5G challenges in the telco sector

– Sii virtualizes network functions for operators

Przemysław, Head of Industry

Bartłomiej, Junior Software Engineer
Weronika, Junior Sofware Engineer

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More than radio - how 5G is shaping telecommunications

As we enter the 5G era, companies are providing end-users with telecommunication services of higher quality compared to the previous generation. The most noticeable changes are faster transfer speeds and lower latency. Since most people can acknowledge them, it should not be surprising that these aspects are the most talked about in the media. Much less is said about the changes that are transparent to end-users, but help operators build and manage infrastructure, which is also reflected in the final price and stability of services. 5G is not just a new radio frequency standard, it is also a series of changes happening after the data reaches the BTS base station and is transported to the operator's server room.

In the server room, the data must be properly processed and transported using the appropriate network functions. They circulate among them until they reach the right place in the right form. Since the highest data processing efficiency can be achieved by designing hardware for specific computations, legacy network functions are usually realized through devices. Examples of such network functions include firewalls, load balancers, and session controllers.

Firewall, FortiGate 4400F

Scope of IT services for the telco sector

This approach differs significantly from practices characteristic of IT services for other sectors, where companies want to have everything in the cloud to depend on hardware as little as possible. They would be most likely to entrust equipment administration to the server room manager providing the platform on which they run services.

While telecom operators still need to rely on their own hardware, the development of virtualization technology has allowed them to move away from dedicated physical devices that perform network functions, such as the one in the photo above. Hence the terms **NFV** (Network Function Virtualization) and **VNF** (Virtual Function Network).

What would an operator achieve if they could virtualize network functions using universal servers? They could use them to replace dedicated physical devices in their server rooms - but what are the benefits?

Main benefits of Network Function Virtualization

In the legacy approach, any change made to a feature also happened on the device level - replacing any network feature with a newer model required invasive work in the server room. And what if a given region grows and we need additional resources for a particular function? Then, we need to physically add new elements as well. An approach that includes virtualized network functions helps avoid such work, making changes cheaper and significantly faster.

„Cheaper" is a sufficient reason for operators to want to implement this solution. But significantly speeding up operations, such as changing network functions, opens up entirely new opportunities for operators. Network traffic varies throughout the day, and different types of data require different power from specific network functions – it isn't constant. When devices are responsible for dealing with data, there must be enough of them to efficiently handle the traffic at the peak of demand that day, and they are not used for the rest of the time. It's easy to imagine a situation where peak demand for particular network functions occurs at different times of the day. This could be due to, for example, users recurrently traveling to work or other locations. When these functions are virtual, they can be physically run on the same hardware at different times, depending on the current demand. This translates into cost savings and higher quality of services, which is improved by the ability to respond more quickly to sudden changes in network needs, including unusual situations (e.g. concerts and other mass events that gather large numbers of users in one place).

Virtualization vs. infrastructure – where to run it?

Virtualizing network functions while maintaining performance and reliability is a complex issue. Even the best-virtualized network functions require an infrastructure on which you can run them later ww– that is where the term **NFVI** (Network Function Virtualization Infrastructure) comes from.

