



**Red Hat**

SOLUTION OVERVIEW

# Increase 5G User Plane Performance and Flexibility with F5 and Red Hat

Adopt Kubernetes-based cloud-native network functions to simplify 5G operations and reduce costs. F5 and Red Hat provide flexibility and scalability with the latest technology for user plane functions.



## KEY BENEFITS

### Reduce CapEx and OpEx

Enable a smaller footprint and horizontal scaling with microservices that also reduce CPU and network requirements.

### Simplify operations

Get a common, consistent management plane across the infrastructure with Kubernetes-orchestrated CNFs.

### Improve performance and delivery

Deploy faster using the Kubernetes API and a microservices architecture. The consolidated data plane improves overall performance and reduces latency by eliminating network hops.

### Increase flexibility

Improve interoperability between vendors by using a single, vendor-neutral orchestration platform using Kubernetes for a lower total cost of ownership.

# Cloud-Native Network Functions Increase 5G Agility

5G standards have embraced Cloud-Native Network Functions (CNFs) for implementing network services in software as containers. The use of CNFs provides a huge improvement in terms of flexibility, service delivery speed, resiliency, and crucially, ease of management by using Kubernetes as a unified orchestration layer. This is a drastic change from previous standards where each vendor had its own orchestration.

Software-defined networking in 5G allows separation of the control and user planes to increase bandwidth efficiency. However, user plane functions are CPU-intensive and require increased bandwidth, especially when using service chaining. Resource inefficiencies when using virtual network functions (VNFs) increase infrastructure costs due to their higher overhead. Managing VNF operations is less agile and can be more complex due to the lack of a common orchestration layer.

Resolving these challenges requires a two-pronged solution:

- Deployment flexibility, ranging from small clusters at the edge to large clusters in central data centers that can scale to support millions of subscribers with a consistent experience.
- 5G-ready performance with a unified data plane to achieve the ultimate per-core efficiency and lower latency.

This can be achieved by using a microservices-based CNF. Deployed within a cloud-native compute infrastructure, the user plane network functions can be deployed closer to the network edge to reduce network latency and improve overall performance, which is not possible with the VNF paradigm.

Re-architecting VNFs as CNF microservices provides:

- A smaller performance footprint with the ability to scale horizontally
- Independence from guest operating systems, since CNFs operate as containers
- Unified lifecycle management across vendors via Kubernetes

## KEY FEATURES

### Simplified architecture

Consolidated network functions, including DNS, firewall, CGNAT, and traffic policy enforcement make functions easier to deploy, manage, and scale.

### Policy and traffic management

Subscriber awareness, TCP and video optimization, and traffic classification deliver increased performance and quality of experience.

### Built-in security

Firewall, DDoS, and intrusion prevention (IPS) are included to protect the subscribers and the network.

### Data plane consolidation

A single hop design eliminates the need for multi-hop service chaining while reducing TCO by up to 60%.

### Validated solution architecture

Designed and validated for communication service providers by F5 and Red Hat.

# F5 BIG-IP Next Cloud-Native Network Functions with Red Hat OpenShift

Together, F5 and Red Hat offer network services built for 5G. F5® BIG-IP® Next™ Cloud-Native Network Functions (CNFs) are a fully re-architected microservices solution for Kubernetes, validated and optimized on the Red Hat® OpenShift® Container Platform. This container-based solution provides increased flexibility and scalability for user plane functions while also increasing efficiency and simplicity.

Built on the widely used and trusted BIG-IP Traffic Management Microkernel, BIG-IP Next CNFs is a suite of applications designed to increase the scale and efficiency of the 5G user plane, offering:

- Large scale carrier-grade network address translation (CGNAT)
- 5G network protection with an IPv4 and IPv6 firewall
- Transparent DNS resolver and caching services to reduce DNS latency up to 80%
- Enhanced customer traffic experience to improve quality of experience
- Reduced CPU consumption through data plane consolidation

Red Hat OpenShift Container Platform uses the latest technology, including a real-time operating system and hardware acceleration, to provide a consistent service provider experience across different infrastructures. Uniform tools and processes improve usability to increase delivery speed at scale.

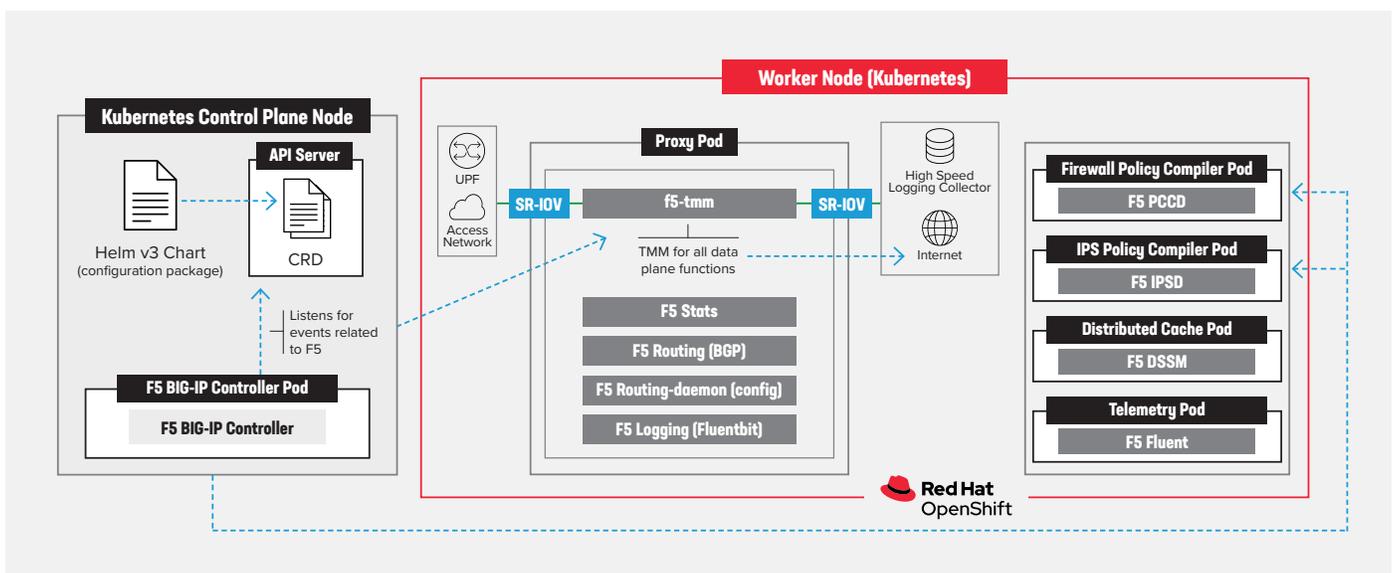


Figure 1: The unified Kubernetes control plane simplifies management and increases performance.



## Cloud-Native Benefits from F5 and Red Hat

By adopting cloud-native strategies offered by F5 and Red Hat, communication service providers can realize the promises of CNFs, including greater flexibility, scalability, faster service delivery, and resiliency, by using Kubernetes as a unified orchestration layer. Enhance the customer experience while lowering CapEx and OpEx by achieving the full potential of 5G.

Learn more about F5 and Red Hat's partnership at [f5.com/redhat](https://f5.com/redhat)

