Chapter VIII
Choosing the Server Operating Platform for Business Continuity

CHAPTER OVERVIEW

Chapter VIII discusses the server operating systems’ main attributes from the selection perspective. Several selection criteria are explained through a model that contains 22 most important features of server operating systems in regard to business continuity perspective. Some empirical studies and results on the performances of most widely used server operating systems are provided.

FRAMEWORK FOR SELECTION

An introductory framework on how to select an appropriate server operating system is presented in this section.

Mission critical applications are installed on enterprise servers that are operated by server operating systems. Therefore, availability of such systems is of extreme importance for organizations that use such applications and implement them within the integrated application suites of enterprise information systems such as enterprise resource planning, customer relationship management, supply chain management, electronic commerce. The same applies even if an organization still uses its legacy system.
As already mentioned in the introductory chapters, when server hardware and server operating system platforms are considered, server operating systems' availability is today expressed in terms of “nines,” a number that determines the system's uptime. According to this approach, the “five-nines” is referred to as a system with 99.999% uptime—the availability ratio, which is regarded as the highest number achievable today. HP, for example, claims that its Integrity NonStop servers can provide 99.99999% availability (“seven nines”), uptime level which translates to less than 3 seconds of unplanned downtime a year. The availability of mainframes, some proprietary platforms (e.g., OpenVMS) and some UNIX systems can be as high as 99.999%, which corresponds to a downtime of five minutes per year. “Four-nines” availability (99.99%) corresponds to a downtime of 53 minutes per year, while 99.9% (“three-nines”) means 8.8 hours of downtime per year.

HP’s OpenVMS, developed by Digital thirty years ago in the form of VMS for VAX machines, and IBM’s z/OS (formerly OS/390) are generally regarded today to be the two “world class” operating systems for mission critical applications that require high availability. Many of the applications in the banking sector and other financial services, healthcare, transportation and telecommunications industries require both high system uptime and high scalability.

System downtime requirements can range from almost zero-downtime to five seconds per year or five minutes per year. In addition to high availability ratios, these systems are expected to provide high performance ratios (thousands transactions per second) and huge storage requirements measured in multiple terabytes.

Availability classification, levels of availability and corresponding annual downtime are given in the Figure 8.1.

A more detailed specification of uptime/downtime scenarios is given in Figure 8.2.

However, high availability systems are expensive, complex to maintain and administer and require skilled professionals. The 99.999% uptime is difficult to achieve and sometime may not be worth the cost it requires. Some businesses would benefit from these expenditures, but some would not. Therefore, a serious return of investment analysis (ROI) is needed in order to justify such a kind of investment.

Figure 8.1. Availability classification (Source: Marchi & Watson, 2002)

<table>
<thead>
<tr>
<th>Availability Classification</th>
<th>Level of Availability</th>
<th>Annual Downtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Processing</td>
<td>100%</td>
<td>0 minutes</td>
</tr>
<tr>
<td>Fault Tolerant</td>
<td>99.999%</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Fault Resilient</td>
<td>99.99%</td>
<td>53 minutes</td>
</tr>
<tr>
<td>High Availability</td>
<td>99.9%</td>
<td>8.8 hours</td>
</tr>
<tr>
<td>Normal Commercial Availability</td>
<td>99-99.5%</td>
<td>87.6-43.8 hours</td>
</tr>
</tbody>
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Classifying Inputs and Outputs in Data Envelopment Analysis Based on TOPSIS Method and a Voting Model