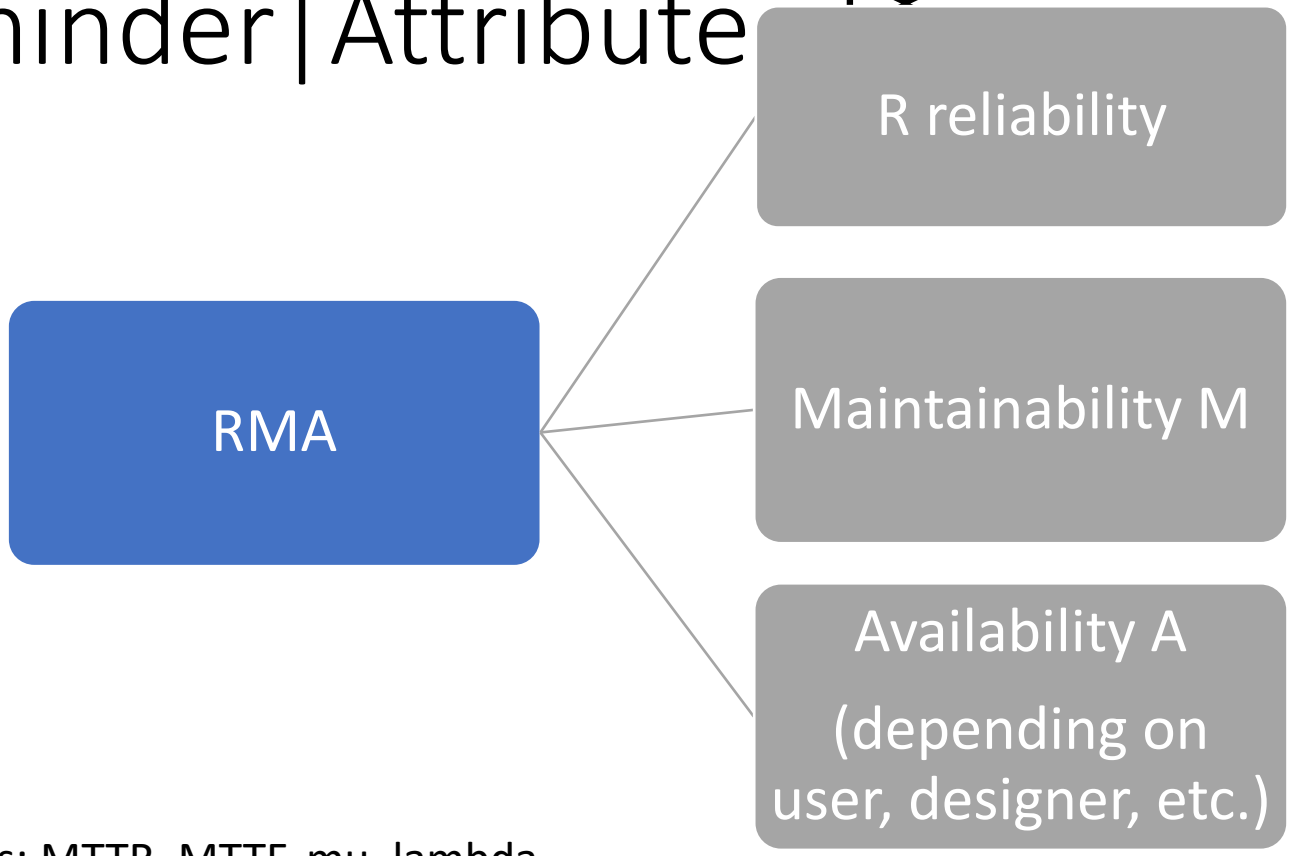


Reminder: Dependability Attributes *

Reminder | threats *

- Several concepts: faults, errors and failures
- Causal chain
- Latency
- Several types of faults (origins)
- Several types of failures (observations)

Reminder | Attribute [illegible]



