Cloud deployment for future network and service evolution

Denis Diachenko, Network Department
Alexander Khvostov, Integrated Solutions Department
Who we are

35M homes
10K racks
More than 100K km of fibers
Connections with 170 networks in 70 countries

Internet
Voice
IPTV
Cloud
IoT
Digital ad
Payment services
Mobile
Security
Smart home

Digital ad
Rostelecom Data Centers transformation

Data centers

Cloud

Services

Servers

Storage

Network

IaaS

MaaS

PaaS

SaaS

BaaS

NLBaaS

Telco Cloud

Webcam

Smart home

Wi-Fi

SOC

Conference

Digital ad

Education

IoT

Office TV

Payment

vIMS

FMC
Cloud services

Clients
- B2B
- B2G
- B2C
- Banks
- Internal

Cloud
- Public cloud
- Private cloud
- Hybrid cloud
- Servers to lease
- Colocation

Data transmission
- MPLS
- Leased lines
- IX
- CDN
- VPN

Services
- DC Design
- Network administration
- System administration
- Smart hands
- SOC
SDN implementation

We launched SDN from Nokia to speed up network service delivery and to minimize the differences between virtualization vendors by unification.

New features became possible:

- DC — MPLS integration. Easy presentation of L2VPN, L3VPN to tenant
- Bare metal servers with VMs in one tenant. Full automation
- Network rate limit per tenant and per VM
NFV approach

Traditionally

Telco Cloud

1. Client PoP 1
2. Client PoP 2
3. Client PoP 3

MPLS
Internet
CPE
Client
PoP 1
CPE
Client
PoP 2
CPE
Client
PoP 3

MPLS
Internet
CPE
Client
PoP 1
CPE
Client
PoP 2
CPE
Client
PoP 3

NFV approach
Telco Cloud key features

- FW, IPS, Anti-DDOS, Anti-Spam, WAF, VPN
- Real DR
- MPLS and OTT
- Full automation: WAN, vDC, VNF, monitoring
- Variety of CPEs
- Easy scaling
Difficulties of NFV implementation

Integration with cloud platforms is tricky:
- Different architectures
- Competing technologies
- Software dependencies

Some security appliances are not NFV-ready:
- Management and data plain separation
- On-demand licenses
- Clusterisation
- API

OSS/BSS is an operator’s work:
- Several OSS/BSS systems
- Long development cycle
- Difficult to support
# Telco Cloud functionality

<table>
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<tr>
<th>Rostelecom SOC VNFs</th>
<th>Infrastructure VNFs</th>
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<td><strong>Firewall</strong></td>
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<td><strong>Remote-Access VPN</strong></td>
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Telco roadmap

- VNF application store & ecosystem
- Integration with public cloud services (IaaS, PaaS, SaaS)
- Flexible accounting schemes
- Integration with regional OSS/BSS
- More CPE models
- Distributed and hybrid NFV models
- Automated integration with IP/MPLS backbone
Highly loaded VNFs require fast bandwidth increasing. Network must dynamically adapt to sustain temporary peaks.

Multi-domain IP and optical network must be able to recover traffic flow as soon as possible.

Existing domains must be reused.

Faster
More Reliable
Multivendor
We work on T-SDN
Transport SDN technology is mostly limited to individual domains, because it is difficult to provide interaction between different hardware vendors.

Each optical network domain used a domain controller that managed services in the respective domain.

A new hierarchical approach is needed that provides full end-to-end service deployment, as well as automation of operations in individual optical domains.

NEC/Netcracker multilayer SDN controller

- NEC Optical T-SDN Controller
- Huawei Agile Controller Transport
- Nokia Network Service Platform

Rostelecom
DATA CENTERS
T-SDN highlights

Automatic detection of topology and resources of the optical multi-domain network

Automatic creation of services using the resources of the optical multi-domain network

Multi-level traffic recovery
Building blocks for 5G

- Data center SDN
- NFV platform Telco Cloud
- Transport SDN
5G implementations

- 5G tests in the State Hermitage Museum. Remote restoration of an old monument with VR and robotic arm
- 5G tests in the Innopolis center. Broadcast of football game live in VR
- 5G tests in Skolkovo innovation center. Unmanned public transport used low response time of 5G network
Thank you!

Denis Diachenko
Director of Network Department
denis.dyachenko@rt.ru

Alexander Khvostov
Director of Integrated Solutions Department
aleksandr.khvostov@rt.ru