SafeNet

Sentinel
Software Monetization Solutions

Sentinel HASP®

Licensing in Virtual Environments

FEATURE BRIEF

End-User Benefits

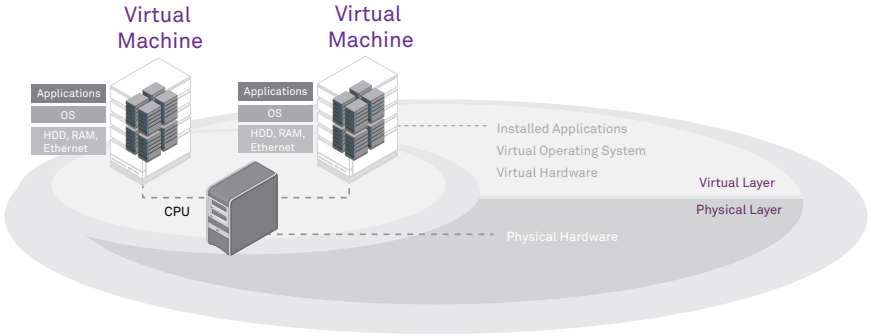
- Reduced capital and operational costs through more efficient use of hardware resources.
- Reduction in power consumption, saving more money while reducing carbon footprint.
- More efficient testing/ development and security of systems.
- Improved scalability and deployment agility for creating increased availability or bandwidth.
- High availability/ redundancy in managing a clustered infrastructure.

Authorize and control software in any virtualized environment with the industry's first and only technology-agnostic VM binding solution.

The Challenge

Virtualization has added a new complication to the world of software licensing because the term "machine" in the conventional sense is no longer clearly defined. Virtualization allows a computer environment to be simulated in software, including most of the hardware resources which support that environment.

Licensing technologies struggle with this concept since they normally do not make a distinction between 'real' hardware and virtualized hardware. Most licensing technologies use the concept of hardware fingerprinting to prevent licenses from being copied illegally. If a virtual machine image is copied or cloned, the virtual hardware fingerprint (along with the copy-protected license) is also cloned

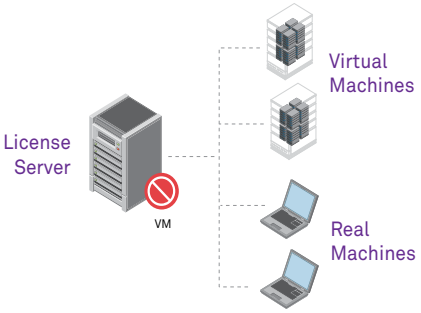


The Sentinel HASP Solution

Sentinel HASP includes two areas of distinct functionality designed specifically with virtualization in mind.

VM Detection

VM detection allows an ISV to set a policy where an application's license will simply be invalid if used within a virtual environment, or set a special condition such as charge customers a premium for running on virtual machines.



Additionally, the ISV can choose to prevent the license server from being installed onto a virtual machine, yet allow the workstations which are running the protection applications to be freely deployed within any combination of native and virtual environments.

Clone Detection for Virtual Machines

When running within a virtual environment, Sentinel HASP uses two specific machine identification properties as part of the license fingerprint data:

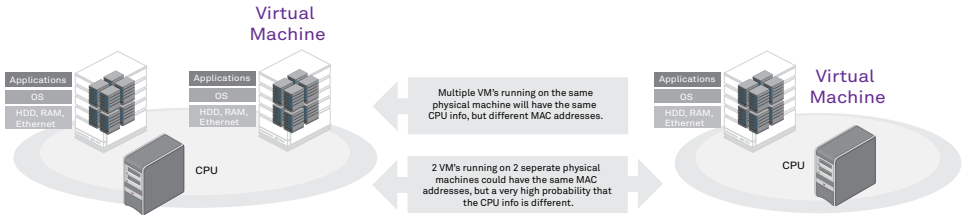
CPU Info

- This is a collection of CPU related attributes which are combined into the overall HASP fingerprint to represent a computer's CPU as uniquely as possible.
- The CPU of the virtual machines' host computer is one of the few components that are usually not virtualized, and therefore any CPU characteristics obtained from within a VM will normally be taken from the 'real' CPU.
- This allows HASP to create a binding between the virtual machine and the physical hardware.

