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Enhancements to network efficiency and a dramatic cost-cut in production by using SDN / NFV in Next Generation Access Networks –

a case study from Germany

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Contents

- QSC AG at a glance
- Competitive situation in germans
- Layer3 – Bitstream network topology
- On the move to Layer2-BSA and VULA
- What could SDN / NFV do here?
- Regulatory implications? A conclusion

QSC AG at a glance

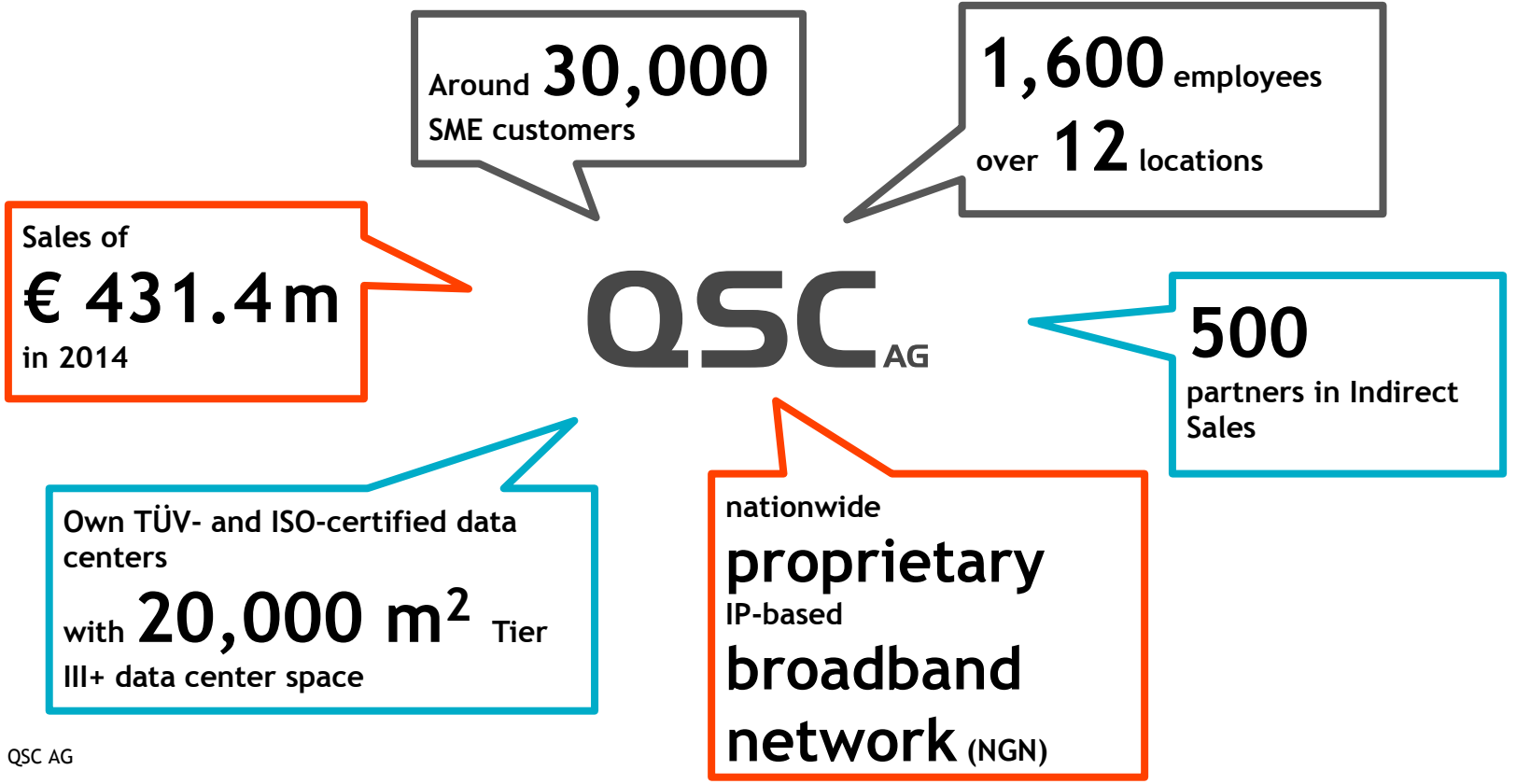
QSC AG is digitising the German SME sector.

