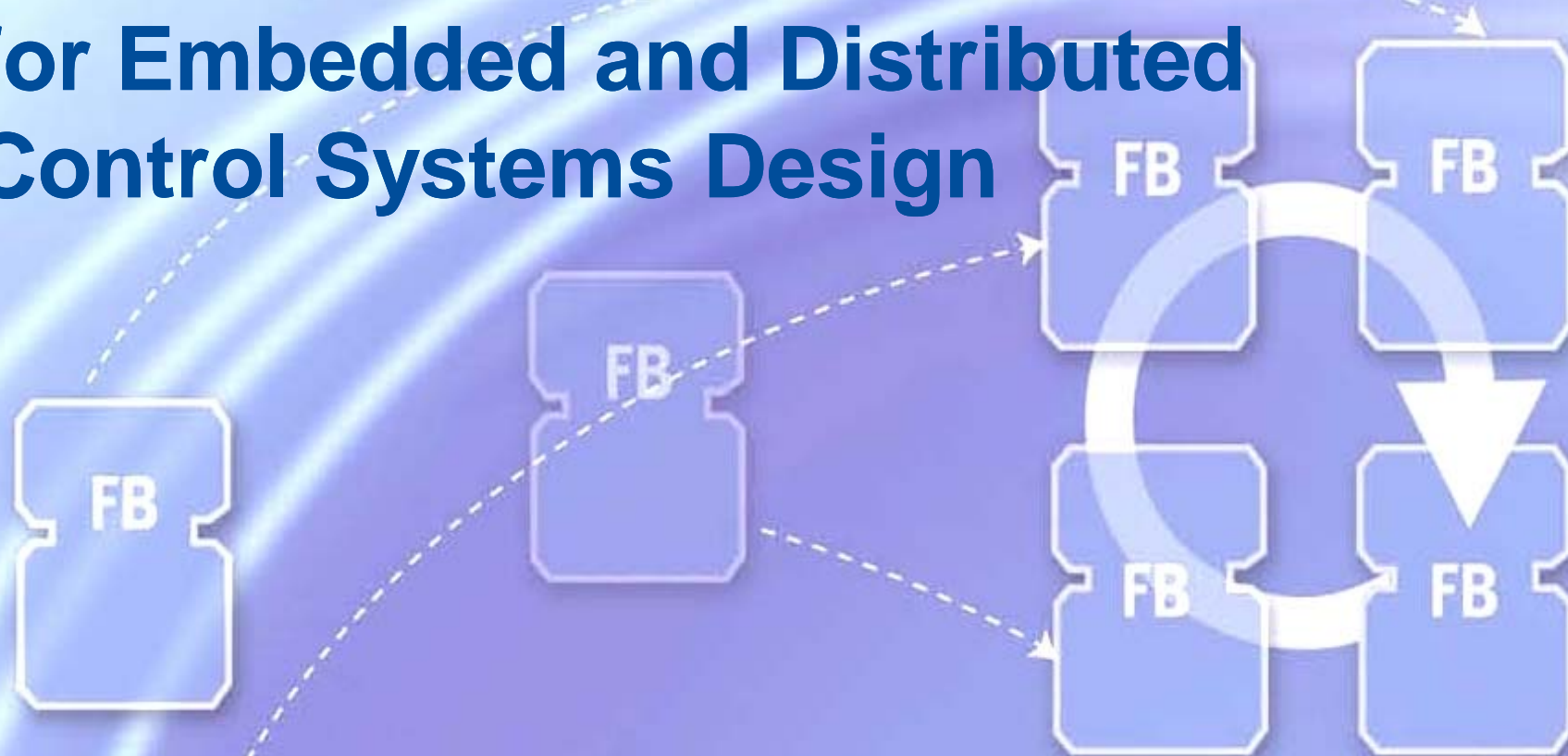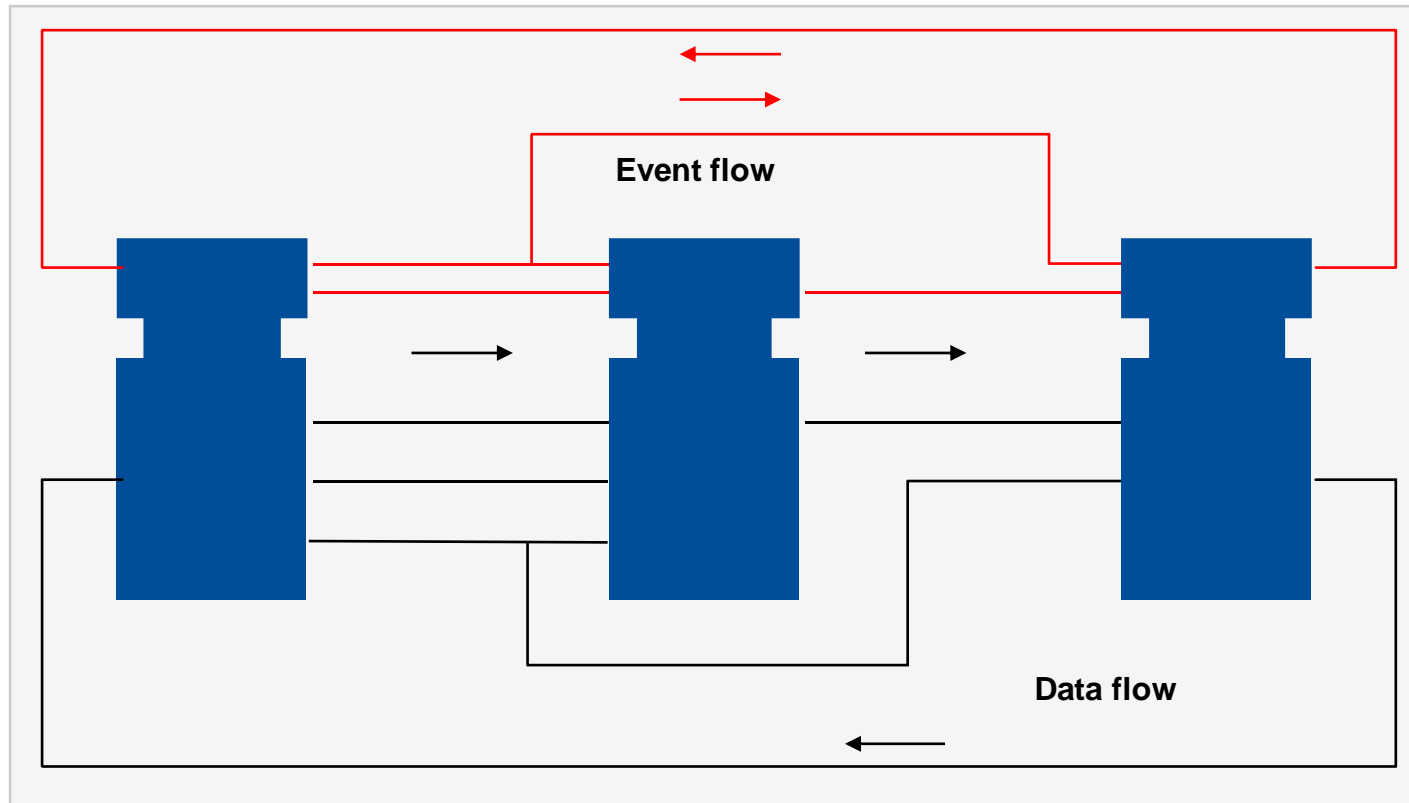# IEC 61499 Function Blocks for Embedded and Distributed Control Systems Design

