mobile adult will often register his or her current address with the family (if for no other reason than so that the parents can send money to help pay the rent!). The family home, with its permanent address, becomes that one place that others can go as a first step in communicating with the mobile adult. Later communication from the friend may be either indirect (for example, with mail being sent first to the parents' home and then forwarded to the mobile adult) or direct (for example, with the friend using the address obtained from the parents to send mail directly to her mobile friend).

In a network setting, the permanent home of a mobile node (such as a laptop or smartphone) is known as the **home network**, and the entity within the home network that performs the mobility management functions discussed below on behalf of the mobile node is known as the **home agent**. The network in which the mobile node is currently residing is known as the **foreign** (or **visited**) **network**, and the entity within the foreign network that helps the mobile node with the mobility management functions discussed below is known as a **foreign agent**. For mobile professionals, their home network might likely be their company network, while the visited network might be the network of a colleague they are visiting. A **correspondent** is the entity wishing to communicate with the mobile node. Figure 6.22 illustrates these concepts, as well as addressing concepts considered below. In Figure 6.22, note that agents are shown as being collocated with routers (e.g., as processes running on routers), but alternatively they could be executing on other hosts or servers in the network.

6.5.1 Addressing

We noted above that in order for user mobility to be transparent to network applications, it is desirable for a mobile node to keep its address as it moves from one network to another. When a mobile node is resident in a foreign network, all traffic addressed to the node's permanent address now needs to be routed to the foreign network. How can this be done? One option is for the foreign network to advertise to all other networks that the mobile node is resident in its network. This could be via the usual exchange of intradomain and interdomain routing information and would require few changes to the existing routing infrastructure. The foreign network could simply advertise to its neighbors that it has a highly specific route to the mobile node's permanent address (that is, essentially inform other networks that it has the correct path for routing datagrams to the mobile node's permanent address; see Section 4.4). These neighbors would then propagate this routing information throughout the network as part of the normal procedure of updating routing information and forwarding tables. When the mobile node leaves one foreign network and joins another, the new foreign network would advertise a new, highly specific route to the mobile node, and the old foreign network would withdraw its routing information regarding the mobile node.

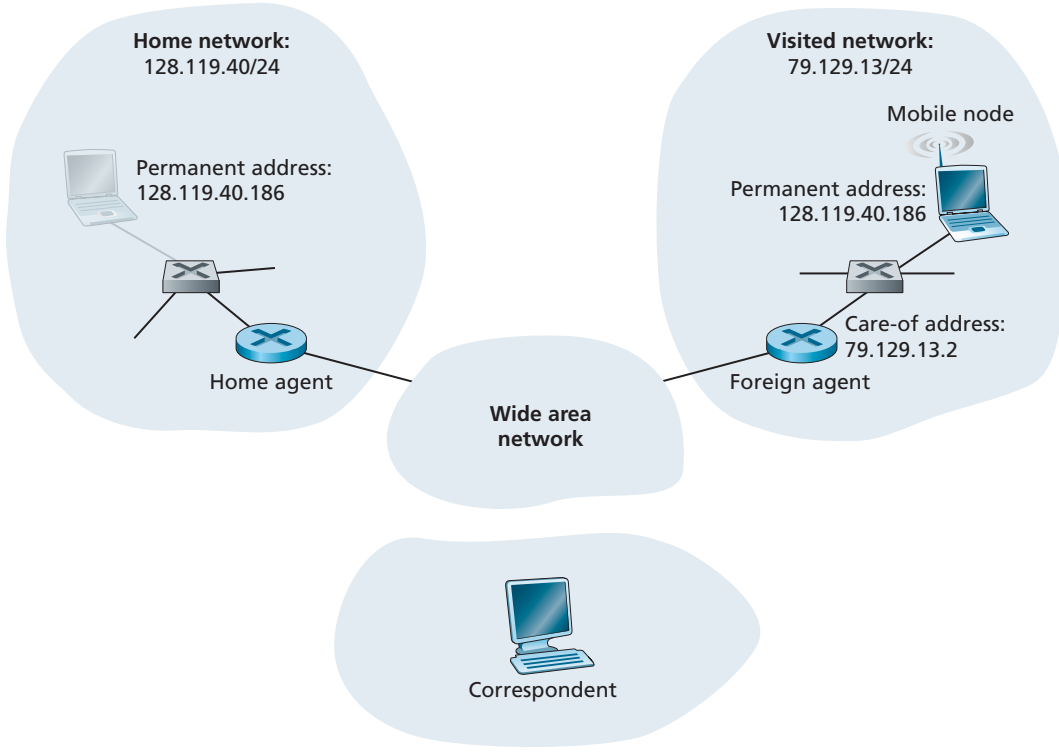

Figure 6.22 ♦ Initial elements of a mobile network architecture

This solves two problems at once, and it does so without making significant changes to the network-layer infrastructure. Other networks know the location of the mobile node, and it is easy to route datagrams to the mobile node, since the forwarding tables will direct datagrams to the foreign network. A significant drawback, however, is that of scalability. If mobility management were to be the responsibility of network routers, the routers would have to maintain forwarding table entries for potentially millions of mobile nodes, and update these entries as nodes move. Some additional drawbacks are explored in the problems at the end of this chapter.

An alternative approach (and one that has been adopted in practice) is to push mobility functionality from the network core to the network edge—a recurring theme in our study of Internet architecture. A natural way to do this is via the mobile node's home network. In much the same way that parents of the mobile twenty-something track their child's location, the home agent in the mobile node's home network can track the foreign network in which the mobile node resides. A protocol