RADCOM
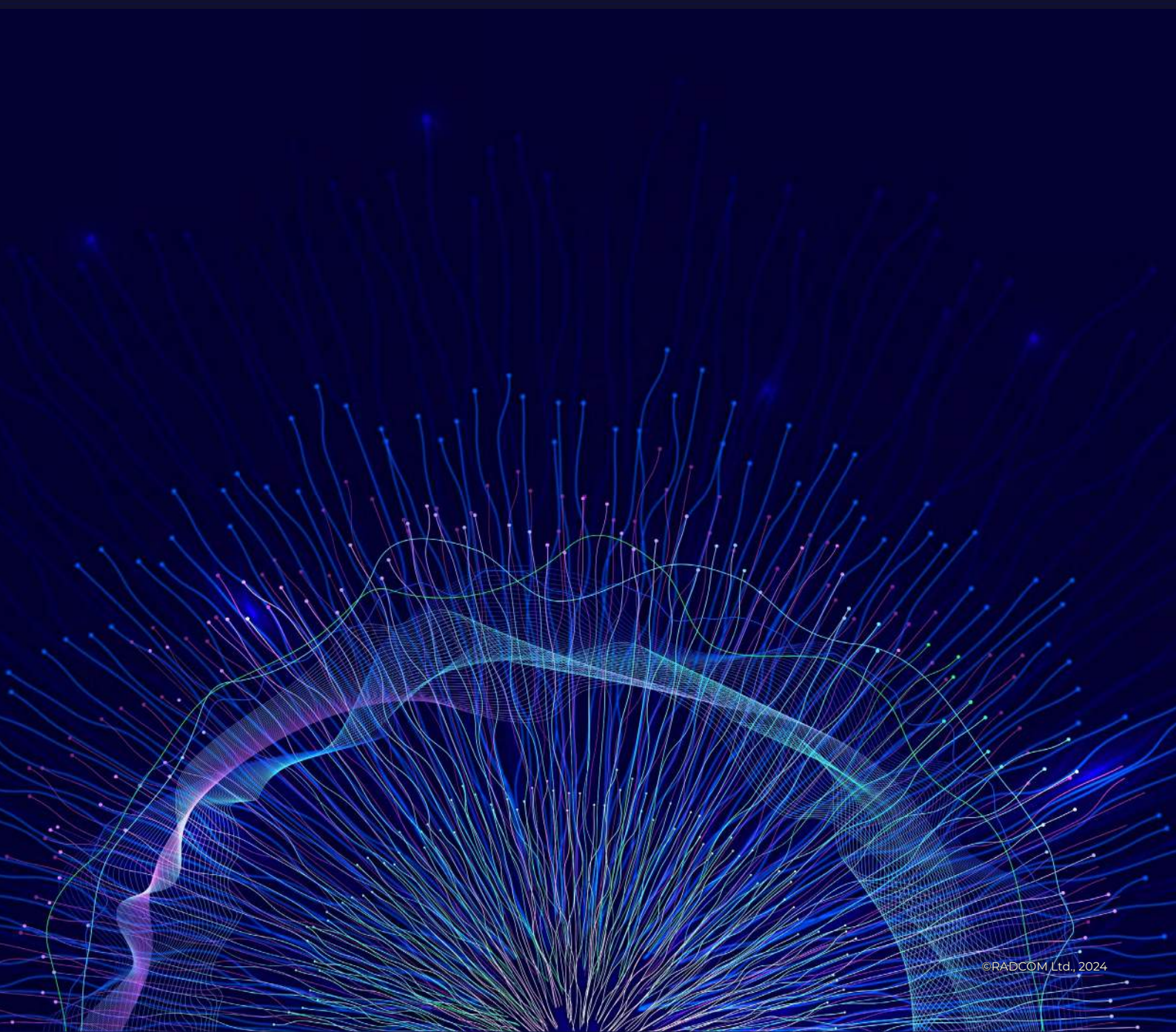
RADCOM VIA

Cloud-Native Network Tapping and Filtering

Introduction

As 5G standalone (SA) networks roll out, a critical challenge is gaining visibility into the networks including in container-centric platforms. Traditional network packet brokers (NPBs) and network tapping tools are no longer sufficient as they need more support for the dynamic nature of 5G SA and the ongoing cloud adoption.

Non-intrusive, dynamic network packet brokers and cloud-native tapping solutions deliver high-performance, with low resource consumption, and fit security considerations. In addition, more modern tapping solutions today acquire container layer traffic, which means there are two main options: host-based and pod-based tapping.

RADCOM VIA

RADCOM VIA provides high-density and powerful NPBs that optimize automated assurance applications and adhere to cyber security policies by delivering the required data in the right volume and format. The solution also offers non-intrusive, lightweight network tapping and advanced filtering that can be deployed stand-alone or with the RADCOM ACE platform to ensure no blind spots inside the network.

The system is designed using the fundamental guidelines for cloud native applications that can be deployed on any cloud infrastructure, bare metal, or both. The solution supports KVM hypervisor, OpenStack VMWare, and Kubernetes (K8s) to control the containerized components lifecycle starting from the initial day-zero instantiation and throughout the overall platform lifecycle.

