» GUIDE

The basics of IT asset management

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Overview

If you're newly responsible for IT asset management (ITAM) at your organization or simply curious about the benefits an ITAM program can provide, this guide is for you.

Explore three eras of ITAM in three parts:

- Part one, the early, pre-cloud days based in software asset management (SAM) and hardware asset management (HAM), along with the ITAM practices rooted from this time that are still relevant today
- Part two, its current expansion beyond those assets into cloud and SaaS
- Part three, the emerging future of IT organizations as providers of Technology Intelligence—the ability to understand and manage all technology

We'll end this guide with advice on how you can apply this Technology Intelligence so your IT team can secure budget and cross-functional support more efficiently. Embracing Technology Intelligence and its future in ITAM will prepare you to handle your organization's ever-expanding inventory of technology assets, as well as your ever-expanding information and collaboration needs.

An important note: As you read, please refer to "Appendix A: Important ITAM Terminology" in the back of this guide for succinct yet informative definitions on foundational terms and concepts in ITAM.

Part I: The foundation of ITAM

The origins and purpose of SAM

The foundation of today's ITAM is in the early days of SAM and HAM. Along with buying hardware and managing its use, SAM professionals would purchase software licenses and manage installed software running on end user devices and datacenter servers. Software vendors would audit organizations to ensure that software was installed and used in accordance with the terms and conditions set forth in their license agreements.

At one time, software governance and audit support were tasks spread across distinct roles in IT. Fast forward to today, and many organizations are employing dedicated ITAM managers to proactively maintain compliance, carry out selfauditing, interpret licensing terms, manage contract renewals, and optimize spend on software.

The components of SAM

Compliance

Compliance is a big part of risk containment in SAM, though compliance means different things in different industries and disciplines. Highly regulated industries (e.g., finance and healthcare) need to comply with industry regulations and government legislation, in addition to complying with the local or regional data protection regulations that all businesses do. For SAM and ITAM practitioners, compliance involves getting visibility into all assets the organization uses and discovering unauthorized software use that could cause a compliance failure. It also refers to the use of software in accordance with the terms and conditions of the license agreement. Organizations that fail to proactively manage license compliance can suffer significant financial and reputational impacts.

The license

At the heart of SAM is **the software license**—the legal entitlement to use an application. The terms and conditions of the license define who can use the software, on what machine(s), and when. A license can, for example, grant a specific user access to an application on a given machine, or to several team members via a server. Clauses governing upgrade rights, access to other applications in the same bundle, audit requirements, home use exceptions and renewal conditions are typically included in the software license. A vendor or partner and an organization or a user typically agree upon licenses. Terms and conditions vary depending on factors such as the volume of licenses acquired and additional purchases such as support and maintenance, as well as any up-front cash commitments. The size and complexity of vendor lifecycle policies grows at the pace of the organization's growth. As the organization and its vendor lifecycle policies grow, so does the scope of managing it all.

The ability of the SAM or ITAM manager to interpret the fine print of the license was—and still is—a fundamental skill. It's done in conjunction with legal, partners and other licensing experts when appropriate. This critical interpretation forms the basis of compliance calculations which can lead to cost savings on software spending and can mitigate the risk of audit fines. The key word when it comes to licenses is entitlement, which governs how the license entitles you to use the software.

Metrics

Metrics are the building blocks of licenses. Software tends to be licensed using one primary metric together with additional use rights. License metrics for the most popular software titles can be categorized by user or per install, processor or core count, number of concurrent users and metering (usage). When metrics relate to hardware, determining compliance becomes more complex because it depends on how servers are configured to include considerations such as load balancing, hot and warm standby, and development vs. production environment.

SaaS software and pay-as-you-go models have introduced additional metrics such as number of application programming interface (API) calls, transactions, dashboards used, cloud spend, etc.

A WORD OF CAUTION:

Software vendors can use the same metric in different ways. Concurrent use may not mean the same thing from one product to the next, and vendors may use the same metric in different ways across their portfolio.

