



DO178C DAL A & CRI-MULCORS

PikeOS as Hypervisor allows constraining the behavior of the interconnect of the multi-core processor offering required determinism so the global behavior can be demonstrated.

But the impact of identified shared resource accesses like memory, bus, network, internal registers, clock management,.. is to be characterized and measured.

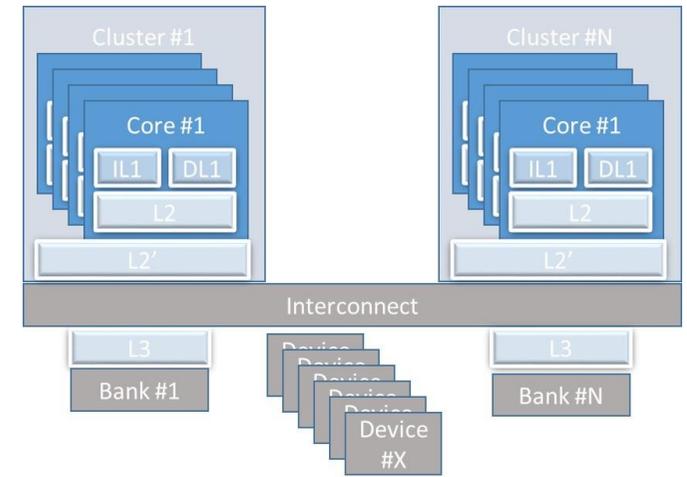
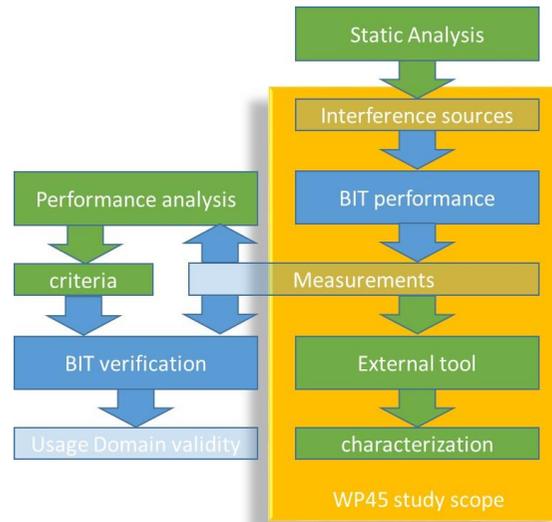
Using an embedded tool PikeOS will also provide the way to ensure the validity of performance against Usage Domain checking the verisimilitude of behavior at both integration and maintenance time.

WCET estimation

Knowing the high variability of execution time, WCET determination will be part of a step by step approach to ensure the temporal deterministic behavior of multi-core processors. This approach implies PikeOS embedded tool providing data and check capability at several stages:

- First is estimation time providing data to the third part tools that will provide the WCET.
- Second is using subset of the measurement that can be used for verification at integration time to ensure the verisimilitude of behavior when deployed and thus verify compliancy with Usage Domain.
- Third is using other subset of the measurement that can be used for verification at maintenance time to ensure the verisimilitude of behavior during operational life cycle.

PikeOS is the first Operating System to be [EN 50128 SIL 4](#) certified on multi-core. But it is still challenging to get certification in avionics requiring new tools to characterize multi-core interference.



PikeOS Service characterization

PikeOS provides ways to tune configuration to reach determined or deterministic behavior of services but as a product line it is also of interest to provide the mean to identify the variability factors impacting a given performance, including inter core interference. Idea is to provide the Execution Time for a given service API with X runtime parameters and Y configuration parameters as a formula of type

$$API_{ET} = f(p1, \dots, pX, c1, \dots, cY)$$

PikeOS embedded tool will provide the necessary data for an external third part tool to compute the WCET. Each data is identified with configuration, including calibrated loads injected on other cores.