Lecture 9: Applications and sub-applications
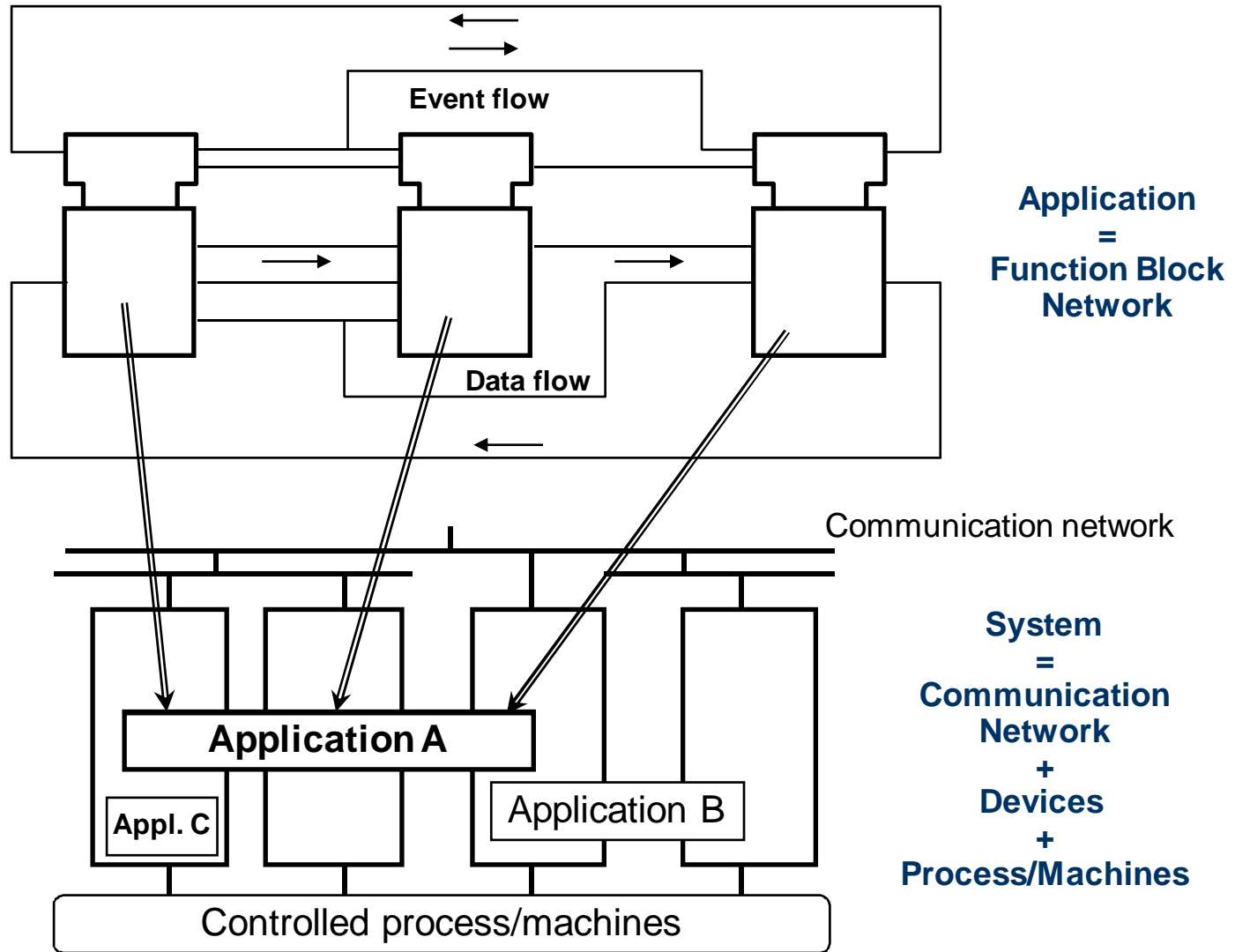
Valeriy Vyatkin © 2007

