Lecture 6 SA Style and Samples

- SA Style
- Samples

主要架构风格

Software Architectural Style

- A system family defined by the architectural pattern and structure
- Specifically, it describes a common structure and a shared set of attributes for a group of SA

Software Architectural Pattern

- A reused design or an architectural solution for a set of design tasks under certain conditions

主要架构风格

SA Style - SA Model Terminology

- 目前尚不完善
- 每个风格可以视为一组构件的集合，以及构件间的交互（连接器）
- 构件（Components）＋ 连接器（Connectors）

  e.g. C/S结构中

  - 构件： Client, Server
  - 连接器： C/S间的通讯协议

主要架构类型

A List of Styles (part)

- Filter/pipe
- Object-oriented Arch
- Event-driven Arch
- Layered Arch
- Data-centric Arch
- Feedback-control Cycle
- Composition of Heterogeneous Sys.

主要架构类型

Pipe-Filter

- Every functional unit has a group of input/output interface.

  functional blocks: Filters

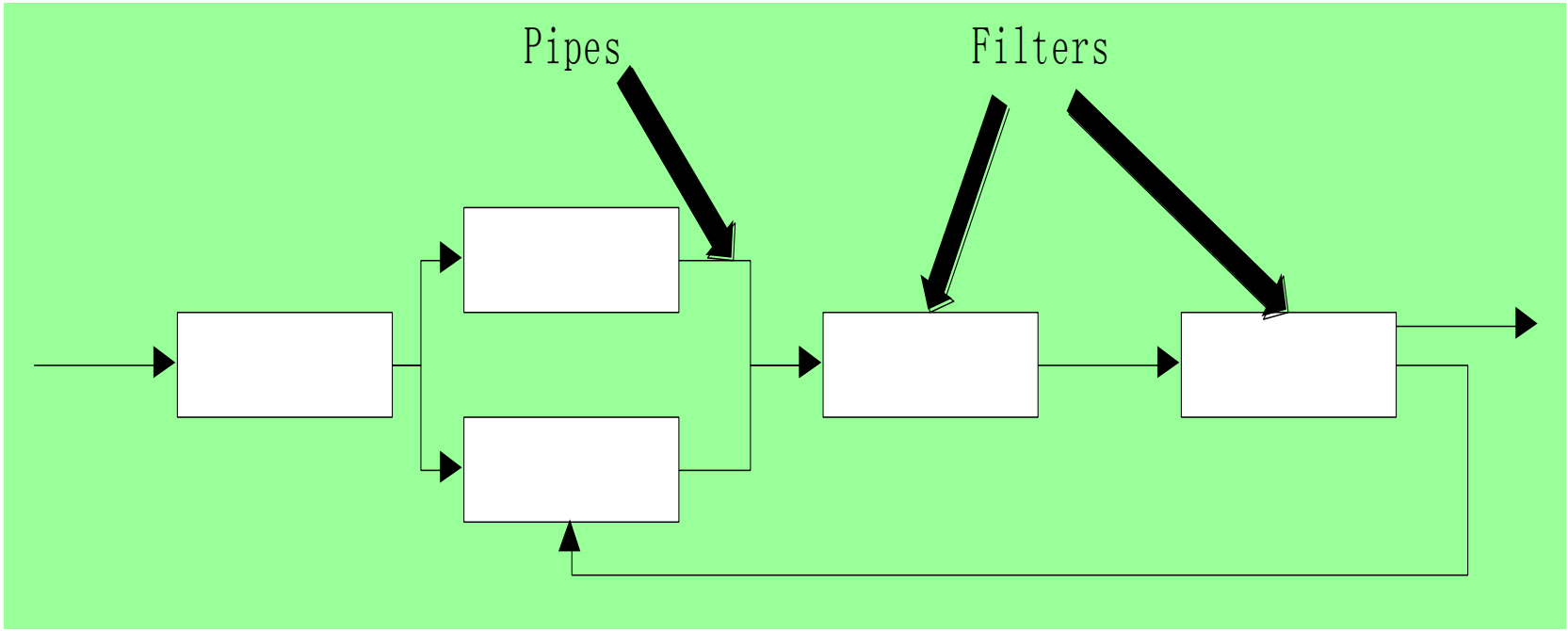
  output/input connections: Pipes

- Filter is an independent unit that has no interactions with other filters

- Filter is also an stateless running unit that does not have impact to other filter’s state

