Title:
Hyper-concentration of Data and Computation in the Cloud: Technical, Economic and Social Aspects

Abstract:
Hyper-scale cloud services present a puzzle and a challenge. What exactly happened to enable this unprecedented concentration of capital-intensive computing hardware, which flies in the face of decades-long trends towards decentralization? I will describe the phenomenon briefly, and share some personal observations of both the landmark technical results and limitations, as well as the economic forces, that combined to produce it. More importantly, what are the impacts, risks and opportunities of this concentration? I will survey as many issues as I can, such as inversions in business costs (from human talent to infrastructure), in network effects (from distributed to concentrated data), and in the balance of power (from individual consumers and developers, to corporations).

Name:
Dr. Abdelsalam (Solom) Heddaya

Current Title:
Architect, Azure Storage for Big Data

Bio:
Solom Heddaya has been a professor, entrepreneur, engineering manager and architect of computer systems. As a professor of Computer Science for nearly a decade at Boston University, he worked on log-structured replicated file systems, on distributed shared memory for parallel computing, and on Internet-scale caching. The latter project spun-off InfoLibria, Inc., of which he was co-founder and Chief Technology Officer. InfoLibria was the premier developer of distributed system appliances, that backbone ISPs deployed to deliver "rich web apps" with high quality and low cost, from the Internet's edge. Solom joined Microsoft at Partner level fifteen years ago. He spent half that time improving all aspects of Windows reliability, by enhancing failure measurement, detection, diagnosis, tolerance, recovery and repair. In the second half, he alternately managed, or was architect for, Cosmos, an internal big data system that combines hundreds of thousands of servers to store many exabytes of data, and to power the analytics that underly all of Microsoft's largest online services (Azure, Bing, Office, Skype, Windows, XBox, etc.).

Solom's academic work was funded by NSF grants, and his entrepreneurial work by significant venture capital from the likes of Microsoft and Nortel. The results were recognized by numerous industry and internal Microsoft awards. Solom is a

co-inventor of over a dozen patents in various areas of computer systems. Recent publications he co-authored include Hydra in USENIX NSDI 2019.

Solom holds a B.Sc. (First Class Honors) in Computer Engineering & Automatic Control from Alexandria University and a Ph.D. In Computer Science from Harvard University.