Swarms: First Class Citizens in the Future Internet

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Abstract:
The current Internet consists of tens of thousand different interconnected autonomous networks. It was designed to support large populations of point-to-point content transfers. This introduces considerable headaches due imbalances in traffic flows, which has the effect of complicating network management, reducing the robustness of the Internet, and reducing user performance.

In this talk, I review the sources of traffic in the Internet over the last 20 years. We will observe that a significant fraction of traffic was generated by peer-to-peer (P2P) "swarm" technology from 2000 to 2007. I examine how and why P2P swarm technology simplifies network management, and makes the Internet and applications more robust. Unfortunately, the use of this technology has decreased since 2006 and shows every sign of continuing to do so. Thus, the rest of the talk focuses on and characterizes an architecture that encourages widespread use of swarm technology. I will focus not only on the problem of transferring content but also on the problem of locating content.

Bio:
Don Towsley holds a B.A. in Physics (1971) and a Ph.D. in Computer Science (1975) from University of Texas. He is currently a Distinguished Professor at the University of Massachusetts in the Department of Computer Science. He has held visiting positions at numerous universities and research labs. His research interests include networks and performance evaluation.

He currently serves on the editorial board of IEEE Journal on Selected Areas in Communications and previously served as Editor-in-Chief of IEEE/ACM Transactions on Networking and on numerous other editorial boards. He has served as Program Co-chair of several conferences including INFOCOM 2009. He is a member of ACM and ORSA. He has received the 2007 IEEE Koji Kobayashi Award, the 2007 ACM SIGMETRICS Achievement Award, the 2008 ACM SIGCOMM Lifetime Achievement Award, the 2011 IEEE INFOCOM Achievement Award, and numerous paper awards including a 2008 ACM SIGCOMM Test-of-Time Paper Award, a 2012 ACM SIGMETRICS Test-of-Time Award, and the 1998 IEEE Communications Society William Bennett Best Paper Award. Last, he has been elected Fellow of both the ACM and IEEE.