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Cisco: "Next Generation Operating Systems"

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Next-gen computing (NGC) platform is a new architectural concept, which will greatly enhance application performance in modern data centers, and will fundamentally deal with following challenges:

Application's parallelization, like e.g. map/reduce, driven by rapidly growing number of CPU cores per socket

Efficient use of resources, driven by diversity of hardware as well as power constrains

Data center wide system consistency, addressing failure of the system components will be a norm not an exception

The paradox of the IT industry is that hardware evolution has advanced at much faster pace than system software features. Hardware has become more powerful, using technologies like SRIOV, VTx, vNIC, SGX, multi core etc., while Operating Systems are still treating them as simple devices, and doing all the heavy lifting by themselves.

NGC is proposing an Operating System redesign by enabling application control over physical hardware (a.k.a. the data plane) and keeping the kernel out of the way as much as possible, while providing management (a.k.a. control plane) functionality. The recent fast adoption of Linux containers (see e.g. Docker, Rancher, LTMCTFY and others), which are essentially an Operating System virtualization technique, is the proof that Data Center is on the quest for more application aware and/or efficient way of abstracting the hardware.

The Data Plane Computing System project in the CERN openlab, executed between Cisco and the ALICE experiment, provides a proof of concept for the above ideas.

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