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# Public-private hybrid cloud for financial services

Use case

**Get mission-critical network control and security, leverage public cloud capabilities in your large enterprise cloud, and reduce total cost of ownership (TCO) by at least 25 percent.**

Do you find yourself pressed between being able to provide public cloud capabilities in-house and being able to afford, let alone secure, operations on the public cloud? Do you worry about how to maintain the utmost control, security, and scalability while trying to offer client services in a rapid and scalable manner? Have you wondered how to leverage the control and security of a private cloud while providing the scalability and utility of multiple public cloud offerings?

Let Nokia show you how to unite private and public cloud approaches into a manageable and coherent whole. And, the Nokia financial services private cloud can provide TCO savings of at least 25 percent compared to a legacy environment that was upgraded to a cloud. This Nokia use case describes how the best of both private and public cloud approaches can be realized in a public-private hybrid cloud—without the disruption of rip and replace.

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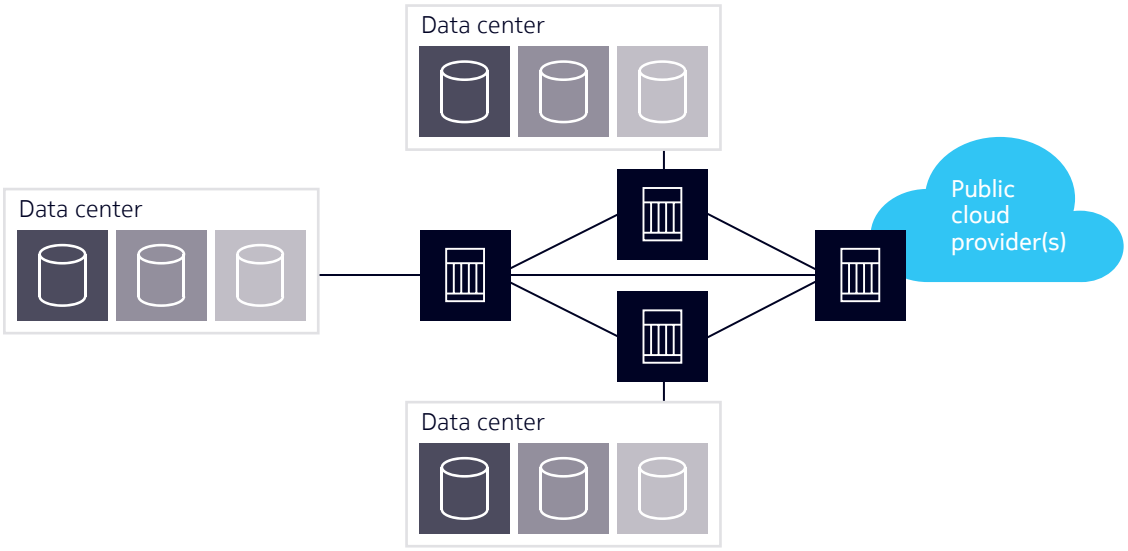
# Challenges

Large financial services firms typically have multiple data centers with semi-independent operations. As each data center evolved to serve the needs of a large department or became part of the environment with an acquisition, each developed its own network environment. Further, as illustrated in Figure 1, as each group of end users independently embraced the public cloud, in response each data center IT team set up links to one or more public clouds. The resulting environment, even if optimized at the data center level, can still be unwieldy and costly to manage. That's why IT organizations are often caught between matching public cloud capabilities in-house and being able to afford or secure operations on the public cloud. The resulting challenges include:

- **Network limitations:** Few truly hybrid approaches exist and fewer still can meet the reliability, scalability, and flexibility needs of large financial services firms.
- **Lack of heterogeneous environment support:** To support financial services needs, a wide range of virtualization hypervisors, cloud management systems, and container hosts must be supported side-by-side.
- **Scalability limitations:** Open source software provides a rich and diverse functionality for the hybrid cloud, but often cannot scale to large financial services levels.
- **Workload immobility:** Legacy approaches do not provide the required workload mobility for hybrid operations. Workloads must be highly mobile within and among data centers. Server, network, and storage operations must also be automated and synchronized.
- **Lack of role-based controls:** Department business and data center directors are reluctant, even if technically possible, to relinquish control of their respective domains to a centralized IT team.
- **Lack of visibility:** A hybrid cloud environment is highly virtualized to achieve control and deliver cost savings. However, virtualization can hinder asset management. For example, the root cause of hardware failure can be hard to identify much less pinpoint in a virtualized environment.
- **Unpredictable Quality of Service (QoS):** A shared IP backbone running distributed applications can suffer from performance unpredictability and availability issues.
- **Increased security challenges:** In a legacy environment, each data center is essentially its own castle with multiple layers of defense. A cloud environment with virtualized applications distributed across data centers presents a much larger exposure surface.