With decades of experience and expertise in the areas of Cloud, Consulting, Outsourcing, and Telecommunications, QSC accompanies its customers securely into the digital age.

The Company’s TÜV and ISO-certified data centres in Germany and its nationwide All-IP network form the basis for maximum end-to-end quality and security.

QSC’s customers benefit from one-stop innovative products and services that are marketed both directly and via partners.

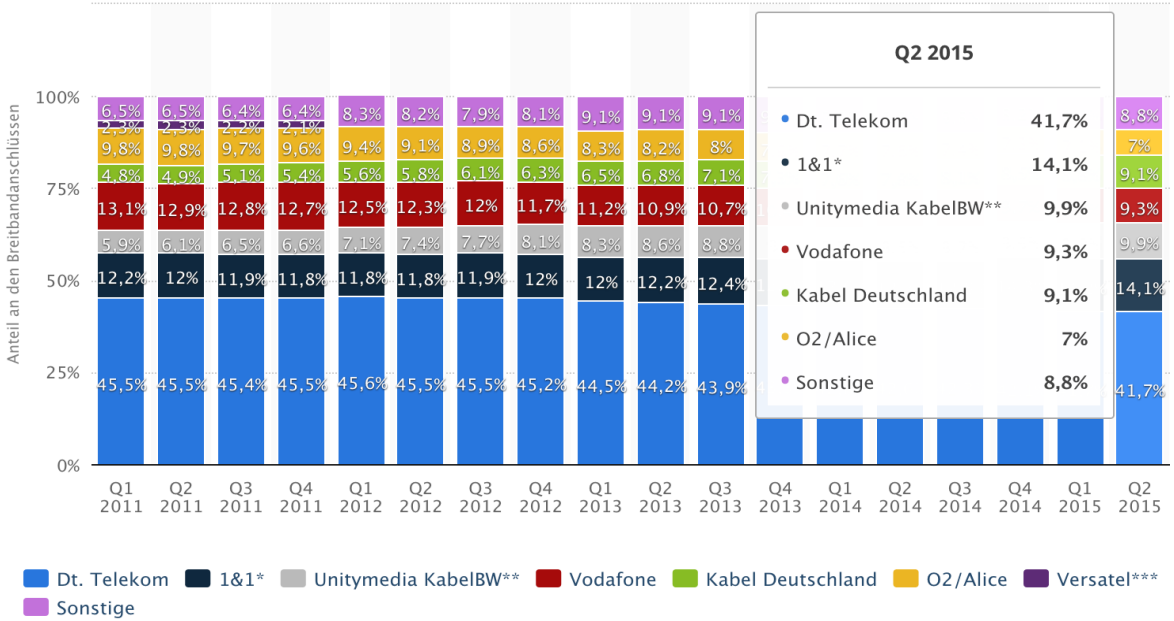
QSC AG in figures



Competitive situation in Germany

The German Telecommunication Market is still mainly led by the incumbent, Deutsche Telekom.

From the user number, DT has more than 40% market share, but from an infrastructural perspective, DT has >60% share.



Source: Statista

http://de.statista.com/statistik/daten/studie/196770/umfrage/marktanteile-der-fuehrenden-breitband-anbieter-in-deutschland/

