INTERACTIVE SESSION   MANAGEMENT

PayPal Ups Its Digital Resiliency

PayPal Holdings, Inc. is an American company operating a worldwide online payments system that supports online money transfers and serves as an electronic alternative to traditional payment methods like checks and money orders. The company operates as a payment processor for online vendors, auction sites, and many other commercial users. You've probably used PayPal if you've bought something from eBay or from an e-commerce website. It is a very well-established and widely accepted payment system. As of the first quarter of 2020, PayPal had 325 million active users. In 2019, PayPal processed 12.4 billion payment transactions and generated $17.77 billion in revenue.

Obviously this is a company that has to work vigilantly to make its services ultrasecure and available 24/7 throughout the world, and PayPal maintains very high standards of security and reliability. But management wanted to make sure the company was doing the best job possible, so it turned to Uptime Institute to evaluate the way PayPal ran its data centers and its level of digital resiliency. Uptime Institute is a consulting group focusing on improving the performance, efficiency, and reliability of business critical infrastructure through innovation, collaboration, and independent performance certifications.

Although data centers try to operate sites full of cost-saving technologies and innovative new approaches, they still struggle with the ongoing performance and reliability of these sites due to the operational plans in place. Various levels of staffing and experience along with limited or inaccurate written documentation of operational processes create inconsistent behaviors and service outages.

Uptime Institute had found that the majority of reported data center outages are directly related to human error. This could be operator error or management error in its decisions regarding staffing, maintenance, training, or overall rigor of operation. With human error responsible for so many data center incidents, organizations need to take a more holistic approach to staffing, organizational practices, maintenance and operations activities, management, and planning.

Sean Tugwell, PayPal's Director of Data Center Architecture and Engineering, wanted to make sure his company had achieved a high level of digital resilience and 99.999 percent availability across all data centers. He also wanted to make sure the colos working with PayPal were sufficiently resilient as well. (A colocation data center, often referred to as a "colo," is a large data center facility that rents out rack space to other businesses for their servers or other computing equipment.)

Uptime Institute's M&O Assessment measures the operational effectiveness of the teams within a data center, focusing on five behaviors that should be proactive, practiced, and informed. These behaviors apply to staffing and organization, maintenance, training, planning, coordination and management, and operating conditions. In early 2018, PayPal received Uptime Institute's M&O Stamp of Approval for its PHX01 data center, earning a very high first-time score of 96.2 percent. Several other PayPal data centers received high first-time scores of 100 percent, further indicating that PayPal had a high level of data center sophistication and maturity.

PayPal also scored well in its implementation of the Service Now platform, which is used for improving procedural approval workflows, maintenance management for critical data center infrastructure, incident management, and space and power planning. One area where PayPal shined was its approach to staffing and organization. Its Facilities Operations group has at least three facilities technicians on site at all times, and these technicians undergo rigorous training to ensure they have comprehensive and in-depth knowledge of a variety of systems and equipment.

PayPal's Facilities Operations group is also responsible for preventive and corrective maintenance at a data center. The group creates and implements on-site maintenance standards and procedures to make sure data center maintenance work is successfully completed and documented. In this area, too PayPal scored very well—all its data centers had no items for deferred maintenance. PayPal's Preventive Maintenance Program helps the company keep equipment in like-new condition.

New hires at PayPal's Facility Operations Team are required to complete an initial training program before they are allowed to work on shift. PayPal also has a training program for vendors who will be performing on-site maintenance.

To promote effective planning, coordination, and management that will result in greater uptime, PayPal has developed various procedures and standards, which are available in its ServiceNow Knowledge Base. This helps promote consistency across all of PayPal's data centers, and also reduces the chance for human error at each site. PayPal's financial team creates, reviews, and tracks budgets to ensure the budget for each data center is appropriate for supporting the firm's business objectives.

Consistency has become even more important for PayPal as it uses more colocation companies to add to its computing capacity. PayPal was able to use the M&O Stamp of Approval program to evaluate its colocation data center vendors. New vendor contracts now require that a data center vendor achieve Uptime Institute's M&O Stamp of Approval and maintain that rating as long as PayPal is a customer.

A high priority for PayPal's Data Center Services Team is reducing business costs. Any data center downtime, whether from a company data center or colo, creates a loss to the business, in terms of number of transactions processed, customer service, and the time and resources required to solve the downtime problem. Uptime Institute's M&O Stamp of Approval promotes this goal, and also helps teams make sure that there are no surprises when new teams and operational practices are introduced to the company.

Given the critical importance of digital resiliency, in addition to its M&O Assessment, Uptime Institute has also recently introduced a Digital Resiliency Assessment program. This program specifically focuses on the resiliency of a firm's internal and cloud-based digital infrastructure, spanning its end users, networks, applications, databases, and data centers, to identify any weak links in the chain and validate the resiliency of the entire system.

Sources: Uptime Institute, "Digital Infrastructure Resiliency Assessment," and "PayPal,"www.uptimeinstitute.com, accessed March 24, 2020; Craig Smith, "Amazing PayPal Statistics and Facts (2020) by the Numbers," DMR, March 12, 2020; and investor.paypal.com, accessed March 23, 2020.

CASE STUDY QUESTIONS

1. Why is digital resiliency so important for a company such as PayPal?

2. How did PayPal benefit from measuring its digital resiliency? What issues did it address?

3. What is the role of management and organizational issues in making an organization's IT infrastructure more resilient?

Security Issues for Cloud Computing and the Mobile Digital Platform

Although cloud computing and the emerging mobile digital platform have the potential to deliver powerful benefits, they pose new challenges to system security and reliability. We now describe some of these challenges and how they should be addressed.

Security in the Cloud

When processing takes place in the cloud, accountability and responsibility for protection of sensitive data still reside with the company owning that data. Using the public cloud disrupts traditional cybersecurity models that many companies have built up over years. As companies make use of the public cloud, they need to revise their cybersecurity practices in order to consume public-cloud services in a way that enables them both to protect critical data and to fully exploit the speed and agility that these services provide.