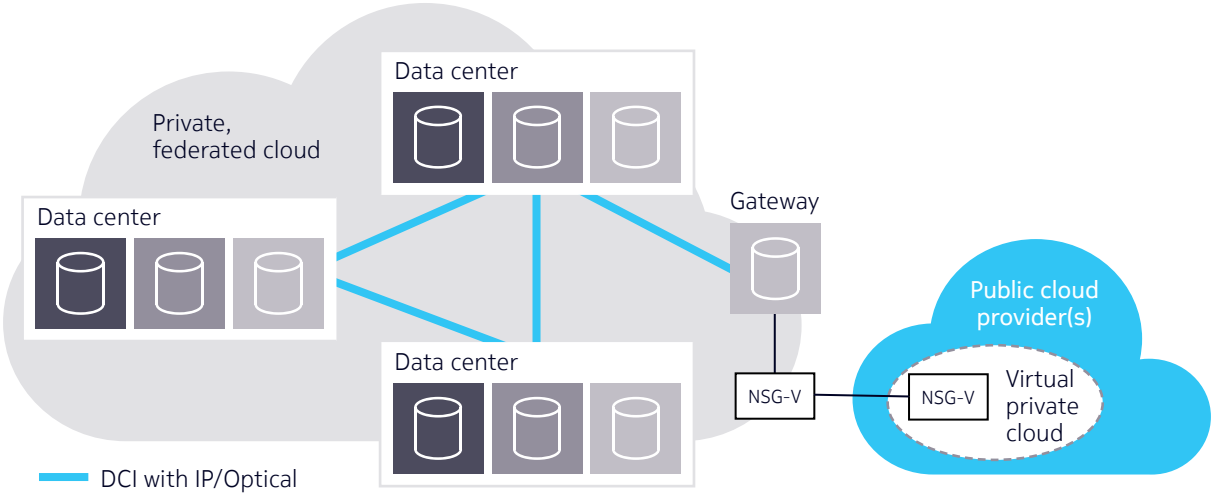
Figure 1. Legacy environments are networked and managed at the data center level.




# How we help you

Nokia combines innovative software defined networking (SDN) and software defined wide-area networking (SD-WAN) approaches with cutting-edge networking technology to deliver a true hybrid cloud infrastructure that provides mission-critical communications and operations while reducing costs. As Figure 2 illustrates, the Nokia Data Center Interconnect (DCI) approach leverages any combination of IP and optical network gear to provide high-performance, scalable, and reliable connections among data centers. The Nokia cloud architecture overlays even the most complex financial services environment without forklift upgrades, transforming the environment into a best practices cloud. By federating this unified environment across data centers and across the WAN, even the most complex enterprise environment is transformed to a best practices private cloud. By enabling consistent communications with public cloud(s), the result is a hybrid cloud.

Figure 2. A federated private cloud with public cloud access increases flexibility and control



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# How our approach changes the game

This innovative approach enables a public-private hybrid cloud that can scale internally through the addition of more IT resources and externally by leveraging public cloud resources for production (e.g., big data jobs or end of quarter accounting runs) or for overflow jobs (e.g., infrequent peaks such as elections or sporting events). This core scaling capability allows financial services firms to capitalize on the best of both types of cloud. Capabilities include:

- **Network flexibility:** The Nokia cloud network provides the core infrastructure that flexes automatically—and in near real-time for mission-critical operations—in response to the demands of the cloud management system (e.g. OpenStack®).
- **Heterogeneous support:** The Nokia overlay approach encompasses multiple virtualization hypervisors, cloud management systems, and container hosts side-by-side.
- **Scalability:** We can show you how to extend cloud management system networking capabilities to scale up to the most demanding financial services demands, such as millions of transactions per day.
- **Workload mobility:** Our cloud approach ensures that cloud management system commands—such as moving a virtual machine (VM)—are fully operationalized at the network level within and across data centers.
- **Role-based controls:** Nokia provides a hierarchical command-and-control capability, enabling multiple levels of network control—from the central team to the subsidiary head, to the data center teams to the department heads.
- **Full visibility:** By mapping between physical and virtualized resources, we provide full visibility. This mapping enables an error's root cause, including hardware failures, to be identified and pinpointed.
- **Predictable Quality of Service (QoS):** Nokia assures that each network stream gets the right network priority and performance needed.
- **Improved security:** We deliver a layered defense for the entire cloud—far more than a bolt-on afterthought:
  - At the physical layer, encryption built into Nokia's optical products provides defense against physical taps.
  - At the virtualization layer, microsegmentation guards communications within and between hypervisors and container hosts.
  - A robust API enables every packet and every stream to be inspected by one-to-many security programs or appliances.
  - Automated declarative policies with endpoint interpretation minimize, if not eliminate, the manual errors responsible for most day-to-day breaches.

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## Why our approach is different

- **Federation:** The Nokia cloud approach is the top if not the only way to transform a diverse enterprise environment into a coherent and single private cloud.
- **Automated workload mobility:** The Nokia cloud approach, as the basis for a software-only infrastructure strategy, provides the automated workload mobility so that the best-suited enterprise data center can be used for the task.
- **Hard cost savings:** The Nokia enterprise private cloud reduces total cost of ownership by a minimum of 25 percent as compared to the original legacy environment that was transformed to cloud.

## How you benefit

The Nokia hybrid cloud approach:

- **Ensures full coverage and consistent control:** It encompasses the entire IT environment—within and among data centers and throughout the WAN for mission-critical operations.
- **Maximizes IT flexibility:** Many financial services firm's cloud strategies alternate between the public and private cloud. Our single migration approach eliminates the need to migrate back and forth from private to public cloud. A flexible and hybrid cloud maximizes the financial services firm's flexibility in leveraging in-house or public resources, as needed.
- **Optimizes cost efficiencies:** Our cloud approach enables cost efficiencies as scale increases, as well as leveraging the public cloud in specific use cases, such as big data analytics.

For more information on our solutions for financial services firms, visit https://networks.nokia.com/financial-services.

### About Nokia

We create the technology to connect the world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry's most complete, end-to-end portfolio of products, services and licensing.

From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience.

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