



Modernize Networking for Distributed Cloud Environments

DISTRIBUTED CLOUD REQUIRES DISTRIBUTED NETWORKING

Organizations are increasingly distributing applications and network functions across multiple cloud sites to place workloads closer to users, data, and devices. Distributing compute, however, is only part of the challenge. Organizations also need to modernize how network services are delivered across sites so workloads can communicate while maintaining the performance, isolation, and connectivity models their applications require.

Wind River Cloud Platform provides the distributed cloud infrastructure and high-performance networking capabilities to deploy, operate, and connect demanding workloads across geographically distributed sites. Arrcus ArcOS complements these capabilities by extending tenant-isolated connectivity across the distributed cloud environment.

Arrcus ArcOS brings a software-based provider edge (PE) routing function directly onto Wind River Cloud Platform. Together, Wind River and Arrcus enable workloads running across distributed sites to communicate through private, tenant-isolated networks without requiring a dedicated physical PE router at every location.

ADDRESS EVOLVING APPLICATION REQUIREMENTS

Distributed applications can have different connectivity, performance, and operational requirements. The Wind River and Arrcus joint solution provides organizations with flexibility in how they connect and operate workloads across sites while maintaining tenant isolation.

The joint solution addresses these requirements through a combination of standards-based network services, flexible forwarding options, and programmable interfaces:

- **Connect across sites:** Extend private, tenant-isolated connectivity between workloads running in geographically distributed cloud sites, with support for both routed and same-subnet connectivity requirements.
- **Scale network performance:** Align the forwarding architecture with application and deployment requirements, from software-based forwarding to high-performance accelerated data paths.
- **Automate distributed operations:** Combine centralized infrastructure automation with standards-based, programmable network configuration across distributed sites.

Why this matters: Distributed cloud does not have to create disconnected islands of infrastructure or require a dedicated PE router at every location. Wind River and Arrcus bring distributed cloud infrastructure and distributed routing together, enabling organizations to extend the network services their workloads require across sites while maintaining isolation, performance, and operational flexibility.

By reducing dependence on dedicated networking hardware at individual locations and providing greater flexibility in how network services are deployed and operated, the joint solution can help reduce site-specific infrastructure requirements and simplify the expansion of distributed cloud environments.

EXTEND WIND RIVER CLOUD PLATFORM NETWORKING ACROSS DISTRIBUTED SITES

Wind River Cloud Platform's integrated, lifecycle-managed networking capabilities build on its distributed cloud infrastructure to provide the foundation for modernizing how network services are delivered across distributed sites with Arccus ArcOS.

As a containerized PE router running on Wind River Cloud Platform, Arccus ArcOS extends this foundation with cross-site routing and network services. Its routing control plane supports standards-based technologies including BGP, IS-IS, SRv6, EVPN, and VRFs, while its Data Plane Abstraction Layer (DPAL) supports different forwarding options as deployment and performance requirements evolve.

How Wind River Cloud Platform and Arccus ArcOS Work Together

The joint architecture establishes clear, complementary roles:

- **Connect workloads to the network:** Wind River Cloud Platform provides pod networking, multiple network interfaces through Multus, SR-IOV VF allocation, and high-performance data networks that connect workloads to the underlying network infrastructure.
- **Extend network services across sites:** Arccus ArcOS uses Wind River Cloud Platform's native networking capabilities to provide standards-based routing, tenant isolation, and cross-site network services across distributed cloud environments.
- **Adapt forwarding to performance requirements:** The separation of the Arccus ArcOS routing control plane from the forwarding data path allows the same routing and network-service architecture to support different forwarding options as requirements evolve.

Why this matters: Wind River Cloud Platform and Arccus ArcOS provide complementary cloud infrastructure and networking capabilities on a common platform. This integrated approach enables organizations to extend network services alongside distributed workloads while maintaining flexibility in how connectivity and network performance are delivered across sites.

CONNECT DISTRIBUTED WORKLOADS WITH THE RIGHT NETWORK SERVICE

In multi-tenant environments, traffic isolation must be maintained as network services extend across distributed infrastructure. At the same time, workloads can have different cross-site connectivity requirements, including routed connectivity across different subnets and same-subnet connectivity across different locations. Supporting distributed applications therefore requires both networking models while preserving tenant isolation across sites.

Wind River Cloud Platform and Arccus ArcOS support these connectivity requirements through standards-based Layer 3 and Layer 2 network services.

Route traffic across sites with SRv6 L3VPN

Arccus ArcOS provides Segment Routing over IPv6 (SRv6) Layer 3 VPN (L3VPN) services as one option for providing routed connectivity across distributed sites. Each tenant is assigned its own virtual routing and forwarding (VRF) instance, keeping routes and traffic isolated while allowing workloads belonging to the same tenant to communicate across locations. Standards-based routing exchanges the information required to establish connectivity between sites.

