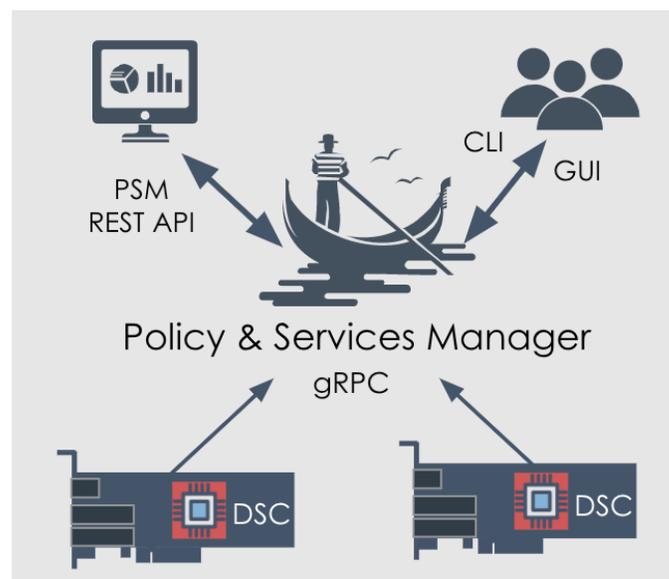


Pensando Policy and Services Manager

CENTRALLY MANAGED | OPERATIONALLY SIMPLE | POLICY BASED | ALWAYS SECURE

MANAGEMENT CHALLENGES AT CLOUD SCALE

- Operational Complexity.** Management plane must simplify services orchestration and automate integration with existing tools. Workloads, network services and security rules must be controlled through programmable automation
- Troubleshooting.** Quickly detecting and responding to network and security problems.
- Observability and Insight**
 - Identifying applications running within the infrastructure
 - Knowing application's network patterns
 - Determining application and network latency
- Security.** Providing consistent security rules and methods that apply across bare-metal servers, VMs, and containers
- Multi-tenancy.** Ensuring operators can host multiple tenants, provide resource allocation and isolation with secure role-based access.
- Resiliency and High Availability.** Avoiding bottlenecks in control systems requires an architecture based on distributed systems.
- Intent-based Policy Resolution.** Configuration changes must tolerate temporary and localized outages and interruptions, while guaranteeing policy instantiation as intended.



Distributed Services Platform with the Pensando Policy and Services Manager (PSM)

INTRODUCING THE PENSANDO POLICY AND SERVICES MANAGER

The **Pensando Policy and Services Manager (PSM)** is a distributed system, leveraging an intent-based model that delivers network and security policy to Pensando Distributed Service Cards (DSC) for services implementation at the edge. The PSM provides a secure RESTful API or browser-based GUI to define, manage, and observe services and applications. The PSM is built as a set of micro-services that runs on the Kubernetes framework, and is therefore highly scalable and fault tolerant.

The PSM's intent-based model assures consistent policy and configuration throughout a multi-tenant domain that supports thousands of nodes.

HIGHLIGHTS

FEATURES

- Microservices-based, scalable distributed management controller
- Visibility at the server edge, to uncover network problems
- Central management of network and security policy configuration
- Integrates with 3rd party tools via REST API
- Intent-based policy deployment model
- Recovery from node / process failures, and network partitions
- Independent from production data and traffic

BENEFITS

- Simplified configuration and policy management for large scale deployments
- Security for Workloads
- "Always-on" telemetry for deep visibility into network behavior
- Troubleshooting capability to drastically shorten problem isolation time.
- High Scale, High Performance

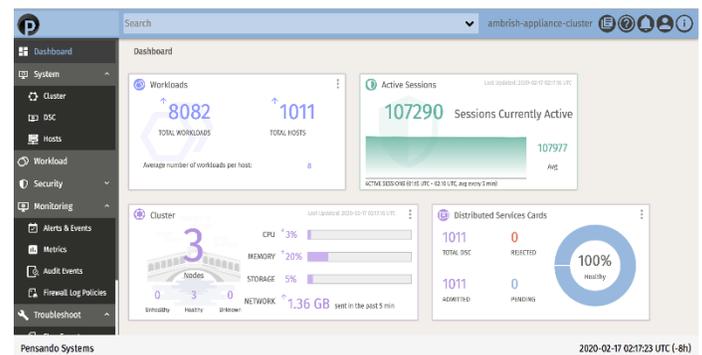
CENTRALIZED DISTRIBUTED NETWORK AND POLICY MANAGEMENT

Managing security at cloud scale requires a new way of thinking about both management and security. Pensando has drawn from the best of today's DevOps practices in architecting the PSM as the backbone for network and security policy management for DSCs, creating an ideal and thoughtful balance. Administrators and operators interact with a centralized scale-out service for simplicity and high availability, while the system itself is fully distributed to avoid both bottlenecks and availability issues.

