

Title: Autonomic Composable Data Center (ACDC): The next generation paradigm for Developing Large Scale Data Centers

Abstract: Data infrastructures such as Google, Amazon, eBay, and E-Trade are powered by data centers (DCs) that contain tens to hundreds of thousands of computers and storage devices running complex software applications. Between 2013 to 2020, organizations' investment in software for mobile, social, cloud, and big data technologies is expected to grow over 20 times faster than organizations' investment in hardware for Information Technologies (IT). Traditional IT architectures are not designed to provide an agile infrastructure to keep up with the rapidly evolving next-generation mobile, big data, and application demands, as they are distinct from the "traditional" enterprise applications. Common characteristics of the next-generation applications are nonlinear scaling and relatively unpredictable growth as a function of inputs being processed, their size, and dynamic behavior. The dynamic and unpredictable changes in the Service Level Objectives (SLOs) (e.g., availability response time, reliability, energy) of these applications require continuous provisioning and re-provisioning of DC resources . Ultimately, this means considering the impractical approach of building new DCs that can efficiently support the distinct design principles for each unique DC workload or application. In this presentation, I will review our ongoing approach to design and implement Autonomic Composable Data Centers (ACDC) and associated resource management techniques that utilize a set of flexible building blocks that can be dynamically and automatically assembled and re-assembled to meet the dynamic changes in workload's SLO of current and future DC applications