Indicators: MTTR, MTTF, mu, lambda

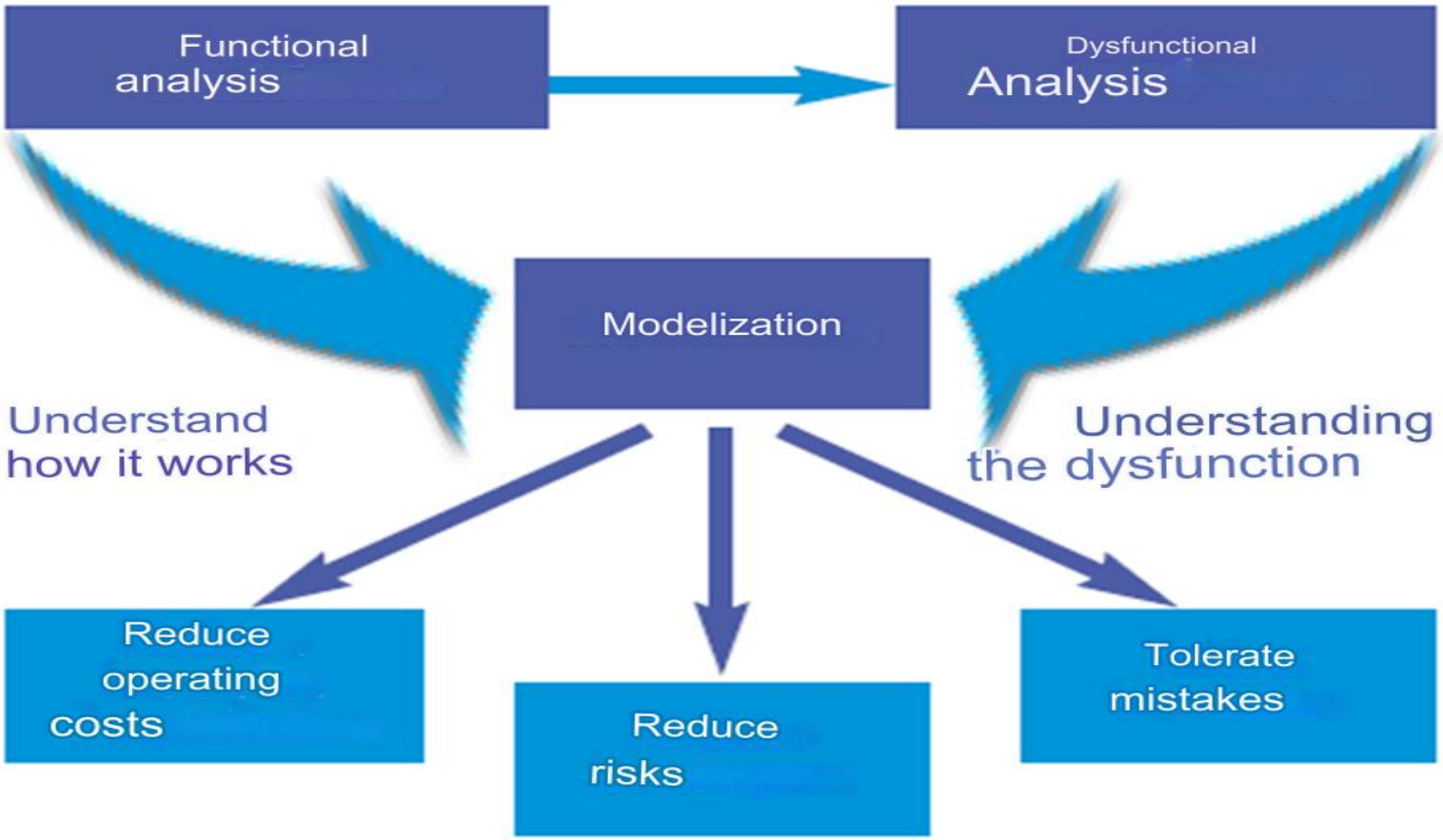
Statistical estimation

Estimation by probabilistic law

dependability means*

- These are proven solutions to break the chains : Fault → Error → Failure and therefore improve the reliability of the system.
- **Fault prediction** (estimate the number and nature of future failures , for example the air conditioner will be rusty after 3 years)
- **Fault prevention (preventing** failure from the start (example: testing after coding or putting exceptions, covering the air conditioner against humidity, it will never get wet)
- **Fault elimination** (maintenance in the event of failure **)**
- **Fault tolerance (provide** two air conditioners instead of just one)