Similarly, while policies are configured and managed centrally, they are distributed to each DSC, enabling individual DSCs to serve as an autonomous intelligent edge, simplifying management by eliminating the need for

centralized appliances and their required connectivity orchestration for delivering infrastructure services.

While the PSM uses a similar structure to Kubernetes for its own objects, customer workloads and services can be defined to correspond to containers, VMs and bare-metal workloads alike, including the ability to configure and manage security, network, and telemetry services.



HIGHLY AVAILABLE / FAULT TOLERANT

To facilitate both operational simplicity and high availability, each PSM cluster node is deployed as a virtual appliance; the PSM may be deployed as a multi-node quorum-based cluster, ensuring high availability and operational correctness in the event of any server or network failures. It is architected to be *fault tolerant*, allowing recovery from any process failures, node failures, or network partitions. Furthermore, since the PSM only manages the control plane, there is no impact to the data path through Pensando DSCs if the PSM is ever offline or unreachable.

POLICY DEPLOYMENT

Policy configuration at scale represents a declaration of intent, regardless of propagation delays, planned maintenance windows, or unplanned network/server outages. Security configuration and changes must always be delivered as intended. The Pensando PSM deploys policy configurations and updates with an intent-based model that is widely used in modern network and storage infrastructure management platforms. All managed DSC devices are guaranteed to run coherent versions of network and security policies that have been deployed at scale.

COMPREHENSIVE AUDIT and COMPLIANCE

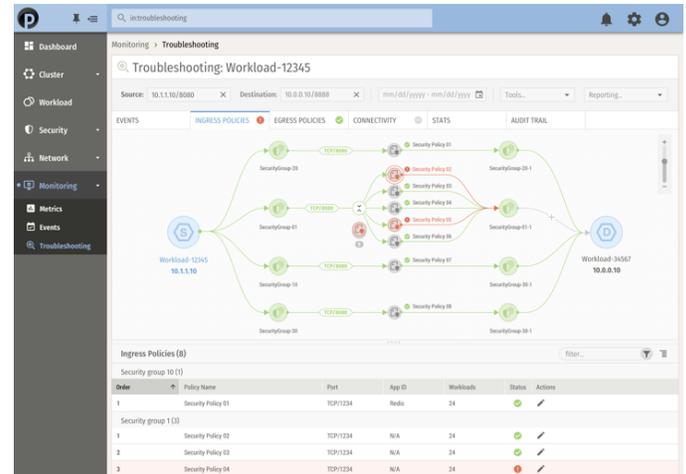
Immutable secure audit records are the backbone of regulatory compliance in any industry. The Policy and Services Manager maintains detailed and comprehensive audit logs of every change. Its firewall service maintains firewall logs that include all essential attributes needed to meet the highest Compliance standards.

All logs can be easily exported into CSV format, or continuously streamed to Syslog, Splunk™, Kafka, ELK, or any preferred streaming platform.

LIFECYCLE MANAGEMENT

Every aspect of data center services and security undergoes continuous change. Managing the lifecycle of security rules and policies, workloads, applications requires a management model that adequately reflects the relationships, workflows and dynamics of data center operations. The Pensando PSM offers comprehensive lifecycle management, not only for security policies and workloads, but also for the underlying infrastructure itself.

A native management model reflects the full lifecycle of all objects, allowing control of every object's lifecycle phase (Create, Replace, Update, Delete) through either the REST API or GUI.



Since the PSM has been designed with an intent-based model at its foundation, updates will always propagate. Even in situations where services or nodes may be unreachable or offline, the PSM guarantees that all updates intended for a given DSC will be received and instantiated as intended, whether towards a specific security rule being updated, or an upgrade of the DSC software itself.

SEAMLESS INTEGRATION

While management is delivered comprehensively across the domain of DSCs, today's modern enterprises also require integration with established frameworks and controllers, or those customized and developed in-house. The PSM can provide integration with frameworks, enabling seamless interoperability for managing bare-metal servers, virtual machines or containers. Administrators can use their existing management interfaces and tools, while enabling critical operational controls to be driven and managed at scale through the Policy and Services Manager.

ABOUT PENSANDO SYSTEMS

Founded in 2017, Pensando Systems is pioneering distributed computing designed for the New Edge, powering software-defined cloud, compute, networking, storage and security services to transform existing architectures into the secure, ultra-fast environments demanded by next generation applications. For more information, please visit pensando.io