Driving cloud adoption in an enterprise IT organization

Situation
Microsoft IT is driving cloud adoption at Microsoft. Part of the Microsoft IT cloud adoption strategy is moving approximately 2,100 line-of-business applications to the cloud platform. These applications are spread across eight datacenters worldwide, which comprise over 40,000 distinct operating system instances.

Solution
Microsoft IT realized that its biggest challenge was not a technology issue. The biggest challenge was powering a cultural change at Microsoft. To drive this change, Microsoft IT formed the Stratus team. The team evaluated the company application portfolio and decided what applications to move first.

Benefits
• A modernized application portfolio.
• Reduced costs.
• New capabilities in the cloud, including agile development and deployment.

Products and technologies
• Microsoft Azure
• The cloud platform
• Power business intelligence

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Microsoft IT is driving the company’s vision of “Microsoft runs in the cloud.” To advance that vision, Microsoft IT created processes and teams to migrate over 2,100 internal applications from on-premises servers to the cloud. The biggest challenge was not technology but a cultural change within the organization. Using a cohesive strategy and process, Microsoft IT has changed its culture and integrated cloud adoption into the business.

Situation
The vision at Microsoft IT is “everything runs in the cloud.” Microsoft wants to benefit from the cost-saving and agile development and deployment capabilities of the cloud platform by moving approximately 2,100 line-of-business (LOB) applications to the cloud. The LOB application portfolio at Microsoft includes finance, human resource, and support applications.

Microsoft IT was tasked with driving this ambitious, company-wide project. The role of Microsoft IT in the project is to drive the migration of applications to the cloud. In fact, the role of Microsoft IT is the same as that of any IT department in a similar project. The team provides the necessary support and expertise to individual departments by consulting with them about moving applications to the cloud. They discuss a delivery model, resource planning, and potential cost savings. They find the best fit for an application in the cloud. And they provide critical reporting data to measure progress of the project.

Solution
Microsoft IT realized that its biggest challenge was not a technology issue. The biggest challenge was powering a cultural change at Microsoft. To drive this change, Microsoft IT formed the Stratus team. The team evaluated the company application portfolio and decided what applications to move first.
To understand how the decision to migrate a specific application was made, it helps to understand that the Microsoft IT organization has two major components:

- **Business process units** (BPUs), which are aligned with business processes such as finance, sales, or human resources. BPUs are responsible for the portfolio of internal LOB applications in their area.
- **Centralized IT services** at Microsoft are responsible for a variety of services, including server infrastructure, SAP implementations, security, and architecture guidelines.

The Microsoft IT strategy of “everything runs in the cloud” applies to both new applications and existing applications that run in a datacenter environment.

**The Stratus team**

The Stratus team is a centralized group of Microsoft IT staff that focuses on driving cloud adoption at Microsoft. The Stratus team provides several critical functions:

- **Analyzing cloud capabilities, application, and platform requirements** and how those enable the adoption of cloud technologies. This is an important function. The Stratus team needed to know when capabilities that are critical to an application are available in the cloud.
- **Training and guidance to enable a cloud-first IT organization.** The Stratus team developed a decision framework on where—or if—an application would live in the cloud. The team consulted with BPUs to provide guidance and training.
- **Reporting**, which is critical to sharing accountability across BPUs.

**Challenges faced by Microsoft IT**

Microsoft IT realized that the biggest challenge was not a technology question. The biggest challenge was changing the culture and mindset at Microsoft. The company needed to switch from a strategic focus on developing technology solutions to measuring business benefits.

The Stratus team needed to carefully orchestrate migration to the cloud. The team would drive the effort, but each department would rely on its own technical expertise during the move. Executive management needed to approve training costs to build the technical skill set that would enable the move.

**Moving to the cloud**

Cloud adoption within Microsoft IT has been an evolutionary journey. In the early phases, when Microsoft IT began selecting applications to move to the cloud, it made simple classifications to determine when an application should be targeted for migration. The team weighed two factors when evaluating an application for cloud migration: technical complexity and business impact.

Microsoft IT began with the least technically complex application that had the least impact on business. This approach let the team build new architecture models and increase the skills of engineering teams to fully take advantage of the new capabilities without great risk.
The decision framework quickly evolved into a model that balanced both technical and business considerations, as shown in Figure 1.

Figure 1. Application criteria for the cloud

The Stratus team supported the move to the cloud by each BPU, department, or division. The team provided guidance and encouraged BPU organizations to adopt the cloud as quickly as possible. The driving factors behind the new strategy were to make decisions based on the difficulty of the project and expected benefits.

If a BPU did not want to move an application to the cloud, the BPU needed to justify the decision. However, once the decision was made to move an application to the cloud, the Stratus team took a blunt approach of “fail and fail fast.” The team encouraged the BPU to simply move the application to the cloud. In many cases, BPUs chose to move applications in development first. If the application didn’t work in the cloud, the team worked to understand why the application failed and how to fix the issue. If the problem could not be resolved, the application would remain in the datacenter.

At Microsoft, applications typically have a plan of record, which is a review of the application lifecycle. A plan of record is constantly changing, based on new successes and challenges. The Stratus team reviewed the plan of record for an application with the BPUs during the cloud adoption process.

Delivery Models

SaaS. In this model, the client pays a monthly fee to use a prepackaged program—software that belongs to the hosting organization. Examples are Microsoft Office 365, Microsoft Dynamics Online, Microsoft Intune, Microsoft Dynamics CRM, Microsoft Exchange, and Microsoft SharePoint.

IaaS. This model shifts the responsibility for hosting away from the client to a hosting organization. Examples of IaaS are servers that are hosted in Azure—virtual servers or virtual OS images. When using IaaS, clients do not create new applications; they run the same applications on the virtual server that they would run in their private datacenter.

