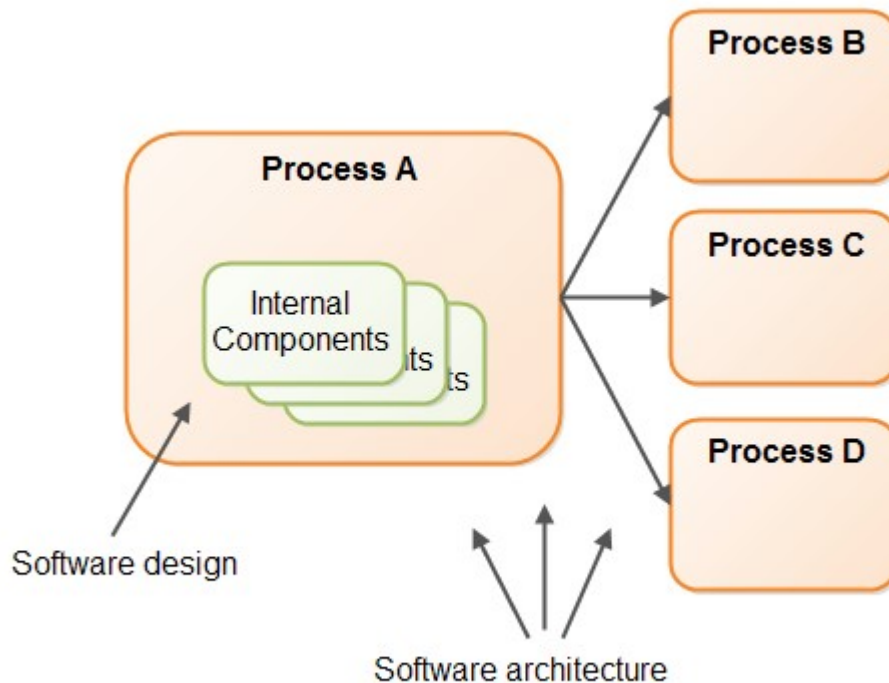# Software Architecture

Software architecture and software design are two aspects of the same topic. Both are about how software is structured in order to perform its tasks. The term "software architecture" typically refers to the bigger structures of a software system, whereas "software design" typically refers to the smaller structures.

Exactly where the boundary is between architecture and design is hard to say, since the architecture of a system also affects its design. The design of the bigger structures affect the design of the smaller structures. Software design is thus concerned with the internal design of a single software process, whereas software architecture is concerned with the design of how multiple software processes cooperate to carry out their tasks.

How does my definition of software architecture fit with the term "distributed systems" ? The way I see it, software architecture provides the basic structures on top of which the various distributed algorithms can run. Yes, there is a certain overlap between the two terms, but various different distributed algorithms can run on top of the same underlying architectures.

Software architecture is also influenced by the hardware architecture of the whole system (software + hardware). You may need different architectures (and thus design) depending on what hardware you are using. Or, you may choose different hardware depending on your architecture.

Common Software Architectures

There are many different types of architectures, but some architectural patterns occur more commonly than others. Here is a list of common software architecture patterns:

- Single process.
- Client / Server (2 processes collaborating).
- 3 Tier systems (3 processes collaborating in chains).
- N Tier systems (N processes collaborating in chains).
- Service oriented architecture (lots of processes interacting with each other).
- Peer-to-peer architecture (lots of processes interacting without a central server).
- Hybrid architectures - combinations of the above architectures.

Here is a simple illustration of these architectures.