Roles of analytics



Fault tolerance

It is based on the use of mechanisms:

- redundancy: the idea is to achieve the same function by different means
- To change architecture or role assignment (example in the case of wireless networks)
- To work with the rest of the components

Types of redundancy*

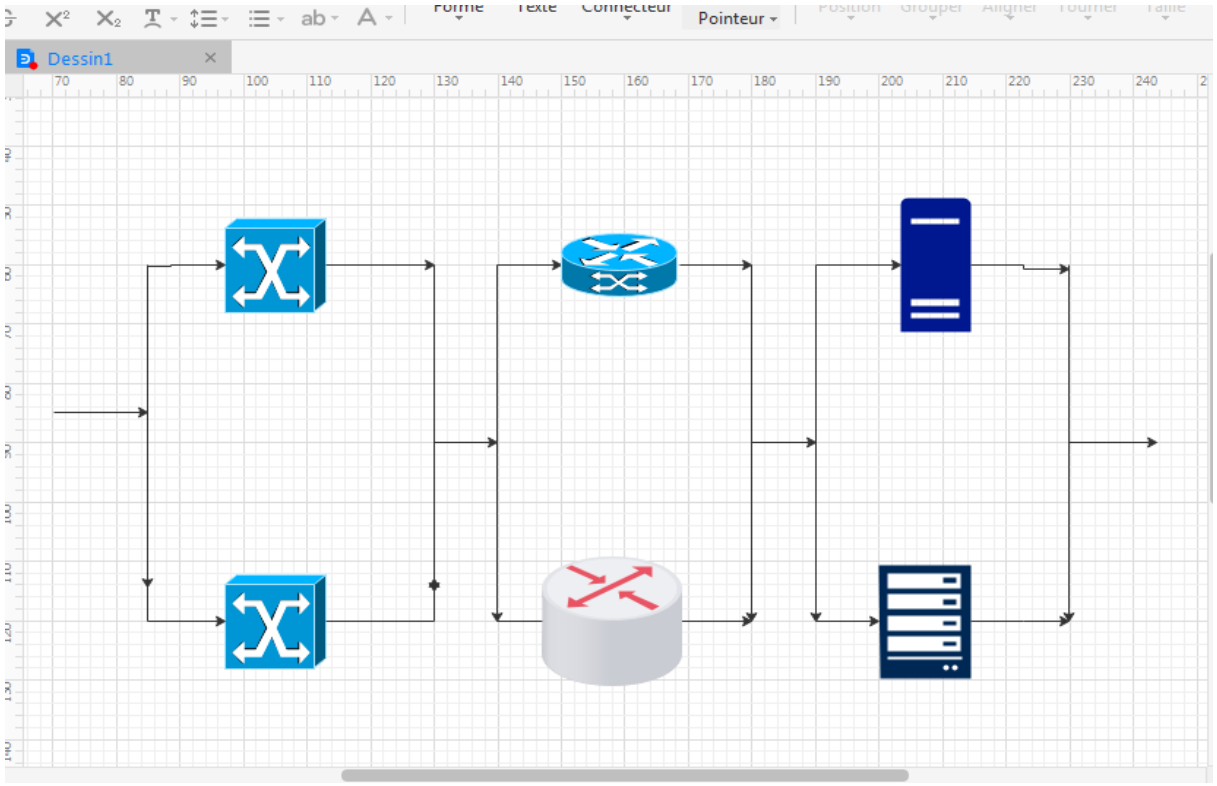
- **Software redundancy**

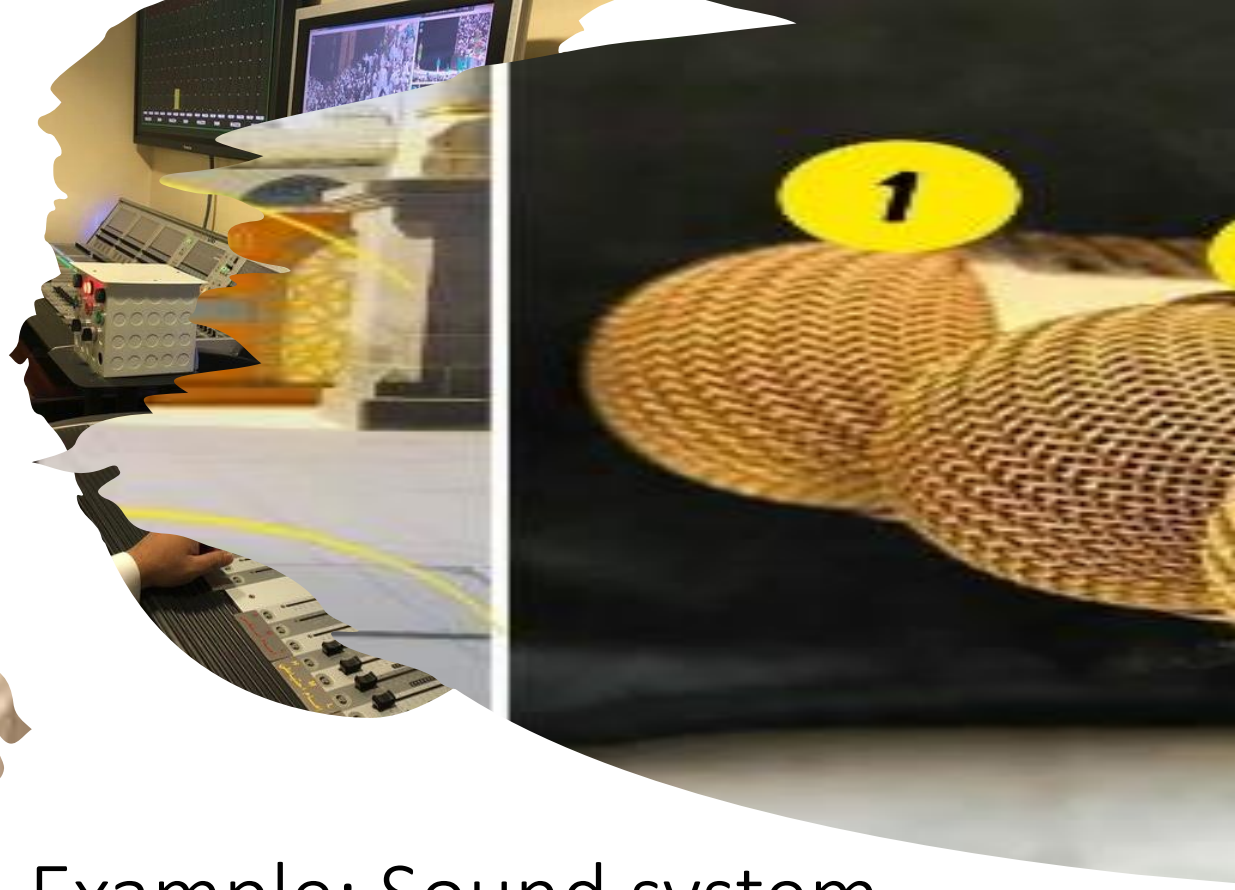
duplication of databases for example, cloning of data from a disk, etc.

- **Hardware redundancy**

duplication of components: several elevators, several routers, several servers…

Example of redundancy*





Example: Sound system at Masjid ElHaram

- Everything is duplicated in 3.
- Reliability=1

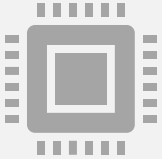
Hardware redundancy type*

1. homogenous redundancy : identical components

2. Heterogeneous redundancy: Not identical

Hardware redundancy type*

I. Cold redundancy :the components become active when those already active fail, otherwise they remain passive



II. Hot redundancy : All components are initially active.

Functional and dysfunctional analyzes

- To see in chapter 4