In this fifth and final part of the book, we review additional technologies relevant to our broad reliability theme: security mechanisms, transactions, and real-time systems. This part of the book also surveys some of the research under way in academic and commercial laboratories world-wide.

There is a tremendous degree of interest in peer-to-peer computing today, and we treat the topic in Chap. 20. However, our review is tempered by some skepticism about the field. Much of the work being done related to file sharing of the type done in Gnutella and Napster, an application that violates intellectual property laws and hence is illegal. On the other hand, there are some exciting non-filesharing applications for these kinds of protocols; these are of interest because peer-to-peer technologies permit a degree of scalability never previously available and also offer reliability guarantees that can help the developer ensure that solutions will be stable even under stress and may actually be able to self-reorganize and self-repair (“re-generate”) if a disruption occurs. Accordingly, our emphasis in the chapter will be on the power of peer-to-peer protocols in these kinds of unconventional setting.

With one eye on length, we will draw the line at the network layer, although one can make a very strong argument that developers who seek to build secure, reliable applications over the current Internet will ultimately be frustrated by the experience. The author has been promoting a type of overlay network architecture recently, in which the Internet is more or less partitioned into multiple side-by-side networks, only one of which would actually run the Internet protocols. Other networks could run different routing and security protocols, dedicate resources for specific needs, and even implement different queuing policies in the router layer.