The audit

Through **audits**, vendors ensure that their customers are using software in accordance with what they have purchased. Sometimes, vendors refer to an audit as an "assessment review" or a "license optimization review." In these instances, exercise caution. **No matter what they call it, your goal is to understand your compliance position**. Rather than sending any data to the requestor, simply state your information security guidelines for not sending company confidential data to third parties. Soon thereafter, review your usage and address any known issues for that vendor because a proposed "assessment review" is very often a precursor to an audit.

Audits may be aligned with customer renewal dates but can occur at any time of the year. For vendors, audits have shifted from an occasional happenstance to a regularly scheduled event that generates vendor revenue. Audits put customers in a position of strength or weakness, depending on the maturity of their ITAM program. Strongly positioned customers—the ones that actively manage and are in control of their licensing—can use the audit process to renegotiate existing agreements.

Don't rely on vendor data alone. If you leverage your ITAM program and come to an audit prepared with your own accurate view of software deployment, configuration, licensing and usage, you'll be in a position of strength and able to clarify any variance with your own accurate data.

Software licensing models

To cater to the numerous ways in which users have consumed software, vendors have devised a multitude of software licensing models. These models ensure that their products remain competitive in the IT landscape and as user consumption patterns evolve. They are often complex and require a

Common audit triggers include:

- Changes in vendor spending, e.g., reduced support and maintenance spending during renewal, support and maintenance that's moved to a third party, or the vendor changing their license model (as in the case of Oracle Java SE)
- Historical proof of entitlement (PoE) requests
- An audit clause in the contract
- Periodic audits usually aligned to renewal dates
- Contract termination
- Mergers or acquisitions
- Unhappy employees notifying the vendor of compliance issues

thorough understanding of how people are using the software, as well as the infrastructure and the hardware on which the software runs.

SAM and ITAM solutions have evolved to mitigate the complexity and simplify the work of constantly monitoring all the machines and devices attached to the IT environment, as well as the daily task of ensuring compliance for every installed application.

As seen in Appendix A, common software license model types include (but are not limited to): perpetual, subscription, consumptive, concurrent/networked, device, and user types.

Calculating an ELP

Since the early days of SAM, calculating an effective licensing position (ELP) has been key to a successful SAM (and now ITAM) practice. Put simply, the ELP is the difference between license entitlements for an application and software consumption. If, for example, the primary metric of the software application is installation, and your entitlements show you have 100 licenses, but the actual number of installs is 90, then the ELP is -10.

The DINROS model

To calculate an application's ELP successfully, you need to choose an ITAM tool that will provide accurate data throughout every step of calculating that ELP. To help ITAM professionals in this task, Gartner®, a technological research and consulting firm, created the discovery, inventory, normalization, reconciliation, optimization and sharing (DINROS) framework for evaluating ITAM solutions.

Solutions based on the DINROS model will help you to:

- Calculate an effective licensing position (ELP) for each application installed on your organization's network
- Optimize spend on licenses
- Spread SAM and ITAM awareness throughout your organization

Software inventory is mandatory for cybersecurity

A complete and accurate software asset inventory isn't just a smart practice for all organizations. For federal agencies, it's mandated by law.

In September 2022, the White House released <u>new guidance</u> for all federal agencies to obtain a full inventory of software they use—within the next 90 days. It was the first of a required series of actions that stem from <u>Executive Order (EO)</u> <u>14028, Improving the Nation's Cybersecurity</u>, released in May 2022. This order directed the National Institute of Standards and Technology (NIST) to publish guidance on how the agencies could better protect government systems with more secure software.

An ongoing strategic ITAM program is the best way to discover, inventory, manage and optimize your software effectively for years to come.

Discovery

The first step in the process, discovery, involves detecting all the machines connected to your organization's network to calculate the ELP for all applications. From a licensing perspective, discovery via inventory should be as complete as possible to ensure that no application is uncounted. In this inventory step, your ITAM solution should detect physical (datacenter and cloud-based) and virtualized machines. Examples of machines include desktop computers, hosts, laptops, servers, and virtual machines in a public/private cloud or on a desktop.

Inventory

Once your tool has discovered all your organization's machines, the next step is to retrieve the information about software installed on those machines. An agent installed on the machine (or a remote interrogation method) usually carries out that inventory. Both methods can extract the necessary information, but an agent can also extract usage information, which is vital for license reharvesting.

