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Application Profiling Informs Intel IT's Evolving Hybrid-Cloud Strategy

Cloud Services Create Opportunity for Modern Development Architecture

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> – Chris Sellers, Director of Intel IT's Software Defined Infrastructure group

Executive Summary

The traditional approach toward app coding required a focus on the underlying computing stack. Today, that legacy "infrastructure-up" model yields to an "application-down" approach thanks to the rise in cloud-based services. Intel IT's commitment to a hybrid-cloud strategy—taking advantage of both public and private cloud solutions for key workloads—is a paradigm shift in the way the company develops and accesses applications. By evaluating each app used across the enterprise, the Intel IT team can determine an ideal hosting environment for it. Dedicated training programs for developers further the effort, supporting re-architecture of older apps to take advantage of cloud services. With each workload hosted in the "right" place, Intel benefits from greater agility in a fast-paced corporate environment, significant cost savings, and faster development cycles.

Challenge

Each day, a global enterprise like Intel depends on scores of applications to serve a multitude of needs. Intel's IT team must continuously evaluate how employees, partners, and customers access those applications, and the business value each app provides. A user-friendly experience coupled with maximum uptime are paramount considerations. According to Chris Sellers, Director of Intel IT's Software Defined Infrastructure group, "Five organizational 'pillars' encompass a majority of applications in use at Intel today: Manufacturing, Engineering, labs, office and enterprise, and various apps connecting Intel with customers and partners externally." To optimize this breadth of workloads, Intel IT must balance available developer resources applied toward app modernization, and identify the most cost-effective way to host each application – be it on-premises or in the cloud. In past approaches to development, considerations like networked resources and storage dictated an "infrastructure-up" approach. Cloud services created new opportunities for developers to adopt an "application-down" programming model.

Fully embracing Anything as a Service (XaaS) represents a paradigm shift for enterprise developers. Sellers summarizes the challenge. "We needed to change how we created applications completely. Many of our developers did not have exposure to the nuances of modern cloud-native application creation. Everyone embraces the new approach once they understand the benefits of cloud-native applications."

Solution

Evaluating applications

Today's prevalence of Software-as-a-Service (Saas), Infrastructure as a Service (IaaS), Platform-as-a-Service (PaaS) or Container-as-a-Service (CaaS), present a significant opportunity for software re-architecture. Embracing the potential of Anything as a Service (XaaS), cloud-based hosting services can provide substantial usability, and efficiency improvements for most modern applications, plus developers benefit from design flexibility and a simplified coding process.

Intel IT first adopted enterprise-level private cloud solutions in 2010. The investment paid off quickly, resulting in cloud service upgrades for approximately 350 applications. That success led to a much larger scale endeavor, scrutinizing all apps in use across the company. Notes Sellers, "This process for application rationalization—also referred to as application portfolio management—examines each application from a business need perspective and a workload placement perspective."

Application Profiling

An "application profiling tool," developed in-house by Sellers' team, empowered the first steps of combing through more than 2,000 applications. The tool filters applications against two simple questions: Is business value being derived from the app? Can the app be improved to make better use of resources assigned to it?

If a given application fails the first test, a phase-out is planned to eliminate it. On the other hand, if an app gets a nod for fulfilling both criteria, further scrutiny is applied to it by Intel IT's Principal Engineers. Applications which can be re-architected to benefit from a public or private cloud-based platform get flagged for a makeover. Sellers elaborates, "For those apps already hosted in the 'right place,' maintenance is our only focus. However, for apps in the 'wrong place,' we form a plan to move it. Physical server infrastructure requires hardware investment, ongoing maintenance, and system redundancies for potential failover. If a cloud service-based solution can reduce those expenses and improve the end-user experience, we want to re-architect the application for long-term corporate benefit."

Further evaluation criteria, which may influence the hosting decision, include requirements like governance, performance, or security. Apps which should not be re-located to the public cloud remain in their current hosting environment. "For workloads requiring high utilization and data bandwidth, public cloud is not an ideal solution," offers Sellers. "For instance, our high-performance computing (HPC) silicon design workloads on our enterprise private cloud prove optimal."

Supplemental developer training

Ongoing developer training proves central to Intel IT's revolution in application modernization. Courses reinforce the latest tools, programming methodologies, development languages, and security considerations necessary for cloud-native app coding. Training also covers "Big Data" considerations like in-memory databases and advanced analytics.

Database as a Service

Beyond the training programs, Intel IT deployed a private cloud Database-as-a-Service (DBaaS), providing another tool to help developers enforce development standards, offer built-in failover should disaster recovery ever be needed, and create the most capable applications. The DBaaS system now supports over 900 applications with more on the way.

