Exhibit 1016

(12) **United States Patent**
Hanson et al.

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(45) **Date of Patent:** Apr. 8, 2003

(54) **METHOD AND APPARATUS FOR PROVIDING MOBILE AND OTHER INTERMITTENT CONNECTIVITY IN A COMPUTING ENVIRONMENT**

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Related U.S. Application Data

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(52) **U.S. Cl.** **709/227**; 709/228; 709/330
(58) **Field of Search** 709/245, 250, 709/330, 229, 228, 227, 230, 203, 220, 221, 202

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(57) **ABSTRACT**

A seamless solution transparently addresses the characteristics of nomadic systems, and enables existing network applications to run reliably in mobile environments. The solution extends the enterprise network, letting network managers provide mobile users with easy access to the same applications as stationary users without sacrificing reliability or centralized management. The solution combines advantages of existing wire-line network standards with emerging mobile standards to create a solution that works with existing network applications. A Mobility Management Server coupled to the mobile network maintains the state of each of any number of Mobile End Systems and handles the complex session management required to maintain persistent connections to the network and to other peer processes. If a Mobile End System becomes unreachable, suspends, or changes network address (e.g., due to roaming from one network interconnect to another), the Mobility Management Server maintains the connection to the associated peer task—allowing the Mobile End System to maintain a continuous connection even though it may temporarily lose contact with its network medium. In one example, Mobility Management Server communicates with Mobile End Systems using Remote Procedure Call and Internet Mobility Protocols.

76 Claims, 32 Drawing Sheets
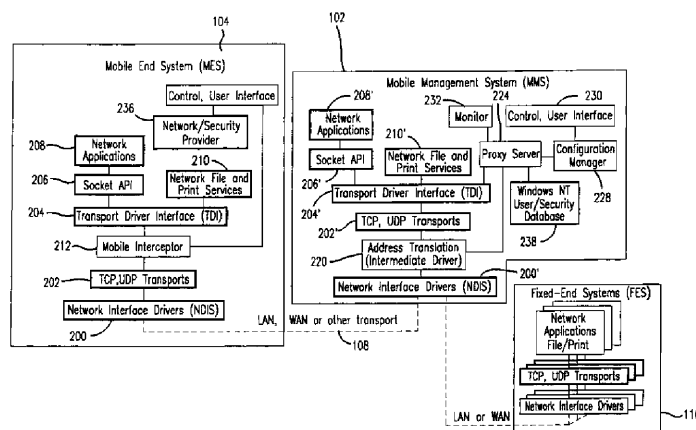
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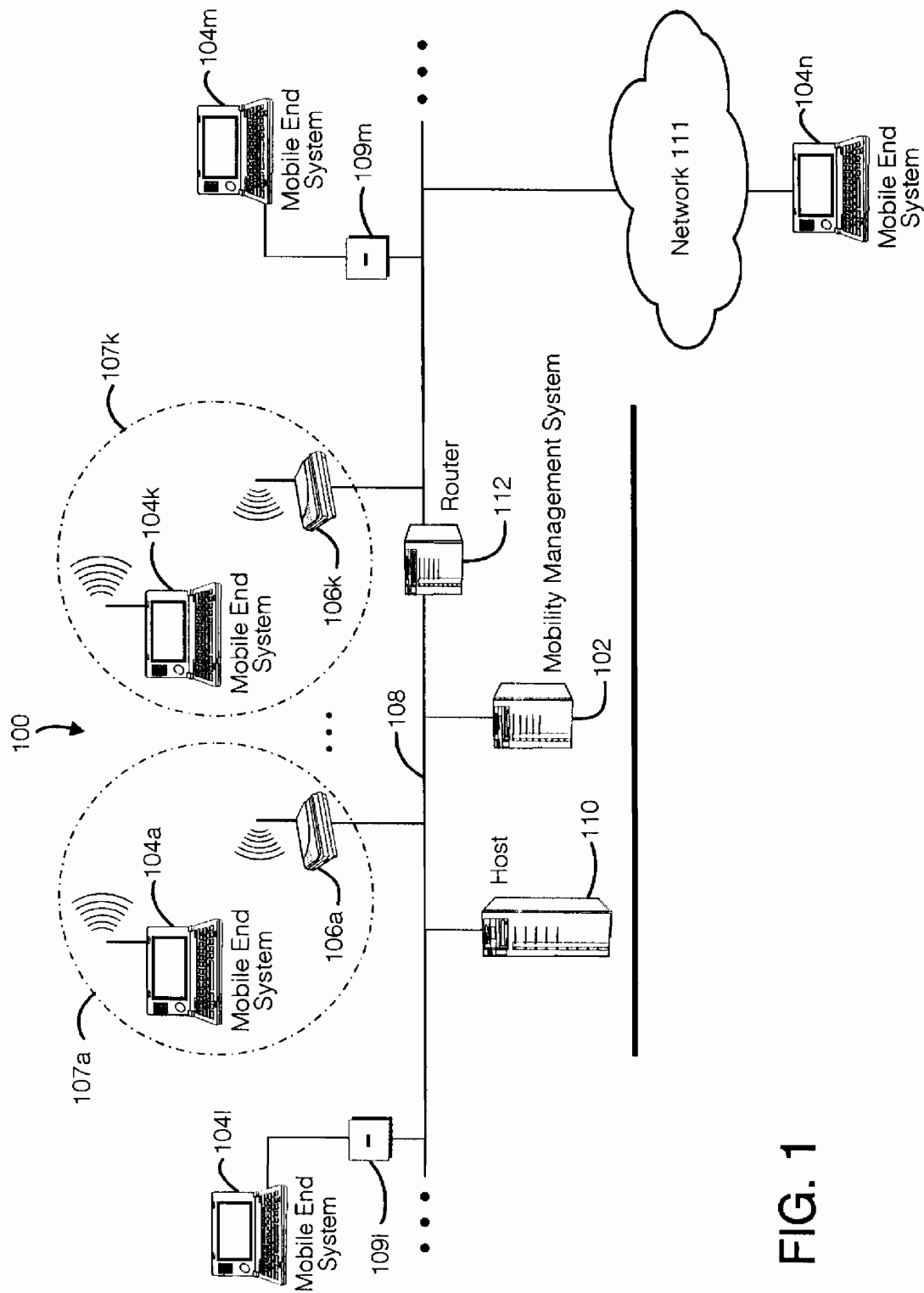
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FIG. 1

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