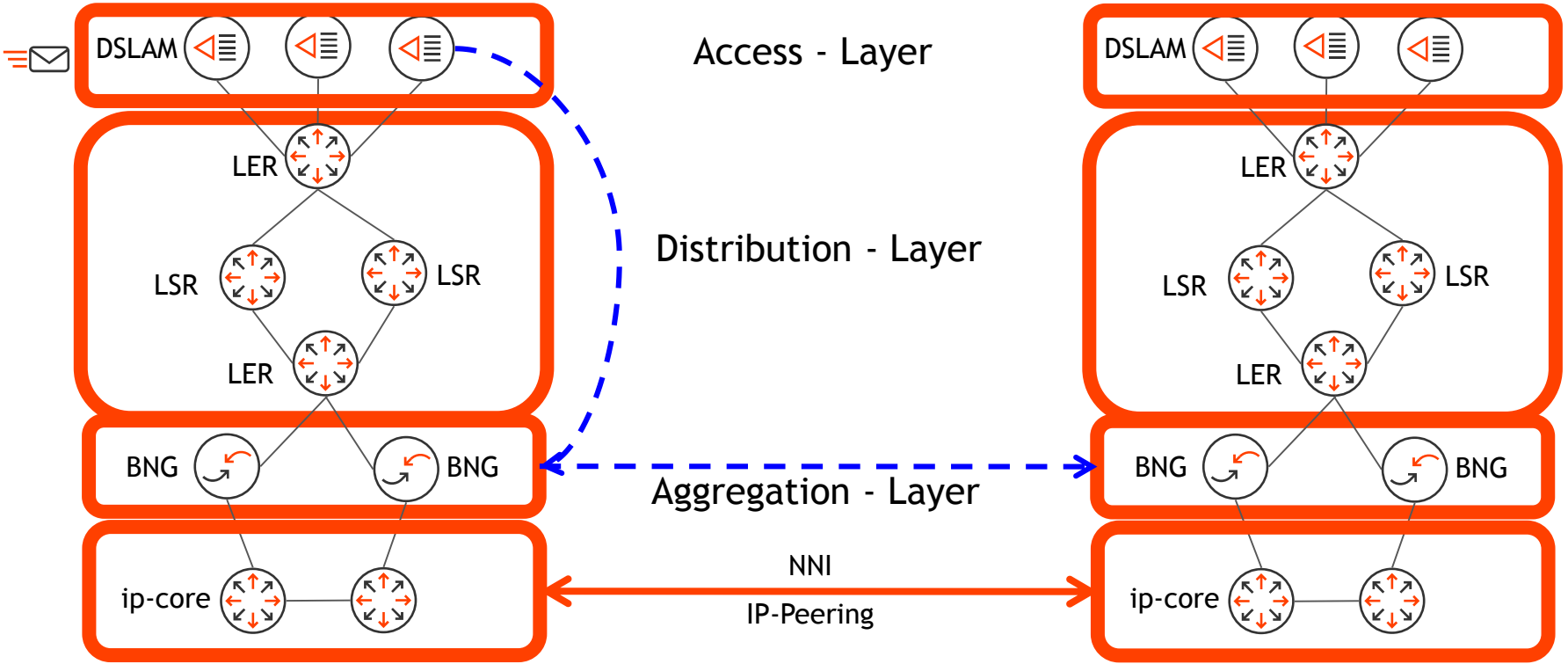
Competitive situation in Germany

Competition is mainly driven regional, where strong, local brands (NetCologne, M-Net, EWE-tel, etc.) have their own physical infrastructure. Nationwide, there are only 4 companies operating own network infrastructure, Deutsche Telekom, Vodafone / Kabel Deutschland, QSC AG and Versatel.

None of the competitors have a >90% coverage, so to be (virtually) nationwide, you have to have a wholesale-contract with Deutsche Telekom, and maybe also with other regional or global operators.

Those wholesale-products are – today – mainly produced as “Layer3-Bitstream” via PPPoL2TPoIP.

Layer3 - Bitstream network topology



On the move to Layer2-BSA and VULA

As one could see in the sketch before, 2 networks are today mainly treated as 2 separate islands (autonomous sytems), with a default interconnect relying on Layer3-routing-protocols, like BGP4.

With the movement towards Layer2-Bitstream-products, such as / as well as VULA, network-centristic and Layer3-routed network interconnects may no longer be suitable for the network needs.

But you still have to have intelligence in the network to be able to serve others with wholesale- / resell-services.