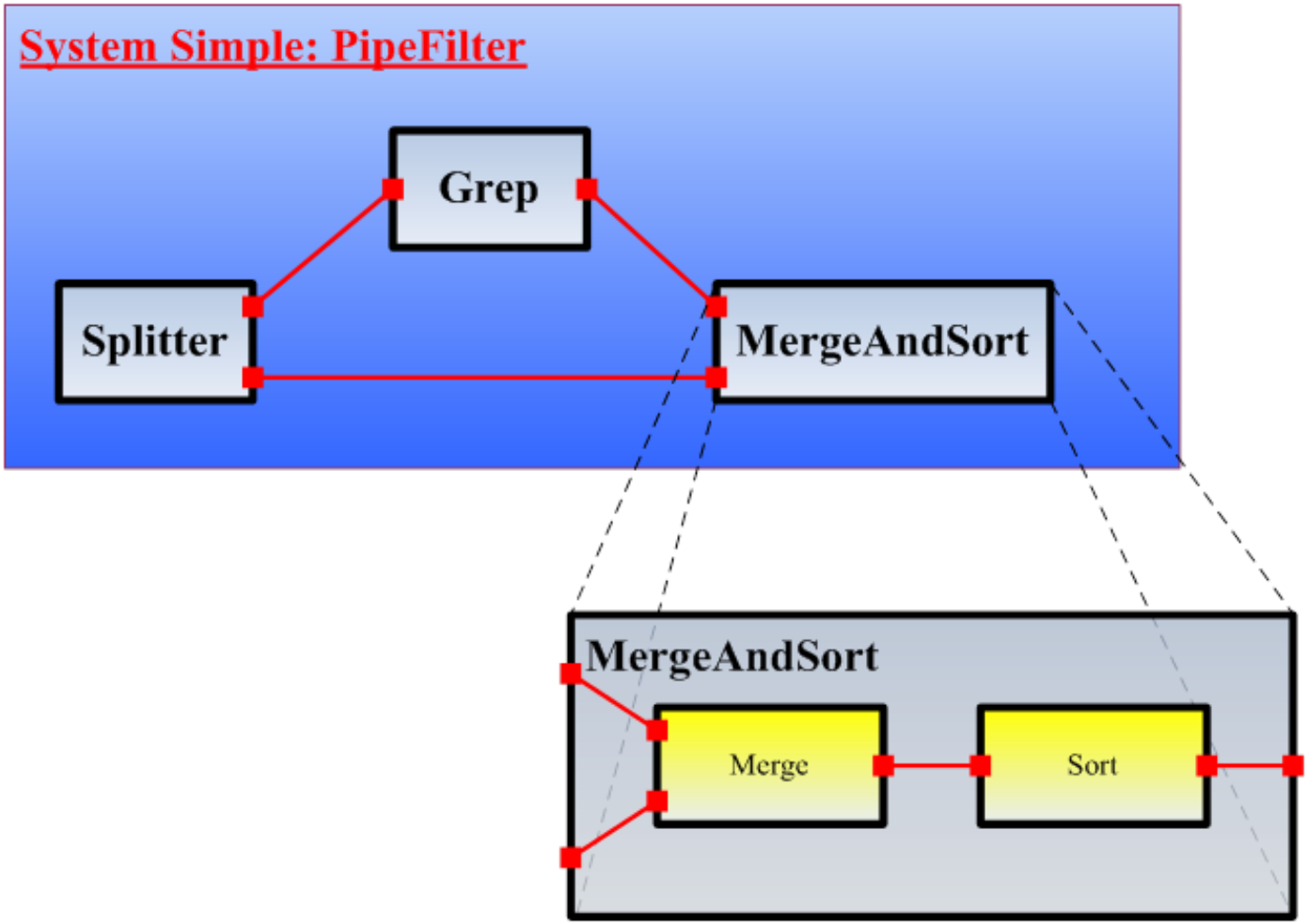
主要架构类型

- The output of filters are order-free and independent to that of other filters'



