CLOUDSKIN 2022: Adaptive virtualization for AI-enabled Cloud-edge Continuum

Description

As of today, 80% of the data processing and analysis occurs in cloud data centers, and only 20% of processing occurs at the edge. This incipient exploitation of edge resources increases time to value and prevents business processes, decisions, and intelligence from being taken outside of the data center, which prevents Europe from unlocking an entire set of new opportunities for serving different industries and use cases in Europe over the next years.

To help to materialize the European bid for a true continuum in the next few years, CloudSkin will build a cognitive cloud continuum platform with three main innovations: 1) the CloudSkin platform will leverage AI/ML to optimize workloads, resources, energy, and network traffic for a rapid adaptation tochanges in application behavior and data variability, re-configuraing the 'sweet spot' between the cloud and the edge in the face of rapidly varying conditions; 2) the CloudSkin platform will also help users to achieve stack identicality across the Cloud-edge continuum, whereby the same(legacy) software stacks (e.g., MPI programs) that run in data centers can seamlessly run at remote edges. The development of a new lightweight, portable virtualizaion abstraction will be paired with the development of new confidential abstractions to protect datawhile it is in use; 3) CloudSkin will also contribute to preparing the infrastructure required to integrate the new virtualized execution abstractions into the virtual resource continuum, particularly, for those Cloud-edge applications composed of small tasks with fast data access and sharing requirements. The infrastructure will expose the relevant control knobs to enable the dynamic reconfiguration of resources as assisted by the AI/ML-based orchestration plane in the CloudSkin platform. Altogether, the above innovations are the strategic elements of what we envision as the new cognitive continuum for the cloud and edge.

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