Normalization

Your inventory will result in a massive amount of raw data that describes the applications installed on your organization's network, as well as the machines on which they run. The process of normalization takes this raw data and makes sense of it. For example, depending on the rollout method for software installation, or inventory collection, the same application may have different names on different machines, even within the same organization. Normalization recognizes applications in a homogenous manner, including bundling information and upgrade/downgrade rights. Normalization ensures accurate software consumption counts.

Reconciliation

To create an ELP for each application, license entitlement needs reconciliation with consumption

counts. This reconciliation requires an ITAM solution to import or add software entitlement data from procurement systems, software reseller portals and other systems managing software licenses.

Reconciliation is a simple equation of license entitlements minus consumption. If the result is negative consumption that exceeds entitlement, you'll need to determine whether additional purchases are required. A zero or positive result shows that use of the application is compliant with the interpretation of the terms and conditions of the license.

Optimization

Optimization is the point at which ITAM starts to get interesting for other parts of the organization. Once reconciliation is taking place regularly, you—and other stakeholders—will be aware of non-compliant software and can start to work on cost control.

Armed with the necessary intelligence about usage and imminent vendor negotiation dates, you can now optimize software spend. You can ensure that volume licensing deals are maximized, that you can reharvest shelfware and that users are on the correct payment plans in accordance with actual usage of SaaS applications.

Share

Ideally, the steps of the DINROS framework are carried out by a software solution that maintains an accurate, consistent, and up-to-date record of software installed, usage and entitlements. An automated ITAM solution shares its data with applicable business functions through reports and APIs, enabling ITAM intelligence to enhance business processes and decision-making.

For example, by providing accurate data on available software licenses to an IT service manager (ITSM), the ITSM can automatically deploy approved software requests when licenses are available. An effective ITAM tool could also:

- Share cost data with financial systems to enhance the accuracy of forecasts
- Provide information about installed software with approaching end-of-life dates to IT security or denylisted software being used by employees
- Forward vulnerability reports to the IT deployment system so it can automatically update software that is missing patches

Part II: The expansion of ITAM to cloud and SaaS

Advantages and downsides

Cloud and SaaS technologies have been game changers for organizations because of the enormous flexibility and advantages they offer to users and service providers. Their growing popularity is increasingly evident in IT budgets, too. While onpremises software is still the largest portion of the IT budget (18%) behind salaries and benefits, SaaS software is becoming a significant portion, nearly doubling over the last 4 years to 11% of total IT spend.¹

Flexibility aside, cloud computing provides many other advantages, including:

- Access to a wider market
- The ability to develop and rollout new services without impacting existing users
- Reduced time spent on software updates and maintenance
- Support for services on multiple platforms
- The capability to seamlessly chain services that multiple vendors provide

Risk and cost control

Cloud capabilities remove many of the headaches associated with managing software and hardware, eliminating much of the complexity involved in managing compliance. However, infrastructure as a service (IaaS) and SaaS replace compliance with two complex issues: risk and cost control.

To avoid risk in a cloud environment, you need to ensure that:

- Users are on the optimal subscription plan according to usage
- Off-boarded users no longer have access to SaaS applications
- Workloads are not left active in a cloud environment if your organization's needs have changed or if somebody forgot to decommission them

The irony of the cloud is that the ease with which users can procure SaaS applications and the simplicity of spinning up infrastructure cause IT costs to rise, despite vendor promises to the contrary. A cloud-centric environment inherently lacks the centralized control over scoping, procurement and billing that IT departments had in the traditional model. In this environment, the focus of ITAM in the cloud shifts from compliance to cost containment and a different set of risks.

^{1.} Gartner. "Key Metrics Data 2023: Industry Measures." 08 December 2022.



The shift from perpetual to subscription licensing

In response to workforce demands for constant access to applications and more flexible use rights, vendors are shifting from perpetual to subscription-based models for software delivery. Cloud technology enables both software and hardware to be delivered on a subscription basis via SaaS, IaaS, and platform as a service (PaaS).