Virtual MAC address

- Every virtual machine within a network will have its own unique MAC address.
- This is a requirement for any machine which needs to have network connectivity.
- A cloned VM image will need a new MAC address to prevent network collisions.

The "CPU Info" is based on multiple CPU related properties (CPU make, model, processor speed) and the probability of multiple machines having identical CPU signatures is low. Alone, it does not provide a sufficiently unique fingerprint, but, when combined with the MAC address, it provides a sufficient level of protection within normal business environments.



Licensing in Centrally Managed Virtual Infrastructures

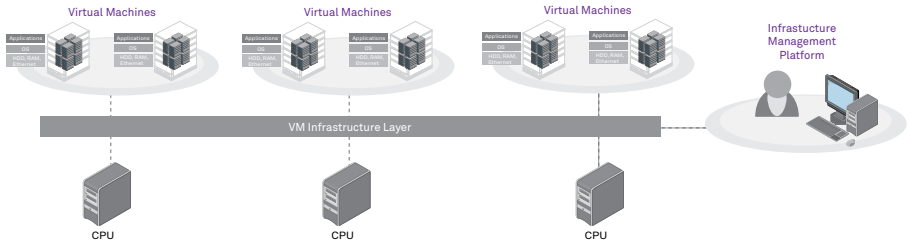
Centrally managed VM infrastructures (also known as server based infrastructures) add the concept of hardware clustering to virtualization. Here, the VM infrastructure does not always leverage a single, fixed set of physical hardware resources, and will instead utilize a shared pool of resources.

Technical Specifications

At the time of writing, the VM detection and VM fingerprinting capabilities provided by Sentinel HASP have been validated on the following technologies:

- VMWare Workstation v7.0
- VMWare ESXi v4.0
- Virtual Box v3.1
- Virtual PC 2007 v6.0
- QEMU v0.11
- Parallels Desktop 4
- XEN Hypervisor 3.2
- Microsoft Hyper-V Server 2008 R2
- KVM 76

For centrally managed cases, binding a license to the CPU info can still usually be considered to be a robust mechanism. For the most common type of clustered deployments where live migration capabilities are needed, there is a requirement for all the physical machines within the cluster to have the exact same CPU configuration. Solutions such as VMware's ESX also include the ability to enable CPU masking to improve compatibility in high availability and fault tolerant setups. This will allow different physical CPU configurations to be used, yet present a common (masked) CPU configuration across all of the physical machines. Therefore the fingerprint based on CPU info will not change when the VM's migrate across the cluster.



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About Sentinel HASP

Sentinel HASP, formerly Aladdin HASP SRM®, is the industry's first and only software licensing and security solution to enable the use of either software- or hardware-based protection keys to enforce software protection and licensing. With Sentinel HASP, you can increase your profits by protecting against losses due to software piracy and intellectual property theft, and enable innovative business models to increase value and differentiate your products. Sentinel HASP fully integrates with your existing software product lifecycle to minimize disruptions in development and business processes. For more information visit www.safenet-inc.com/SentinelHASP

SafeNet Sentinel SRM Solutions

SafeNet has more than 25 years of experience in delivering innovative and reliable software licensing and entitlement management solutions to software and technology vendors worldwide. Easy to integrate and use, innovative, and feature-focused, the company's family of Sentinel® solutions are designed to meet the unique license enablement, enforcement, and management requirements of any organization, regardless of size, technical requirements or organizational structure.

Only with SafeNet are clients able to address all of their anti-piracy, IP protection, license enablement, and license management challenges while increasing overall profitability, improving internal operations, maintaining competitive positioning, and enhancing relationships with their customers and end users.

With a proven history in adapting to new requirements and introducing new technologies to address evolving market conditions, SafeNet's more than 25,000 customers around the globe know that by choosing Sentinel, they choose the freedom to evolve how they do business today, tomorrow, and beyond. For more information visit www.safenet-inc.com/sentinel

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