PaaS. This model starts with the hosting freedom of IaaS and adds prepackaged components that can be used as building blocks for modern LOB applications.

Hybrid. The hybrid model is a combination of cloud delivery models and the on-premises infrastructure.
The basic view of cloud adoption benefits by delivery model is shown in Figure 2.

**Figure 2. Delivery models**

Microsoft uses the terms “sustain” and “investment” to describe applications that will be moved to the cloud. If an application is moved to the cloud and no further investment is planned for redevelopment, it is in a “sustain” mode. These applications should be re-hosted in IaaS. If an application will either be re-architected or is a new application, it should be developed for PaaS or SaaS, software as a service.

**Figure 3. Applications in the cloud**
Additional approaches and business drivers were incorporated into the strategy as the migration project progressed. The team used multiple strategies to move applications to the cloud, as shown in Figure 4.

![Migration strategies diagram](image)

**Figure 4: Migration strategies**

**Environment rationalization**

The team ultimately decided to develop a decision framework to evaluate whether applications should be moved to IaaS, consolidated, or shut down. The decision framework was based on telemetry and the understanding that the Stratus team had of existing virtual machines and physical server environments, which had very particular characteristics based on several factors:

- Hardware requirements
- Software versions
- Network and required access to internal resources
- Security considerations

Based on those characteristics, the team built a construct that compared the on-premises environment to the IaaS delivery model in Microsoft Azure. The Stratus team also took a big-picture view of moving applications. Typically, applications require multiple servers to support an environment. Therefore, the team took a holistic view to understand the upstream and downstream relationships at the application layer. In some cases, it was possible to move one server in a hybrid model and not impact the overall health or service level agreement (SLA).
The decision framework quickly became quite sophisticated. The newly evolved framework used numerous data points and resulted in a recommendation to re-architect an application for SaaS or PaaS, or re-host in IaaS, as shown in Figure 5.

**Figure 5. Microsoft IT cloud migration strategy**

The result of the Stratus team’s efforts became the cloud adoption factory

**Supporting success**

A critical part of cloud adoption is increasing the knowledge base among application development teams. Microsoft IT built a comprehensive model to share information about cloud technologies and success stories about moving and re-architecting applications. The focus is two-fold: to increase the collective knowledge of IT teams and to provide a platform highlighting work that is taking place to help support the cloud adoption strategy.

This information-sharing model consists of holding regularly scheduled meetings to discuss cloud adoption projects, highlighting work and teams that are supporting the strategy, and sharing new capabilities of cloud services as they are released.

A cloud wiki provides a comprehensive store of information that helps development teams understand cloud technologies and examples of their use (Microsoft IT uses a shared Microsoft OneNote notebook to deliver this). The wiki includes information about:

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<th>Leadership directives</th>
<th>Cloud technology</th>
<th>Architecture patterns</th>
<th>Key considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cloud strategy at a consumable level for application teams</td>
<td>Description of features and components consolidated into a section</td>
<td>Examples of successful cloud architecture used for internal applications</td>
<td>Resiliency design</td>
</tr>
<tr>
<td></td>
<td>Appropriate uses for different components and guidance on design</td>
<td></td>
<td>Cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Security requirements</td>
</tr>
</tbody>
</table>
People, skills, and Microsoft IT

Microsoft IT has seen a shift in the roles and skills that are required to manage Azure platforms; the emphasis in Azure on agile development, automation, and self-service technologies has caused a dramatic change:

- Fewer business project managers
- Near-elimination of the development/testing role as the position transitions to development/operations
- Fewer solution deliverers
- More project managers with agile and cloud skills
- More developers and support engineers with development skills

Lessons Learned

The cloud adoption factory project began as an opportunity to use the advantages of the cloud. By modernizing the Microsoft application portfolio, Microsoft IT is realizing those potential benefits.

Microsoft IT learned that a team dedicated to driving cloud adoption is critical to success. Specifically, the team is important because:

- The Stratus team constantly analyzed evolving cloud capabilities and server and application requirements. When the required capabilities were available in the cloud, the Stratus team used the decision framework and worked with the BPUs to find the best fit and move an application to the cloud.
- The Stratus team proved the value of reporting. By sharing reporting data across BPUs, the team could not only measure the progress of the project but could also promote accountability across BPUs.

Best Practices

The “everything runs in the cloud” strategy was key in the Microsoft move to the cloud. Enterprises prioritizing on-premises asset reduction and following the operating expense model may find it helpful to embrace “lift and shift” to the IaaS process. This is also an opportunity to revisit existing environments and aggressively right-size them for the cloud, turn off unused environments, and potentially realize cost savings. Other recommendations are:

- Drive cloud adoption through both the technical expertise of IT departments and through chief information officers (CIOs) providing training and support.
- Create a team dedicated to driving cloud adoption because this is critical to success.
- Use a business problem that you are trying to solve as the core of every cloud services decision. But be sure to balance business and technical factors in making that decision.
- Remember that one size does not fit all. Each organization should determine how to grow cloud services.
- Use the cloud as an opportunity to downsize, right-size, and optimize to combat server sprawl.
- Use the scalability and capabilities of PaaS when developing or re-architecting applications for the cloud.
- Consider a hybrid strategy when moving multi-tier applications to the cloud.
- Keep applications in the cloud modular to take advantage of cloud resiliency.
- Aggressively suspend or eliminate underused and abandoned servers.
- Realize that cloud adoption will change the IT roles in any organization. Agile development skills will become increasingly important. Prepare staff for the skill sets that are required to manage a hybrid infrastructure.

**For more information**

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