RADCOM VIA includes smart sampling which saves operators significant assurance spending by acquiring traffic samples of user plane traffic while capturing the full control plane traffic. This is a more efficient service assurance approach that saves costs while providing full visibility into the customer experience.

RADCOM VIA Benefits

- Offers vendor-agnostic visibility that can be implemented regardless of which network functions are implemented.
- Provides NPBs as pure software-based solutions deployed on a VM or a container and as hardware solutions deployed using the most modern chipset technology.
- Employs non-intrusive visibility with a low footprint and low overhead (for instance, mirroring 5Gbps of traffic requires <0.5% of the host's CPU).
- Simplifies deployment and is centrally managed across multiple clouds.
- Orchestration support for virtualized and container-based NPBs enables on-demand cluster scaling based on configurable triggers such as bandwidth requirements.
- Deploys tapping/filtering automatically for on-demand instantiation, scaling, and healing.
- Automates service discovery via the 5G NRF function (optional).
- Learns the network topology via integration into the Kubernetes API.
- Supports multiple container network interfaces (CNIs) for different flavors of Kubernetes and multiple environments: OpenStack, Docker Container.

Network Packet Brokers

RADCOM VIA provides NPBs as pure software solutions deployed on a VM or a container and as hardware solutions deployed using the most modern chipset technology. With its innovative software, the NPB leverages a powerful state-of-the-art platform, resulting in the market's most reliable, scalable, modular NPB. The NPBs support all network rates with optical, copper, DAC interfaces in a compact 1RU form factor. They offer intelligent traffic distribution, filtering, and load balancing across multiple clouds and domains.

The advanced NPBs are implemented with unified and generic software architecture for all management interfaces supporting CLI, SNMP, web UI, NETCONF, and RESTCONF. The NPBs collect traffic from TAPs and SPANs (switched port analyzers) and bypass input links. They execute a wide range of policies and forward network traffic to security and performance controls, supporting both in-line and out-of-band deployments. The NPBs support aggregation, thousands of filters, load-balancing, rate adjustments, header manipulation, timestamping, and additional operations that result in superior network visibility.

In addition, RADCOMs patented network tapping for multiple domains, including 5G SA and IMS networks, is fully container-based. The solution offers host-based and pod-based tapping and advanced filtering technology.

Benefits

- Deploys as software on virtual machines/containers and hardware-based options
- Supports all network rates with Optical, Copper, and DAC interfaces in a 1RU form factor
- Provides intelligent traffic distribution, filtering and load balancing
- Delivers a wide range of features (time stamping, packet slicing, aggregation, header editing, and replication)
- Offers large-scale packet buffers to prevent packet loss

RADCOM cTap

RADCOM Containerized Tap (cTap) provides an automated, dynamic tapping solution for complete network visibility while highly agile, scalable, and resource efficient. It can tap any combination of worker node, network namespace, and pod name, including wildcards. Furthermore, as the solution is fully cloud-native, there are no dedicated hardware limitations, and it can be dynamically deployed and scaled efficiently. No modification is needed in the kernel or network function pods. In addition, RADCOM cTap can be configured to filter out any unneeded traffic from the target pod and forwarded only the required packets to the probe (RADCOM vProbe or third party probe).
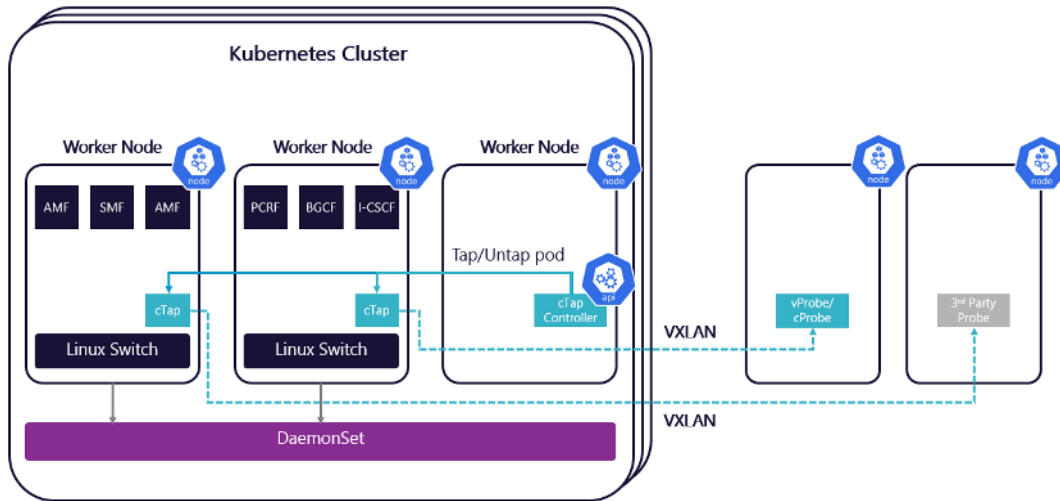
RADCOM cTap provides visibility across multiple domains

RADCOM cTap

Cloud-Native Design

cTap is fully containerized and comprises multiple cloud-native functions that can be integrated into leading orchestrators, supporting multiple container network interfaces (CNIs) for different flavors of Kubernetes. The solution can be implemented across the entire 5G core, whatever mix of cloud or hardware vendors and CNIs are deployed and can tap both intra-node and inter-node traffic. For example, internal traffic to the Kubernetes worker node, such as an interface between two network functions that reside on the same worker node, can be tapped using the host-based tap.

