DIMES – New Results from Wide-area Internet Topology Mapping SHLOMO HAVLIN, SHAI CARMI, The Physics Department, Bar-Ilan University, Israel, ERAN SHIR, YUVAL SHAVITT, Department of Electrical Engineering, Tel Aviv University, Israel, SCOTT KIRKPARTRICK, School of Computer Science and Engineering, The Hebrew University of Jerusalem, Israel — DIMES is a distributed agent-based Internet mapping effort which at present has attracted thousands of volunteers running clients world-wide. Despite the "law of diminishing returns" seen when when adding agents in past mapping attempts, we find that significant amounts of new information can be found in the long tails of our measurement process. We use the k-pruning method to decompose the network into nodes with distinct roles. The analysis suggests a new picture of the AS-level Internet structure, which distinguishes a relatively large, redundantly connected core of nearly 100 ASes and two components that flow data in and out from this core. One component is fractally interconnected through peer links; the second makes direct connections to the core only. We plan to use this picture as a framework for measuring and extrapolating changes in the Internet's physical structure. Our analysis may also be relevant for estimating the function of nodes in the "scale free" graphs extracted from other naturally-occurring processes.

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