IEEE ComSoc IEEE Communications Society

Social Networks Technical Committee

Metaverse, Metastability and Beyond

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Abstract: Roblox Metaverse supports an impressive 55M daily users. The underlying infrastructure is geographically distributed, with multiple edge data centers in all continents. The Metaverse stack consists of multiple layers of software systems, with complex dependencies that can be represented as a DAG (Directed Acyclic Graph) or a multi-layered queueing system. In short, the concept of Metastability happens when each moving part of the stack works in harmony. In contrast, a Metastable failure results from a trigger originating in some part of the stack that cascades through multiple dependencies to finally affect a third-party system. Such kind of failure has large-scale consequences and can deem the overall stack unusable. This talk will deep-dive in the characterization (or absence) of metastability based on a queueing theory model and analyze the dynamics that can lead to different flavors of system-wide failures. Furthermore, the model will be used as the basis to (mathematically) devise measures for the early detection of failures and explore fault-tolerance measures that ensure metastability.

Bio: Dr. Tania Lorido-Botran is a full time research scientist at Roblox, where she leads several efforts at the intersection of Machine Learning and Distributed Systems. Prior to that, she worked at Microsoft and the Pacific Northwest National Laboratory. Dr. Lorido-Botran holds a PhD from University of Deusto with a Cum Laude Distinction. She is very active within the research community: invited keynotes (ACM DEBS´23, HotCloudPerf´23, BDCAT'22), doctoral symposium co-chair (ACSOS´23), session chair (ACM DEBS'23), panelist (HotCloudPerf'23), PC member (CCGRID´23, DEBS´23, HotCloudPerf'23, etc). Her research interests include ML for Systems, data center sustainability and fault tolerance.

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December 22, 2023 – 10 am CET – Roma Tre University