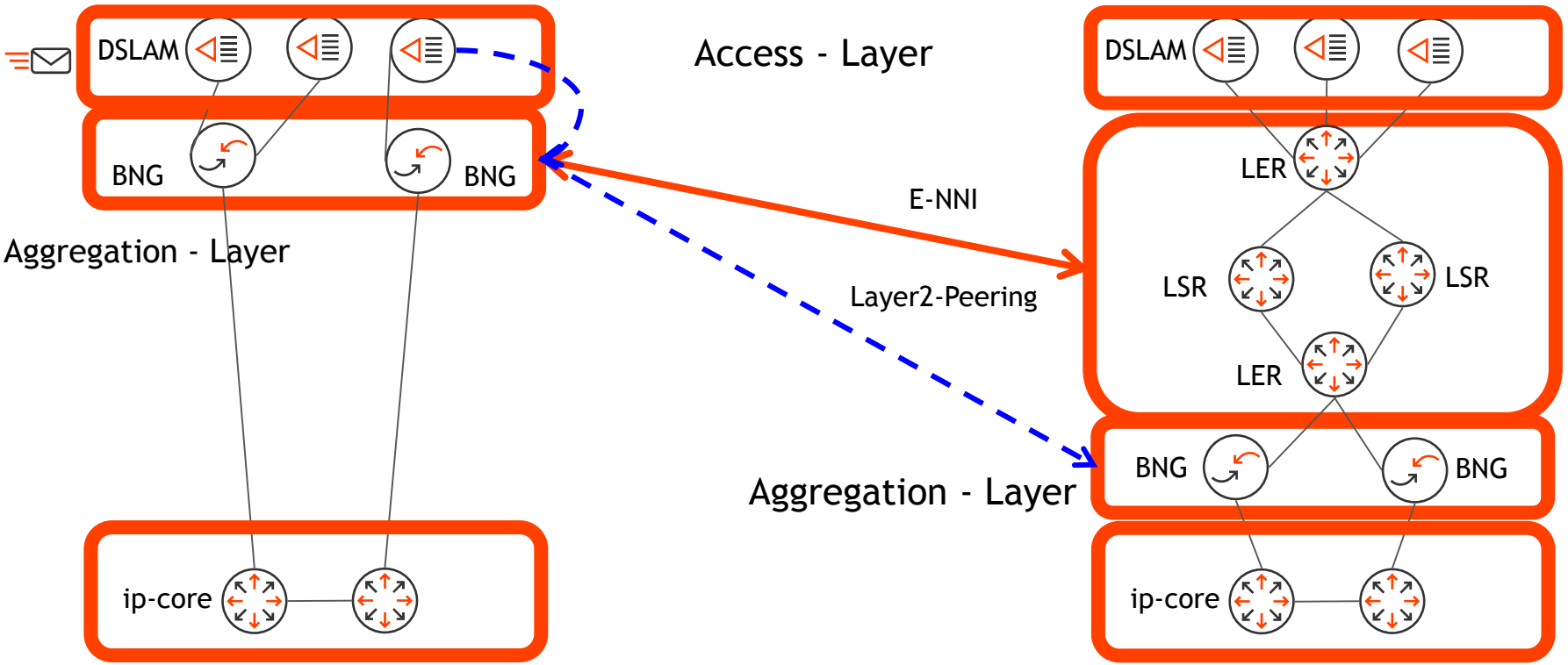
On the move to Layer2-BSA and VULA

To do so, you can either bring the service creation point closer to the physical access – DT e.g. is planning to place 1200-1500 BNG in 899 locations near the physical access.

This is a topology in contrast to successful, network centristic approaches as we are all seeing with cloud solutions and datacenter services.

To bring more “intelligent” and by this more expensive equipment to the countryside does not seem to be very efficient.

Layer2 - BSA network topology



What could SDN / NFV do here?

In both Layer2- and Layer3-options, there are to separate networks. For any 3rd-party user service, you have to have 2 service-creation points (BNG), have to have two authentication systems (such as RADIUS or TACACS) and to separate aggregation and distribution networks to send the traffic along.

In Layer2-scenario, you additionally have to have those infrastructures near to the customer, which is not as cost-effective as it could be.

What if both networks would be controlled by the same control-plane?

What if we logically combine both networks to one software-defined network?

What could SDN / NFV do here?