Such a platform must provide the resources to quickly and reliably run subsequent VNFs while managing and optimally utilizing the physical servers. Once we have virtual network functions and the resources to run them, we still need an orchestrator to manage the process of running VNFs based on the current needs.
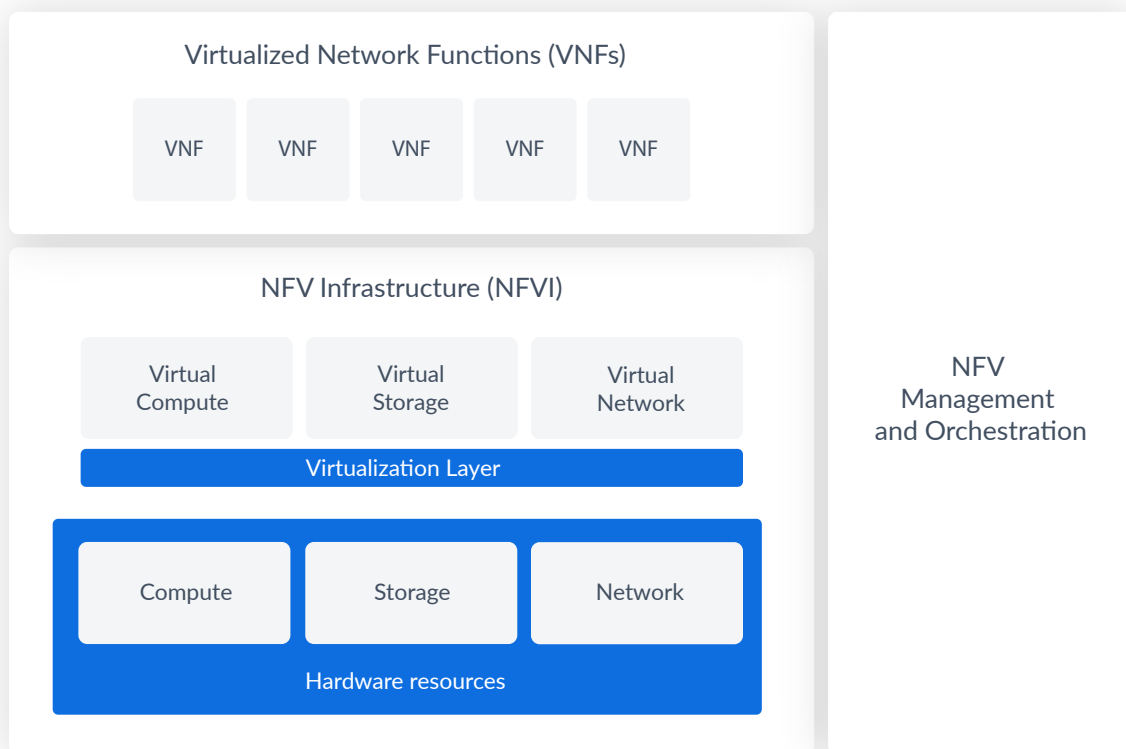
NFV Architecture

Unlike non-virtual network functions, VNFs aren't immediately connected via cables in a way that ensures proper connectivity between the required elements. VNFs may need to communicate with other VNFs that may reside on another server and in such cases, their communications should be isolated from other communications running over the same physical connections. In addition, the requirements for such connections change with every change in the VNF, which means that it happens too often for an operator to be able to reconfigure it on the fly. This problem is solved by **SDN** (Software Defined Network) with orchestrators **(SDNO),** which automatically configure network connections between servers in such a way as to ensure the parameters required for efficient VNF operation.

Network function virtualization
– our projects

Sii Poland in cooperation with its clients provides mobile operators with solutions within the areas of NVF, NFVI, and SDNO. These solutions are prepared based on 5G standards and are fully compatible with 3rd party solutions. They help operators make the full transition to 5G, which entails cost savings and higher service quality.

5G networking solutions and project facility set-up

The client needed expert support in the field of 5G networks in a cloud environment. Additionally, the project required providing a room tailored to the highest security standards.

What we did:

Set up a project room adhering to the company's security policy with SVPN, separate VLAN, external access control readers, and a CCTV system in Sii Cracow.

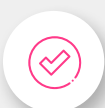Designed and deployed solutions for 5G networking.

Built a team of experts to support project implementation in the areas of 5G Core network functions and Operations, Administration & Maintenance.

Created a global 5G architecture.

Effects of cooperation with Sii

Key benefits for your company:

- Readiness to implement IoT and 5G solutions

- Maximized flexibility in deploying new services

- Introduction of the application -agnostic approach

- Enrichment and modernization of the technology stack

- Increased savings in the area of capital expenditure

- Reduced service delivery time

Looking for support? Contact Sii!

Take advantage of the opportunities offered by 5G in your company. Contact Sii experts to talk about network function virtualization and other possibilities for cooperation.

Contact us!

With 7 000+ specialists, Sii is the largest technology consulting, digital transformation, BPO and engineering services vendor in Poland. Sii experts carry out projects for leading companies operating in the automotive, banking and financial, hi-tech, healthcare, retail, logistics and utilities sectors. Sii Poland has 15 offices in Warsaw, Gdansk, Wroclaw, Poznan, Cracow, Lodz, Lublin, Katowice, Rzeszow, Bydgoszcz, Czestochowa, Pila, Bialystok, Gliwice and Szczecin.