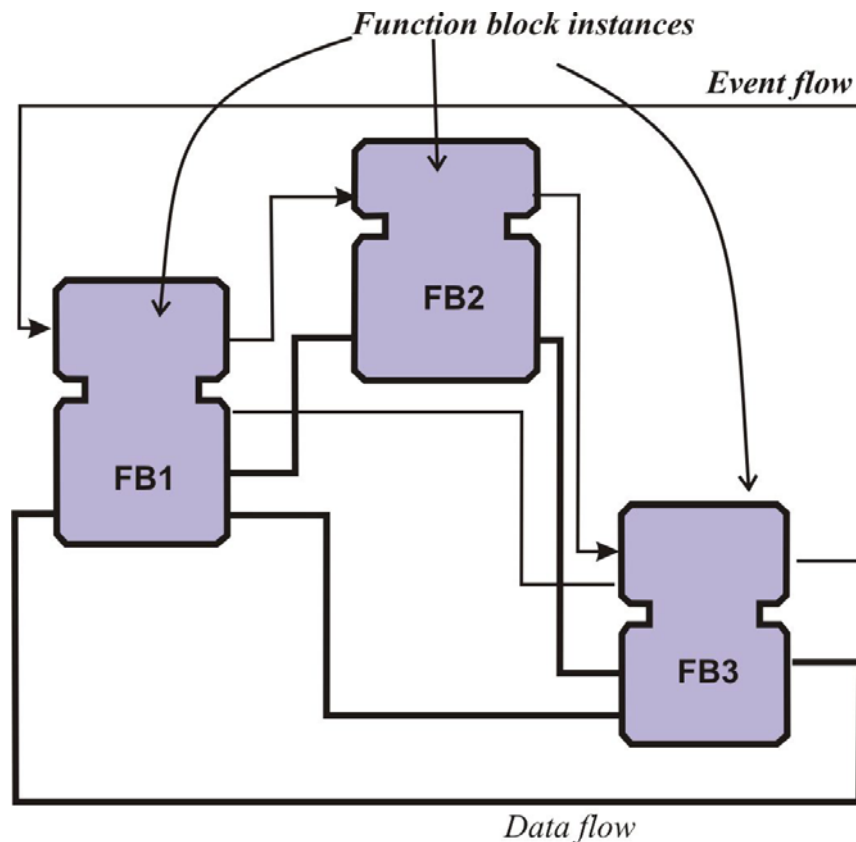# Application logic: Event and Data connections of FBs