Unfortunately, complexity also increases with increased cloud adoption. In addition to its other inventory functions, an effective ITAM tool must be able to distinguish perpetual and SaaS versions of software. Today's models support the use of subscription software on-premises as well as traditional SaaS. Perpetual licenses might become extinct at some point, but the market currently supports a mix of licensing.

The word "perpetual" is perhaps a bit of a misnomer when it comes to licensing. A perpetual license forever entitles the consumption of software within the terms and conditions of the agreement. Software, however, evolves and doesn't last forever. Most software gets to end of life (EOL) status at some point, after which the vendor is no longer obliged to provide you with updates, security patches or support. Consequently, EOL software becomes a risk for attacks. In some cases, old software won't run on newer hardware and eventually it also becomes an inefficient solution.

Conceptual differences between perpetual and subscription licensing

The ways that subscription and perpetual software licenses differ depends on the application and the terms and conditions of the license agreement. The following table provides an overview of some of the conceptual differences.

Pay-as-you-go vs. BYOL models

ITAM is typically tasked with managing all an organization's technology assets. However, because cloud teams or specific business units drive many cloud activities, ITAM teams may have an incomplete picture into these investments and their impact. This situation can create significant blind spots. An ITAM team likely may not know, for example, which software licenses are running in the cloud or within containerized environments. This has implications not only for license compliance but also cost optimization. Imagine if you're on a team that's responsible for managing Windows[®] Server or SQL Server licenses. Typically, pay-as-you-go licenses offered by cloud providers are much more expensive than a bring your own license (BYOL) model.

Attribute Perpetual Subscription For as long as payment continues; some vendors offer grace periods after final payment to allow Duration Forever users access to their files/change their minds Often included if the subscription is cloud-based Storage Not usually included to enable anywhere, anytime access to data Web-based, and sometimes device Machine install Туре install for hybrid applications Often through a software deployment Authenticated through vendor portal, Delivery tool centrally controlled by IT sometimes leveraging SSO Depends on the overall agreement Updates Usually included between the vendor and you Depends on the overall agreement Usually included, often with varying Maintenance support and services between the vendor and you levels, based on subscription

Differences between perpetual and subscription licensing

The BYOL is a licensing model that offers flexibility for organizations to use their licenses on-premises or in the cloud. Organizations focused on migrating workloads from on-premises data centers to IaaS should know if they can leverage their excess licenses in IaaS environments. Licenses purchased with the BYOL model can offer significant savings over licenses purchased within a pay-as-yougo model from cloud infrastructure vendors.

SaaS: from compliance to cost containment

Vendors usually provide SaaS applications on a subscription basis with monthly, annual or usage-based fees. They also tend to offer SaaS licenses on different levels or plans (such as bronze, silver, and gold) enabling you to choose the level of service that best suits the needs of your organization's individual users.

You can make significant savings by ensuring that your organization's software consumption matches your chosen SaaS subscription plan. You might, for example, be on a gold subscription plan for an application. If you don't use the additional services included in the premium version, your organization can save money by assigning the gold plan license to another user and downgrading your plan. Similarly, you can shift to a cheaper cloud-only plan if you don't use the installed version of an application.

ITAM process changes for SaaS applications

With SaaS, some aspects of the traditional ITAM lifecycle need to be adjusted. Because a large percentage of SaaS applications are purchased outside central IT, it's critically important to monitor SaaS applications usage and share this information across the organization to identify risk and control SaaS sprawl.

Containerization

In addition to SaaS and cloud technologies, containerized environments are another of today's emerging technologies that is an important factor for licensing and selecting an ITAM solution. A container is a software code package containing an application's code, its libraries and other dependencies. Containerization makes your applications portable so that the same code can run on any device. Typically, containers run a single process or application, although they can handle more than one. Because it is easy to create and destroy containers, organizations can leverage them to scale application performance during peak periods.

Containers require an orchestration engine to be managed, created and destroyed. Popular orchestration engines include Docker, Kubernetes and Openshift. These container orchestration tools are focused purely on assembling container images and deploying containers. Unfortunately, they don't make it easy to collect a view of what containers are running. Without a tool that monitors software running in containers and the associated license requirements, you can't obtain a truly complete picture of your asset landscape or have totalconfidence in your license compliance position.