主要架构类型

Nested Pipe-Filter Architecture



主要架构模式

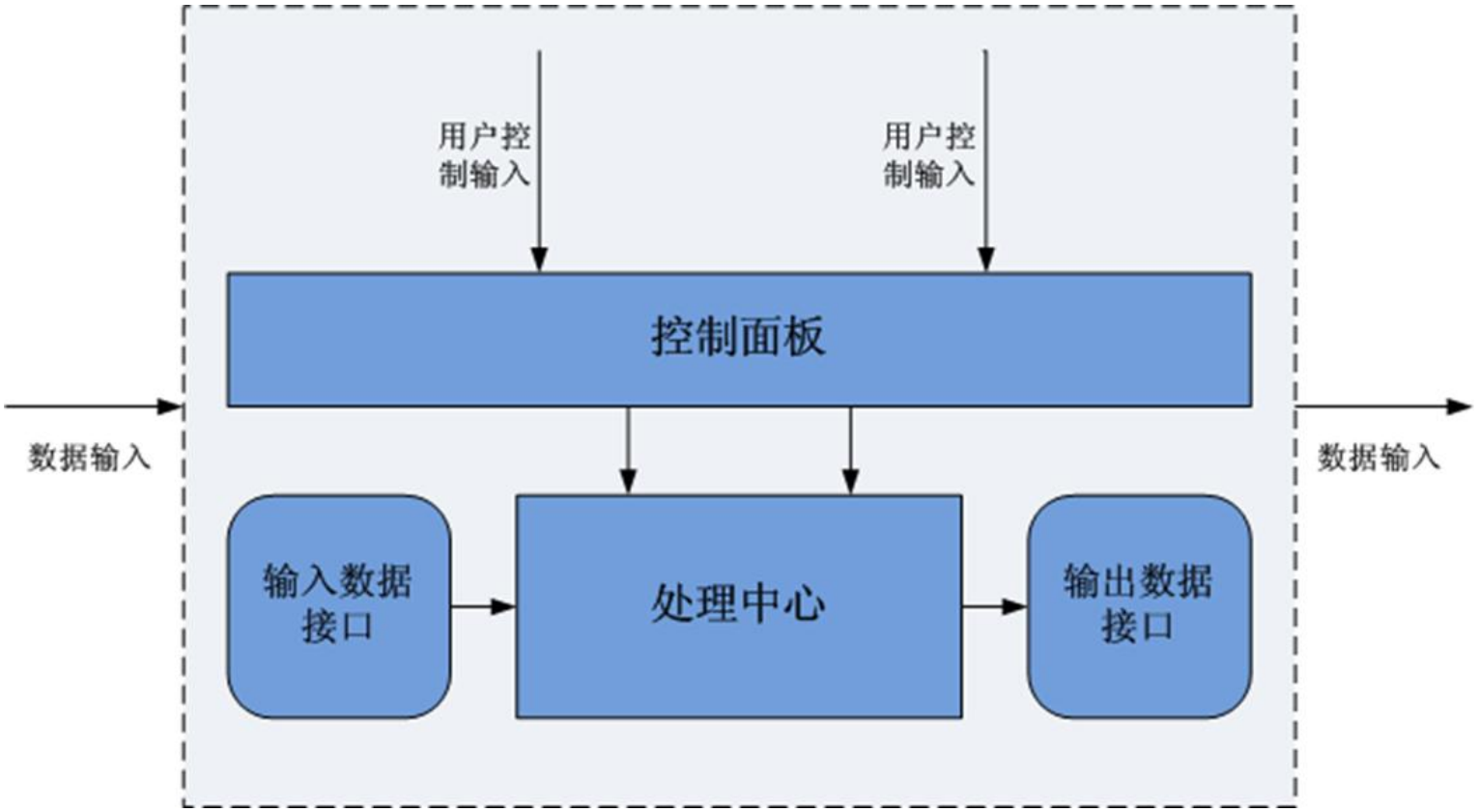
- Reuse of functional units in Pipe-Filter

  Any two independent filter units can be connected and used as a composition unit as long as they support the same pipe interface

- Better maintenance and expandability
- Support data-centric concurrency
- Easy for certain types of performance assessment, such as system throughput or deadlock examination
- Not appropriate for online processing systems that involve user interactions