An <u>application</u> in IEC 61499 is a network of function block instances connected via event and data connections.

An application definition does not have interface.

Two Stages of Design

Event flow

Data flow

**Application
=
Function Block
Network**

Communication network

Application A

Appl. C

Application B

Controlled process/machines

**System
=
Communication
Network
+
Devices
+
Process/Machines**

Application design

Function block instances

Event flow

FB2

FB1

FB3

Data flow

Application completely describes desired functionality of a system but does not specify architecture of hardware

Application is still an abstract step, since it may not include particular dependencies to devices

Next step in the design is mapping of application to a particular configuration of devices

Role of Application in FBDK
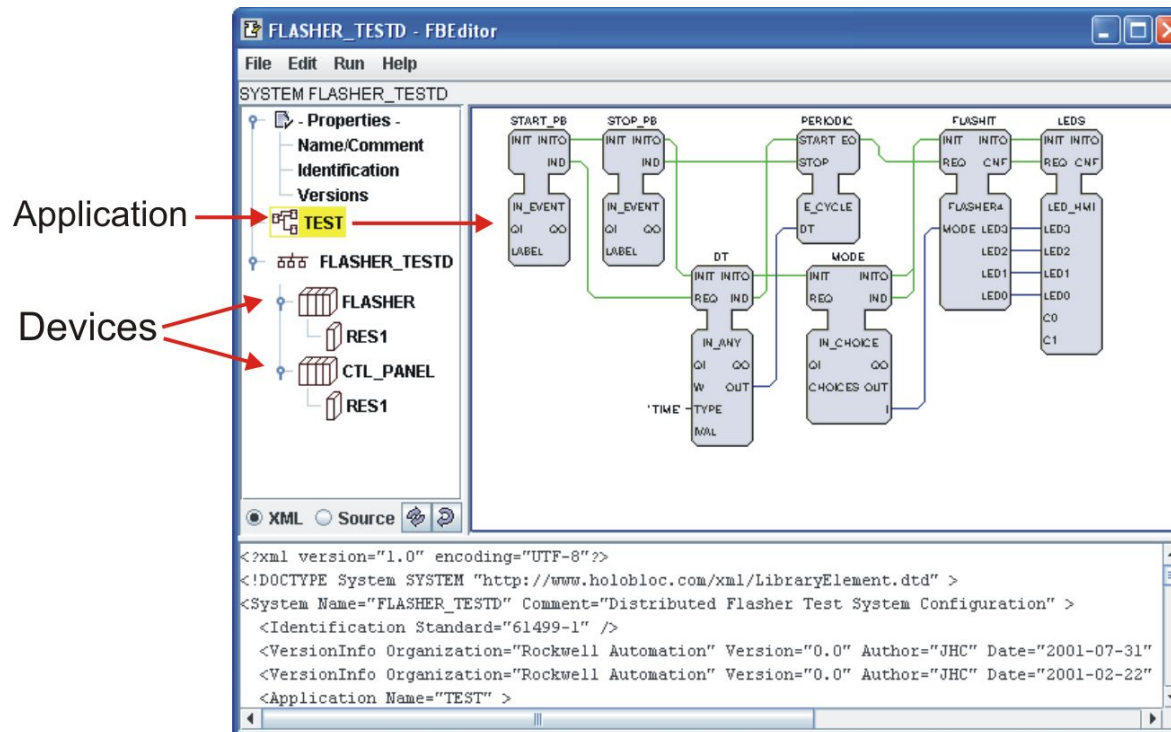
In FBDK application is a part of system configuration. Thus, system FLASHER_TESTD includes exactly the same network of function blocks as FLASHER_TEST in its application section.

