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Tour de Sys: The traveler's view of a network DANIEL GRADY, CHRISTIAN THIEMANN, DIRK BROCKMANN, Northwestern University, Evanston IL, USA — The plight of the Flatlander is imperfect information about a high-dimensional object. Yet even so, the clever inhabitant of a low-dimensional world can gain a great deal of information about such an object by examining it from many perspectives. We analyze complex transportation networks by using shortest-path trees to measure universal network properties from different locations. Furthermore, by defining a measure of a node's geographical access area we give a more realistic characterization of the centrality or remoteness of a location. The network topology indicates a clear distinction between the center and edge of a network, but we find that examining the weights of links is crucial, as the distinction in the weighted network for some quantities is even more pronounced. Often prior research has not focused on the weightedness of transportation networks, in spite of the fact that this property has an obvious bearing on how the networks are actually used. We show that measuring networks with weighted edges significantly affects their statistics. Our analysis indicates dynamical processes occurring on these networks should behave in a manner very different than what is predicted by considering topology alone.

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