主要架构模式

An Modified Pipe-Filter Arch with Controller



主要架构模式

Pipe-Filter Sample: Digital Transmission System

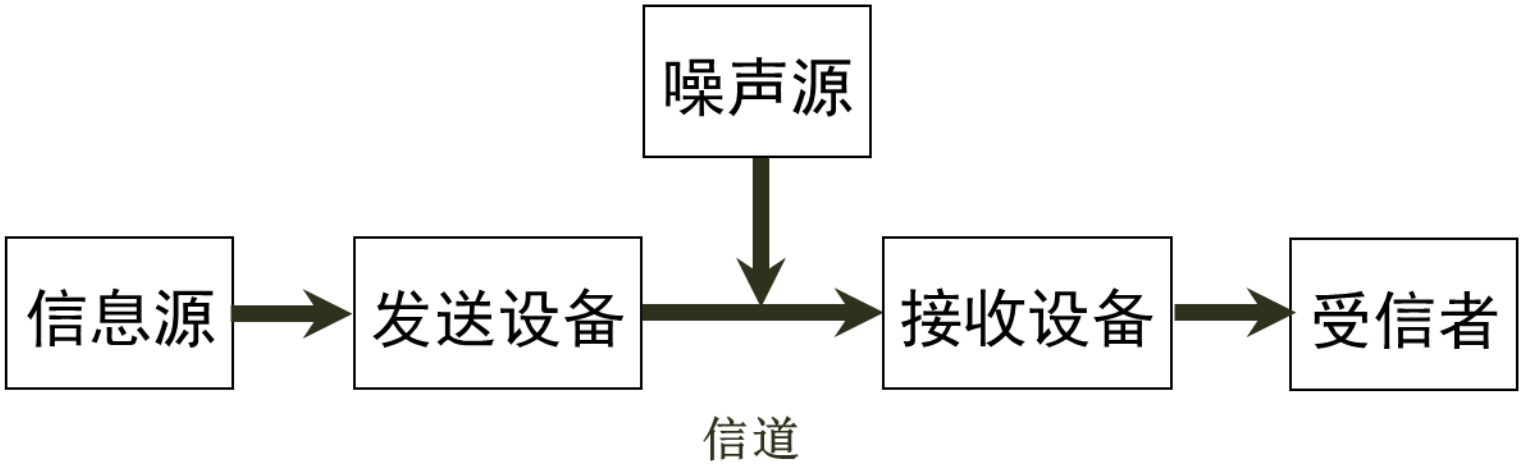
- 通信的目的是传递消息。消息具有不同的形式，例如：符号、文字、语音、音乐、数据、图片、图像等等。因而，根据所传递消息的不同，目前通信业务可以分为电报、电话、传真、数据传输及可视电话等。对于基本的点对点通信，是把发送端的消息传递到接收端。

数字通信概念模型

主要架构模式

System Model – Digital Transmission System

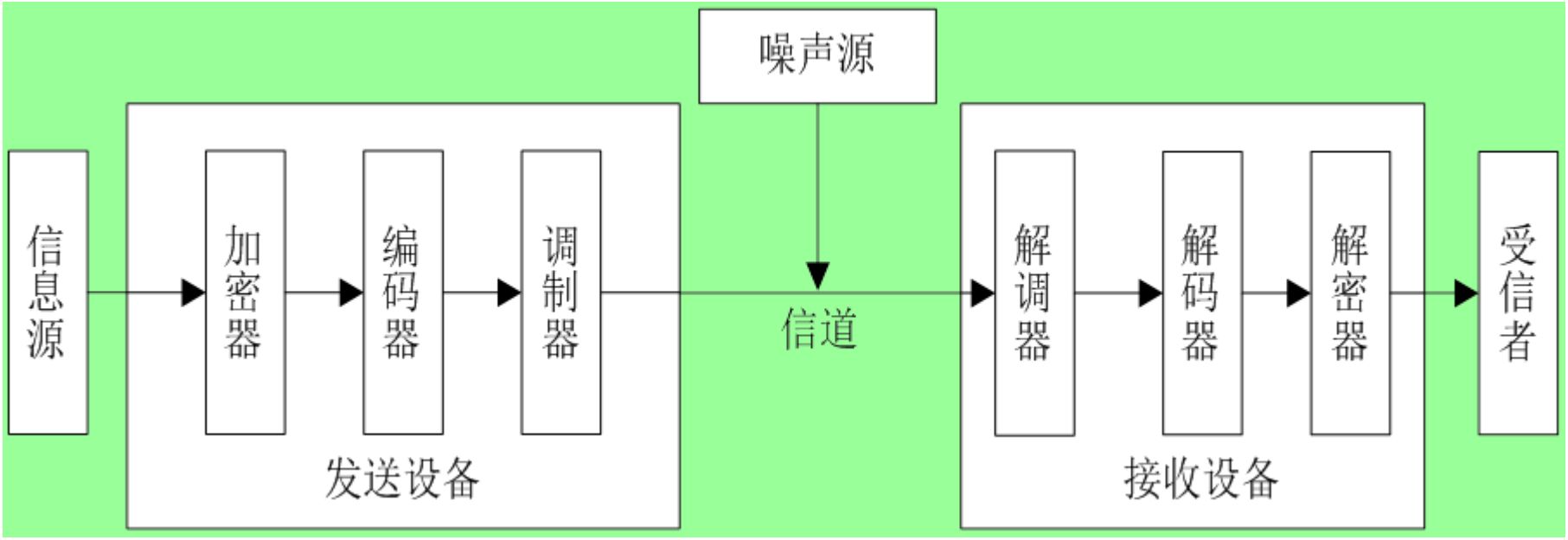
- 将上图发送端进一步细分为信息源和发送设备，将接收端细分为接收设备和受信者；同时，在通信过程中会有噪声干扰，在模型中添加噪声源可得到图所示的数字通信系统粗略模型。