Then function blocks of the application are mapped onto 2 devices. Application is included into system configuration for documentation purposes and to support the 2 stages engineering process.

FLASHER Application
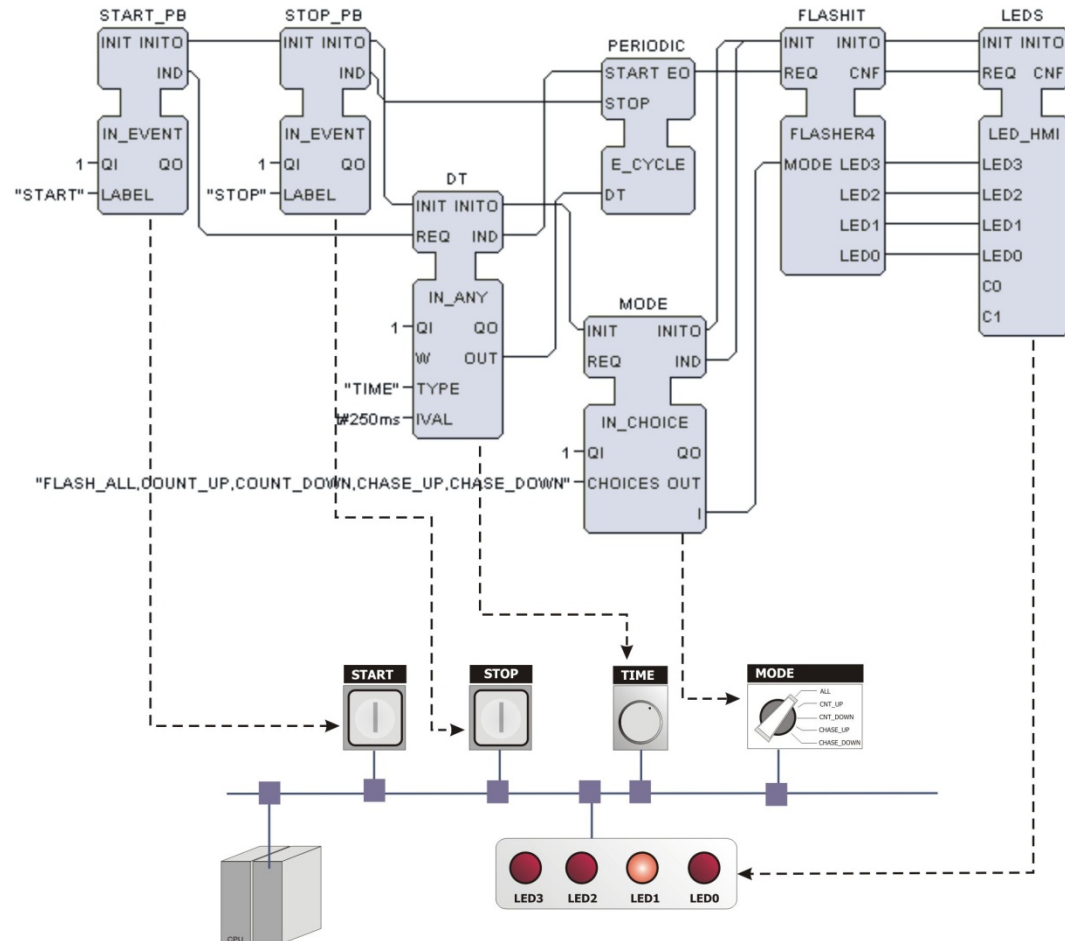
FLASHER application is designed in object-oriented way: each function block corresponds to physical unit in the distributed system

Summary

- **Application** determines the desired function, but in abstract way – without specifying the architecture of devices where particular function blocks are to be executed.

- **Subapplication** is an encapsulated network of function blocks that can be later *mapped onto distributed* devices.

- In FBDK an application cannot be created and stored independently, but only as a part of system configuration.