Process changes for SaaS applications

Lifecycle process	On-premises software	SaaS applications	SaaS impact
Requisition: The process for identifying and requesting software	Centralized purchasing	Sometimes decentralized	Ideally, you would want to provide business unit leaders and employees a list of authorized software and have a way for them to request a license should they need one.
Procurement: The process for purchasing software	Centralized purchasing	Sometimes decentralized	If this does not exist, users could purchase many redundant applications or multiple subscriptions for the same application.
Deployment: The process of installing software and provisioning licenses	Automation tooling + patching and upgrading	Automation tooling to provision licenses	Less work is required to maintain SaaS applica- tions, but you still need to ensure you provision the correct permissions for SaaS applications
Support/Monitoring: The process of tracking software usage and entitlements; this includes renewal negotiations and payments	You can use an agent (or third-party tool such as SCCM that already captures this information) to detect installations and reconcile those to entitlements	You need a broader level of discovery to understand SaaS application usage in the organization	New methods are required to capture known and unknown SaaS usage in the organization to be able to identify risk (free and unsanctioned apps), catch distributed spend, and identify waste from inactive users
Retirement: The process for removing software that is no longer needed or transferring the software/ license from one location or individual to another location or individual	Leveraging data from the monitoring process, you can uninstall software and reharvest unused licenses to put back into the pool and prevent overbuying	Leveraging data from the monitoring process, you can reharvest unused licenses to put back into the pool and prevent overbuying	New methods of mon-itoring are required to understand licenses that should be reharvested

Part III: The future of ITAM

If technology is the foundation of the modern organization, ITAM is probably its greatest unsung hero. It saves money, thwarts security risks, introduces efficiencies, ensures regulatory compliance and so much more.

Today's ITAM is more complex and crucial to an organization's success than ever before, but it requires going beyond addressing SaaS and cloud proliferation to keep evolving and staying relevant in the long run.

As ITAM evolves, its future in your organization will rely on two key actions related to Technology Intelligence

- Taking steps to embrace change and enable the entire organization to unlock future opportunities for enterprise-wide cost optimization, innovation and growth on a single Technology Intelligence platform
- 2. Communicating ITAM's strengths to the business by making other functions and leaders aware of ITAM's importance and impact on shared goals, and making it a cultural keystone



Figure 1: The reach of Technology Intelligence

Embracing change

Doing more with less is a common change many organizations face as they strive to be more agile in an increasingly challenging climate. For tomorrow's ITAM teams, achieving this agility means identifying where your ITAM team can save time and be more efficient. It also means seeking ways in which your ITAM practice can evolve to support larger organizational goals and become relevant across different functions. Discover all the assets in your technology landscape

Some of the steps your team can take include:

- Incorporating automation
- Employee app store, provisioning, onboarding/ offboarding, license harvesting, etc.
- Refining and efficiently executing processes
- Improving sustainability
- Maximizing budgets
- Enabling or improving hybrid working
- Learning new skills and technologies
- Enabling total cost visibility and holistic cost optimization by proactively incorporating SaaS and cloud governance into your ITAM practice

Adopting new tooling in the form of a Technology Intelligence platform will help you complete each of these steps. That platform will become the intelligence layer for all your technology so you can discover outdated hardware, training deficits, inefficient processes, etc.

Collaboration and a shared common language

Before Technology Intelligence, your organization would have independent teams with different perspectives on organizational data. With an effective Technology Intelligence platform, those once-siloed departments share a single source of accurate information by tapping into the same normalized data and actionable insights. With this intelligence layer, each function (IT, HR, Cybersecurity, FinOps, etc.) can extract the data that matters for their individual team to address its own goals. Looking over the same picture of your organization's tech estate, they can then collaborate and have faster, more efficient problem-solving for enterprisewide issues such as SaaS sprawl, sustainability, cloud cost optimization and overall efficiency.

The FinOps example

Harnessing Technology Intelligence is one of the major ways you can build and maintain crucial relationships between key functions and realize organizational success. Take, for example, the relationship between ITAM and FinOps.