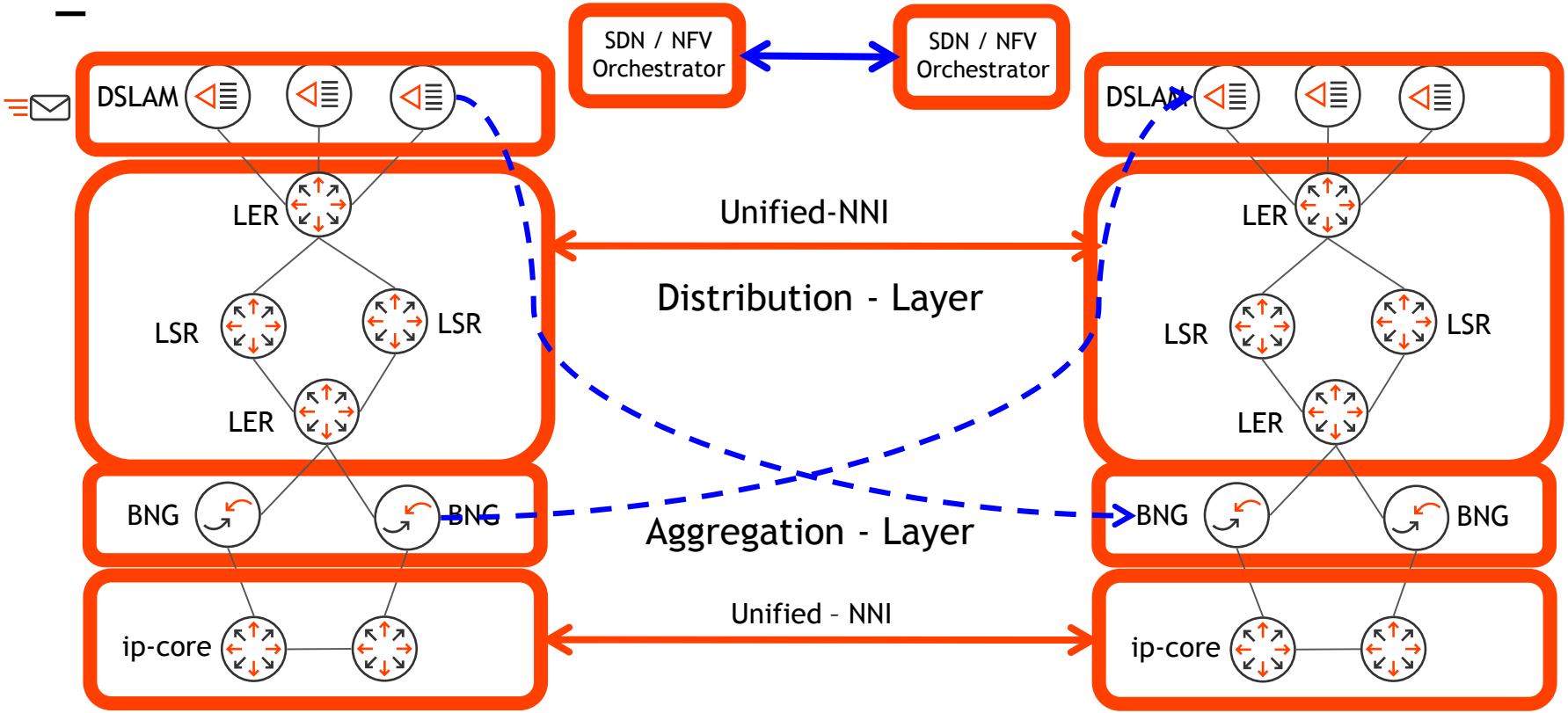
To give someone else some kind of control over your network is not completly new.

In BGP4, for example, we can use MED (multiple exit descriminator), longer prefix routing and other options to decide, how traffic is flowing within another network.

In L2TP-scenarios, Radius-proxy is used to have the tunnel setup steered by third party.

There are plenty of other examples, how we are all already using those mechanisms, without calling them SDN so far.

Converged Layer2/3 - Bitstream network topology



What could SDN / NFV do here?

In an ideal world, you could use unified NNIs to transport both L2-BSA and L3-BSA on the same interconnect, which can either be local or centralized.

With better understanding about where traffic comes from, and where traffic needs to go to, you can have multiple advantages.

Traffic only needs to pass geographical regions once, because you can steer the traffic as close to the destination as possible.

Packets only have to pass one BNG, which can effectively terminate the service (BNG A for layer2 and BNG B for layer3).

Regulatory implications? A conclusion

As shown before, SDN and NFV can enhance the efficiency of networks, reduce the number of „intelligent“ network elements and save bandwith.

But those advantages are mainly with the former incumbants, which are subject to regulation.

Moving towards VULA will bring significant changes to all our networks – but we should pay attention to the possibilities of SDN and NFV, both from a network design perspective, but also from a pricing perspective.

Thank You!

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