Automated

RADCOM cTap can be deployed, controlled, and scaled automatically via integration in Kubernetes' network orchestration. Utilizing RADCOM's controller auto-service discovery via the 5G NRF function, it learns the network topology via integration into the Kubernetes API. The solution automatically recognizes new network functions and services.

This automation empowers advanced capabilities like on-demand probing so the solution can be rapidly deployed to analyze a specific network area or service on the fly. Moreover, once any service degradations are resolved, the operator can wind down the tapping deployment to free up network resources.

Open Platform

cTap provides an efficient and automated visibility solution. It offers open APIs for dynamic tapping and filtering, which is ideal for the 5G core and other cloud-based networks that avoid vendor locking.

Network Discovery

Kubernetes API integration lets RADCOM cTap learn the network topology and discover new, terminated, or failed pods. The RADCOM cTap controller can give a "tap" or "untap" command to the host-based taps residing on the worker nodes. This ensures that the tapping or filtering solution deployed constantly adapts to the network changes and taps all instances of the target Network Functions to provide complete visibility into the required traffic.

cTap Deployment Options

Host-Based Mirroring

Host-based mirroring ties into the operating system's virtual networking layer, ensuring that packet mirroring is efficiently performed in kernel spaces without requiring any changes or extensions to the kernel. As a result, it provides very granular insight into the data without significantly affecting latency and utilizes as few resources as possible. Host-based mirroring runs vendor-agnostic, so network function vendors do not need to be involved in the tapping process to enable this tapping option to work. Host-based tapping can provide operators with a single pane of glass view across the entire 5G network, whichever NF vendor is deployed.

Pod-Based Mirroring

This method focuses on accessing the container layer by tying it into traffic at the application level. It requires a sidecar within every pod, sitting next to the primary workload application/ container in the 5G network that needs to be tapped.
cTap passively captures complete packets (layers 1-7) in the service-based architecture (SBA). It taps intra-node (for example, two network functions on the Kubernetes worker node) and inter-node traffic. As a result, there is no need to deploy additional solutions (like load balancers between the physical network tap and assurance/security tools). In addition, load-balancing capabilities maintain session awareness to enable advanced, scalable 5G network troubleshooting, which is critical for new network deployments.

Optional eBPF-Based Filtering

RADCOM's cTap can also use extended Berkeley Packet Filter (eBPF) technology, which allows data to be collected from the Linux kernel area. Users can manipulate traffic tapped according to different criteria. A collection of predefined actions is applied for traffic that matches the criteria. This allows the user to aggregate traffic to an external tool, drop specific traffic, offload its tools by filtering out non-relevant data, and support many other use cases.

- Each filter consists of the following concepts:
- Interfaces: A list of input and output interfaces on which the filter is applied
  Classifiers: A set of matching criteria that matches incoming traffic
- Actions: Action to take in case there is a match

Summary

RADCOM VIA offers the most efficient NPBs and network-tapping solutions today and are designed for the challenges of transitioning to 5G and the cloud. RADCOM VIA provides powerful NPBs as pure software solutions deployed on a VM or a container, and hardware solutions are deployed using the most modern chipset technology. It also provides network tapping and filtering that offers host-based and pod-based tapping and filtering. These can be deployed stand-alone or with our RADCOM ACE platform. RADCOM VIA solves some of the critical challenges telecom operators face today when trying to gain visibility into the new container-based network functions in 5G.

The cTap offers patented packet capturing and forwarding performed in the kernel space, uses minimal resources, and only sends relevant traffic to the assurance probes, reducing network overhead. Furthermore, the solution adapts to any network topology changes with automated, dynamic tapping that integrates with the Kubernetes API. Easily deployed, the tapping is performed non-intrusively, is vendor-agnostic, and works with any 5GC network function vendor and any flavor of Kubernetes.

If you would like more information on RADCOM VIA please click here and contact us.

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RADCOM (Nasdaq: RDCM) delivers real-time network analysis, troubleshooting, and AI-driven insights to ensure a superior customer experience. Utilizing cutting-edge technologies for over 30 years, we are the operators' eyes into their network, supporting them as they transition to new network technologies such as the cloud and 5G. Delivering dynamic service assurance for an accelerated digital transformation.

We offer the most advanced 5G portfolio for large-scale networks, providing operators with an innovative, efficient, and on-demand approach to network monitoring that meets the challenges of assuring the customer experience in the 5G era. Our leading solution, RADCOM ACE, is explicitly designed for telecom operators, delivering Automated, Containerized, and End-to-end network visibility. We enable operators to seamlessly manage and optimize their network operations using our innovative technology.