According to the FinOps Foundation, FinOps is "an evolving cloud financial management discipline and cultural practice that enables organizations to get maximum business value by helping engineering, finance, technology and business teams to collaborate on data-driven spending decisions." At its core, this discipline seeks new ways to handle cloud cost issues more efficiently through increased visibility and accountability among varied stakeholders. Technology Intelligence provides the information that these different stakeholders need but in related terms that are useful for them and encourage their involvement. Varied teams could see the same licensing data, for example, and all those teams would be able to understand the information. They could use it for their own purposes—HR for training and onboarding, Finance for budgeting, IT for security issues, and so on.

Ready to step into the future of ITAM?

Now that you know the basics of ITAM and what to expect for its future, it's time to start thinking about how to implement what you've learned in your ITAM practice. Here are some questions to answer before you make your first move.

- 1. What are my organization's goals and what are the biggest challenges it's facing today?
- 2. How can my ITAM team address those goals and challenges?
- 3. How will my ITAM practice cut spend and reduce risk?
- 4. What reasons would necessitate making changes now?
 - Is there an impending audit or renewal?
 - Has my organization been through multiple mergers and acquisitions?
 - Have my software vendors (Oracle Java SE, VMware) changed their price metrics?
 - Am I getting priced out and need to find alternative technologies?
- 5. Where can I make the biggest impact in the shortest amount of time?
- 6. Which function(s) should I get involved in my plans for ITAM and how can I secure buy-in from different stakeholder groups?
- 7. What must I consider when choosing an ITAM tool? How can I ensure the tool will support the organization's short- and long-term goals for sustainability, cost reduction, etc.?
- 8. How am I defining ROI for my program?

Important note: Use your ITAM solution vendor or consulting team to help you articulate ROI. These organizations help ITAM teams start and evolve their program every day. You can normally find case studies on their website.

Addressing C-suite challenges and goals for the future

As you're considering your organization's goals and challenges, don't forget to consider the priorities of your c-suite. The future state of IT and ITAM will drive the innovation agenda for C-level executives and their organizations, so be sure that your plans for change address the latest technology challenges on your CIO's list of issues to address.

Some of these major challenges facing tomorrow's ITAM include:

- Containers
- Artificial intelligence (AI)
- Sustainability
- Open-source code

The right Technology Intelligence platform can track these technologies. It can keep tabs on AI usage, peer into containers for application usage information, identify risks for shadow SaaS usage and much more.

How Flexera can help

Navigating this market and selecting the right ITAM tool that meets the needs of multiple business functions is an important decision that can come with significant payoffs for your entire organization. For example, Gartner predicts that, "by 2025, organizations with integrated SAM and FinOps functions may report 50% less SaaS shelfware than those with separate functions."²

As a Gartner-recognized SAM representative vendor, Flexera has designed solutions that will effectively support ITAM professionals seeking to optimize their practice and collaborate with their wider organizations over accurate and normalized data. Our cloud-native Technology Intelligence platform, addresses every component of the DINROS framework and delivers actionable insights on your IT environment. It brings together IT visibility, SaaS management, software asset management, hardware asset management and cloud migration and cost management under your ITAM practice for holistic cost optimization. With the actionable insights it delivers, your ITAM team can optimize total IT spend, mitigate risk and drive value from all your technology. Thanks to Technology Intelligence, your ITAM team will collaborate with its stakeholders over shared information and insights to improve processes and ultimately achieve organizational goals and growth.

²Kalay, Jaswant, and Ciaran Hudson. Gartner, 2022, "Market Guide for Software Asset Management Tools."

About Flexera

Flexera saves customers billions of dollars in wasted technology spend. A pioneer in Hybrid ITAM and FinOps, Flexera provides award-winning, data-oriented SaaS solutions for technology value optimization (TVO), enabling IT, finance, procurement and cloud teams to gain deep insights into cost optimization, compliance and risks for each business service. Flexera One solutions are built on a set of definitive customer, supplier and industry data, powered by Technopedia, that enables organizations to visualize their Enterprise Technology Blueprint[™] in hybrid environments —from on-premises to SaaS to containers to cloud.