Connect workloads across sites with EVPN-VXLAN

Arrcus ArcOS also supports EVPN-VXLAN for cross-site Layer 2 and Layer 3 connectivity. For applications that require Layer 2 adjacency across locations — for example, when workloads in different sites must remain within the same IP subnet — EVPN-VXLAN can extend the same subnet between distributed sites while maintaining tenant isolation.

In addition, Arrcus ArcOS uses BGP EVPN to exchange network reachability information between sites. For Layer 2 connectivity, this enables remote MAC addresses to be learned dynamically as the network extends across distributed Wind River Cloud Platform environments.

Organizations can select the network service based on their cross-site connectivity and deployment requirements:

- **SRv6 L3VPN:** Provides routed Layer 3 connectivity across distributed sites and supports workloads operating in different subnets.
- **EVPN-VXLAN:** Supports Layer 2 extension across sites as well as routed Layer 3 connectivity on accelerated and hardware-offloaded data paths.

Why this matters: Applications do not have to conform to a single cross-site networking model. By supporting multiple network services for routed Layer 3 connectivity and Layer 2 extension, the joint solution gives organizations greater flexibility to distribute applications based on their requirements without redesigning the applications around the network.

SCALE PERFORMANCE WITHOUT REDESIGNING THE NETWORK

Network performance requirements can vary significantly across distributed deployments. Software-based forwarding may be sufficient for some workloads, while others may require accelerated packet processing or hardware offload. Meeting these different requirements calls for a forwarding architecture that can scale performance without requiring organizations to redesign the underlying network architecture.

Building on the joint architecture described earlier, Wind River Cloud Platform provides high-performance network access, including SR-IOV capabilities for direct access to network interfaces, while the Arrcus ArcOS DPAL enables different forwarding engines to address varying performance requirements.

Choose the data path that matches your network performance requirements

The joint architecture supports a progression of forwarding options for different levels of network performance:

- **Linux kernel:** Provides software-based forwarding for workloads with standard network performance requirements.
- **VPP/DPDK:** Provides accelerated software forwarding for more demanding network workloads.
- **BlueField-3 DPU:** Extends the architecture to hardware-offloaded forwarding for environments requiring higher levels of network performance.

Across these options, the Arrcus ArcOS routing and network-service configuration remains consistent as the forwarding data path changes.

Why this matters: Organizations can align network performance and infrastructure investment with application requirements without introducing a different network architecture for each performance tier. This flexibility allows them to scale performance and introduce acceleration where it is needed while maintaining operational consistency and reducing configuration variations that can introduce errors.

AUTOMATE OPERATIONS ACROSS DISTRIBUTED ENVIRONMENTS

As cloud infrastructure expands across distributed locations, coordinating infrastructure and network operations at each site can increase operational complexity and make consistent operations more difficult to maintain. Organizations need automation that can span distributed cloud environments while providing programmatic control of the network services connecting them.

Wind River Conductor provides centralized orchestration and automation across distributed Wind River Cloud Platform environments, helping organizations manage infrastructure consistently across geographically dispersed sites. Arrcus ArcOS complements this operational model with standards-based northbound interfaces, including RESTCONF and NETCONF, that enable network configuration to be driven programmatically.

Programmatically configure network services across sites

Arrcus ArcOS enables organizations, through its standards-based northbound interfaces, to programmatically configure PE routing functions across independent Wind River Cloud Platform clusters, reducing the need to manually configure individual routing instances at each site.

A common management plane can configure Arrcus ArcOS instances across multiple Wind River Cloud Platform clusters while keeping network configuration correctly scoped to each environment. This API-driven model provides a foundation for extending network automation as distributed environments expand.

Why this matters: Distributed infrastructure should not require distributed manual operations. Centralized infrastructure automation and programmable network configuration can help organizations maintain more consistent operations across dispersed sites while reducing reliance on repetitive, site-by-site configuration as their distributed environments scale.

EXTEND THE VALUE OF DISTRIBUTED CLOUD

By bringing distributed cloud infrastructure and software-based PE routing together, Wind River and Arrcus enable organizations to modernize how network services are deployed across geographically distributed sites while reducing dependence on dedicated, site-specific networking hardware and the associated deployment and operational overhead.

This software-defined approach, built on standards-based networking technologies, gives organizations greater flexibility to align connectivity, network performance, and operations with evolving application requirements while interoperating with existing network environments — helping simplify the expansion of distributed cloud deployments and adapt infrastructure investment as requirements change.

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