Results

Intel IT's first step in a three-year app optimization plan is now complete. With an ideal hosting environment for each app determined, phase two requires re-purposing and re-platforming applications for business value. Resulting cloud-native and mobilized applications offer both immediate and long-term benefits. The third step begins soon. Over a year's time, the Intel IT team will have all applications hosted in the "right" place. Intel IT anticipates several benefits as a result:

Price-performance

Physical IT infrastructure requires up-front capital expenditure, ongoing administrative support, and maintenance of hardware and software. By running appropriate applications on cloud-based service options, Intel can benefit from cost efficiencies like cloud-based

Application Migration Rationalization Process

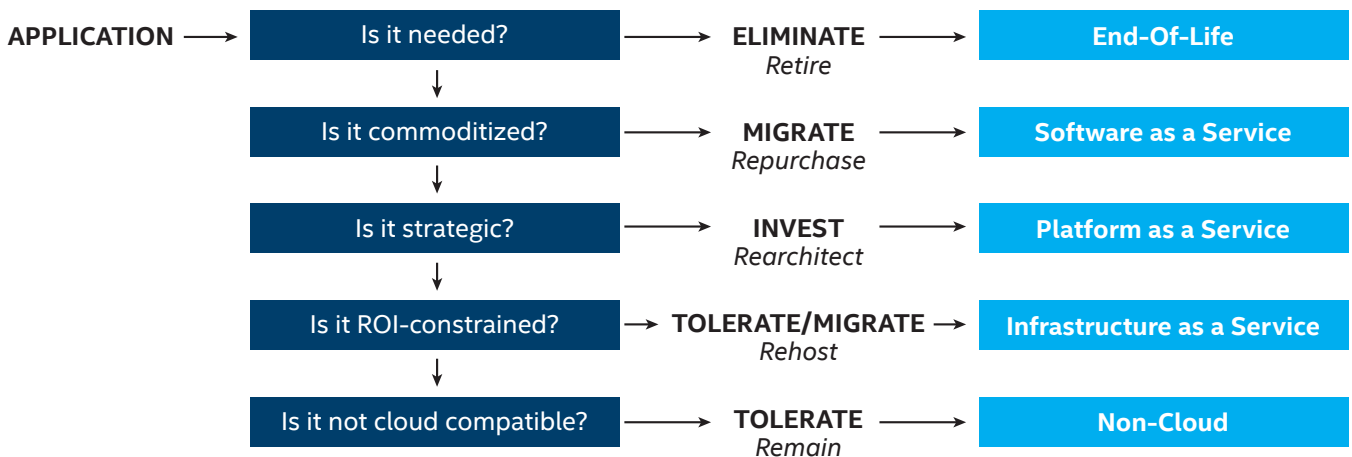| APPLICATION → | Is it needed? | → | ELIMINATE *Retire* | → | End-Of-Life |
	↓				
	Is it commoditized?	→	MIGRATE *Repurchase*	→	Software as a Service
	↓				
	Is it strategic?	→	INVEST *Rearchitect*	→	Platform as a Service
	↓				
	Is it ROI-constrained?	→	TOLERATE/MIGRATE *Rehost*	→	Infrastructure as a Service
	↓				
	Is it not cloud compatible?	→	TOLERATE *Remain*	→	Non-Cloud

Fig. 1. We use a standard application rationalization process to guide our application migration decisions

hosted platforms offering a flexible pay-for-usage cost structure. This strategy combined with the method of placing more mission-critical or compute intensive workloads in their private cloud achieves better data center efficiencies overall.

Agility

Enterprise private or public cloud-based hosting deliver stable environments needing little maintenance from Intel's IT group, plus built-in failover and redundancy spread mission-critical workloads across geographically diverse datacenters. Employee downtime is a disruptive and expensive proposition. Should a vital app experience a system failure on a hosted cloud-based service, fast failover means that users may not even be aware of an outage. As a result, Intel IT's hybrid-cloud approach, and the cloud-native applications enabled through it offer a more globally-consistent user experience.

Maximizing Developer skills

An "application-down" model leveraging cloud services removes the tether to a single-option hosting scenario. It also enables faster app development and simplified portability of applications.

Future-ready

While the multi-phased effort has created significant benefit already, the extensive process of application evaluation – and re-architecture when necessary – is an ongoing proposition. An app may reside in the ideal hosting environment today, but future services and technologies may offer benefits which drive a business case for re-hosting it.

Sellers envisions further maturation of hybrid-cloud solutions, and his team is preparing for it already. "The next step will be moving up another layer where we break a larger application down into functions. We can start consuming those functions, whether they are exposed in a public or private cloud, and put them together based on needs from an application. This anticipated shift represents the next step in maturity from an industry standpoint, and which we are looking at from an Intel IT perspective."

Solution Summary

By embracing a hybrid-cloud strategy for application development, Intel IT has reaped many benefits. Their first step involved the creation of an in-house tool to analyze each corporate app. The effort determined whether each application remained business-critical, and if so, whether if it could be re-architected for more efficient and cost-effective cloud-based, XaaS hosting. By offering their developers additional training in cloud-optimized coding, modern applications are developed faster with future-proofing in mind. As cloud services continue to improve over time, Intel IT will regularly re-evaluate apps to ensure they remain in the ideal hosting environment.

Where to Get More Information

Learn more about hybrid cloud solutions at Intel