assumes the best possible ordering (from the firm's revenue-maximizing point of view).

11.2 System Architecture, Hardware, Software, and Interfaces

RM is a computationally intensive process. Huge amounts of data have to be collected and stored in databases. It must then be extracted and processed by the forecasting system to make thousands of forecasts on a daily basis. Finally, the optimization module uses the forecasts to come up with detailed quantity or price controls or both. Both forecasting and optimization can be computationally intensive tasks.

Figure 11.3 shows the flow of a nightly batch-process RM system. Figure 11.5 (repeated from Chapter 1) illustrates a prototypical process flow of RM. The steps involved in a forecasting module for an airline application (under the independent-demand model covered in Section 7.1) are shown in Figure 11.4, and the steps involved in the processing of a reservation request to a GDS are shown in Figure 11.8.

11.2.1 Hardware Requirements

Hardware requirements for RM systems can be immense.[6] That said, not every firm needs a million-dollar mainframe to run RM software. Some of the smaller, simpler applications (say, in a medium-size hotel) can be run on a PC. A multiprocessor database server and a powerful workstation for forecasting and optimization are usually sufficient for all but the largest RM systems. Current RM systems run on a large variety of platforms, from stand-alone PCs to Unix workstations and servers to mainframes. Reliability, redundancy, and good back-up procedures are important as RM is a mission-critical application; if a RM system is down, critical controls are not being set properly, which could lead to a significant loss of revenue.

11.2.2 User-Interface Design

The user interface (UI) is an important component of a RM system. They serve as the analysts' "window" on both market conditions and the RM system's response to these conditions. As mentioned in Chapter 1, RM is a man-machine process, with systems automating most of the routine decisions but under the oversight of analysts who intervene as necessary to respond to unusual market conditions or system errors. The

[6]United Airlines, to take a case in point, is reported to use several of IBM's "deep blue" supercomputers for portions of its RM system.