System-on-Chip (SOC) design is increasingly complex, as a growing number of applications are integrated in such systems. These applications have mixed time-criticality, i.e., some have firm-, some soft-, and others non-real-time requirements. Executing such a mix of applications on a SOC poses several challenges, especially if some of these are real-time control applications.

To reduce cost, platform resources such as processors and memories are shared, leading to interference between applications. Since the performance of applications is inter-dependent they cannot be developed or tested in isolation.

The CompSOC platform addresses this problem by executing each application on an independent virtual execution platform (VEP). The VEPs are composable, i.e., cannot affect each other’s behaviours in terms of timing or energy. As a result, applications can be designed, developed, verified, and executed in isolation.

The VEPs are also predictable, such that the performance of real-time applications can be computed at design time, and guaranteed at run time. This is particularly important for embedded control applications with (firm) real-time requirements. VEPs can be started and stopped independently, and without affecting running applications, using a general resource management software stack.

In our University Booth we will demonstrate that multiple real-time control applications can be developed independently even though they share platform resources. We show that they can run together with other applications on a wireless network of multiple CompSOC platforms, where each platform has multiple processors, NOC, and a complete microkernel, streaming software, and resource management stack. We will also show that (control) applications can be quickly and safely loaded and started without interference to other (real-time control) applications, thus implementing a network of MPSOCs for distributed mixed time-criticality applications.

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