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Concept	Description
Bundle	A collection of software applications that can be procured individually, but which for commercial or technical considerations are offered together as a bundle. The capability to identify whether an application is installed as a standalone or as part of a bundle is a significant factor for accurate calculation of software consumption and license compliance.
Bring your own license (BYOL)	Bring your own license (BYOL) is a licensing model that offers flexibility for organizations to use their licenses on-premises or in the cloud. Organizations focused on migrating workloads from on-premises data centers to IaaS should consider understanding if excess licenses can be leveraged in IaaS environments, which can offer significant savings over pay-as-you-go licenses purchased from cloud infrastructure vendors.
Computer/ Device/Install	A license metric limiting the number of installations of the application on computers, mobile devices, or servers.
Concurrent/ networked	A license metric limiting the number of concurrent users or concurrent users on the same network.
Container	A container is a software code package containing an application's code, its libraries, and other dependencies. Containerization makes your applications portable so that the same code can run on any device. Typically, containers run a single process or application, although they can handle more than one. Containers require an orchestration engine to be managed and created and destroyed. Popular orchestration engines include Docker, Kubernetes, and Openshift. Because it is easy to create and destroy containers, organizations can leverage containers to scale application performance during peak periods. However, with the ephemeral nature of containers, it is difficult to track software license compliance.
Contract renegotiation date	Point at which a license agreement between a vendor and the customer should be renegotiated — often three years with an annual review. Restrictions sometimes apply during the months preceding contract renegotiation date, such as limited capability to purchase additional licenses. Vendors tend to allow customers to use their software for a year without auditing, providing additional licenses are procured prior to annual reviews.
Core count	The number of processor cores available to an application; often used as a licensing metric for server-side software, as it provides an indication of the computational capacity of the underlying hardware. Traditional hardware architectures were built with one processor per machine. To improve computational capacity, both dual-processor machines and multicore processors have develo ped. Dual-processor machines have two sockets, one for each processor. Multicore processors contain several cores on the same chipset. Some license terms and conditions carry a core count and others a processor count. To further complicate matters, software publishers may count cores differently from hardware manufacturers.

Appendix A: Important ITAM terminology

Concept	Description
Effective license position (ELP)	The effective license position is the difference between license entitlements for an application and software consumption.
End of life (EOL)	Date on which an application version is no longer supported, maintained or patched by the vendor. End-of-life information is important for the SAM manager to ensure that such software, which poses security risks and is costly to maintain, is replaced or updated before the EoL date.
Entitlement	How you can use software in accordance with the terms and conditions of the license, in conjunction with applicable volume and maintenance agreements. Correct interpretation is a significant factor for accurate ELP calculation.
Infrastructure as a Service (IaaS)	The delivery of traditional hardware capabilities—computational power, networking, memory and storage—as a software service often on a subscription payment (pay as you go) model.
Indirect usage	Relates to the way a given piece of software is connected to other systems. For example, a payroll system using software X is connected to a financial system running software Y. The application uses content generated by application X to provide a dashboard for the CFO. If the terms and conditions for application X contain an indirect usage clause, some form of license will be required for Y to use the data generated by X.
Perpetual license	Allows use of the product or service described in the license agreement forever. Most software, however, carries an end-of-life date, after which the vendor no longer provides additional maintenance and support contracts. Use of software after this point is open to risk.
Primary metric	The main metric used to determine compliance. For example, if the primary metric of an application is installations, then compliance will be based on the number of installs.
Processor count	The number of processors available to an application; often used as a licensing metric for server- side software, as it provides an indication of the computational capacity of the underlying hardware. Traditional hardware architectures were built with one processor per machine. To improve computational capacity, both dual-processor machines and multicore processors have developed. Dual-processor machines have two sockets, one for each processor. Multicore processors contain several processors on the same chipset. Some license terms and conditions carry a core count and others a processor count. To further complicate matters, software publishers may count cores differently from hardware manufacturers.
Technology Intelligence	The ability to see and manage all technology in your IT environment. Normalized data and actionable insights power Technology Intelligence; in turn, Technology Intelligence empowers teams to make better, faster decisions, mitigate risk and achieve goals for themselves and organizations.

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