数字通信系统粗略模型

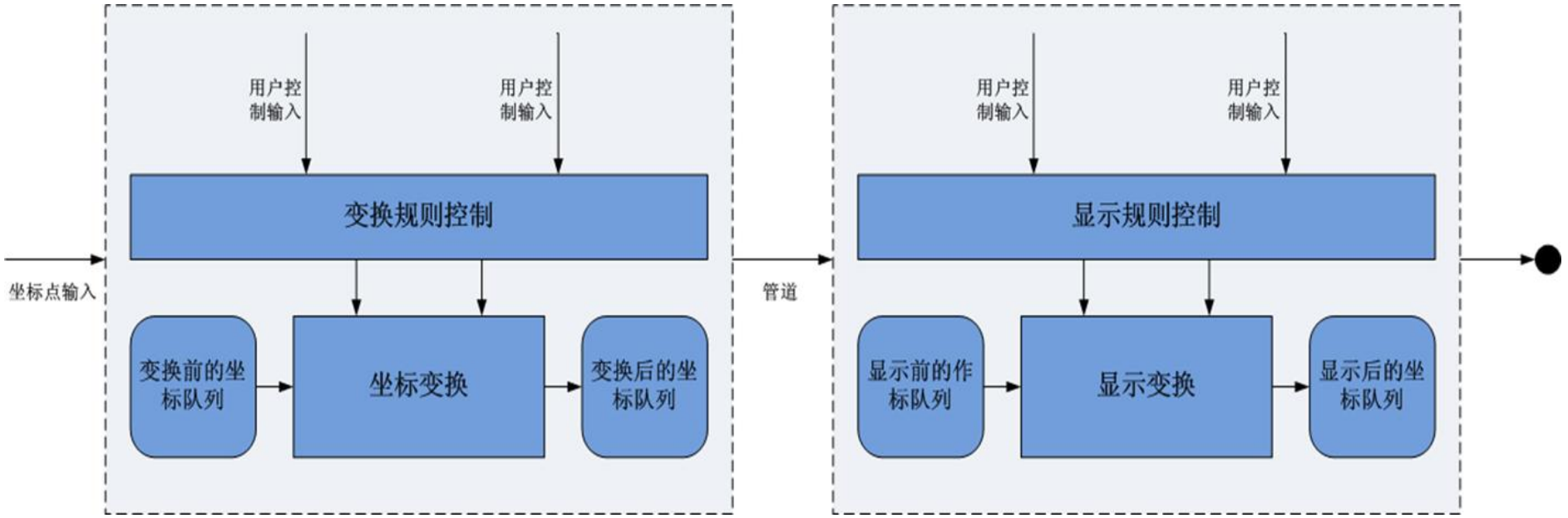
主要架构模式

Software Architectural Model



主要架构模式

Computational Model



主要架构模式

Data Flow Arch Style

- the availability of data controls the computation
- the structure of the design is dominated by orderly motion of data from process to process
- the pattern of data flow is explicit
- in a pure data flow system, there is no other interaction between processes

主要架构模式

Components: Computing or functional Units

- Interfaces are input ports and output ports
- Input ports read data; output ports write data
- Computational model: read data from input ports, compute, write data to output ports

主要架构模式

Connectors: Data Streams

- Uni-directional, usually asynchronous, buffered
- Interfaces are reader and writer roles

Systems

- Arbitrary graphs
- Computational model: functional composition

End of Lecture

Thanks!