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SDN Decrypted
A top level view to SDN

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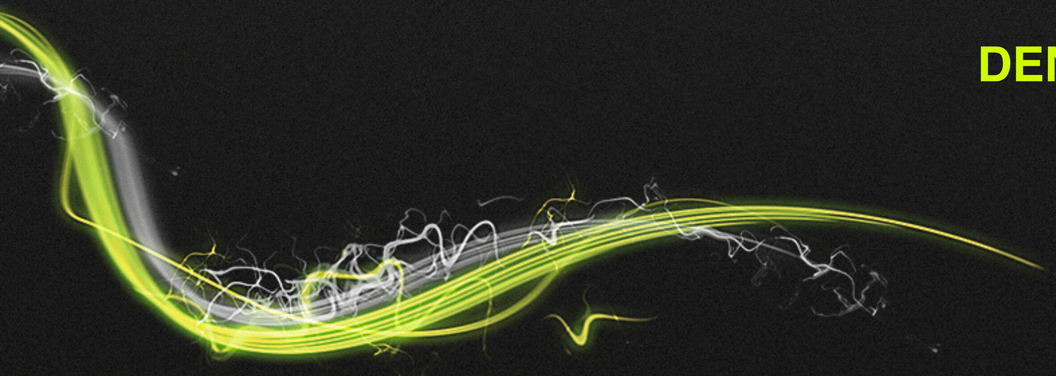
DENOG6



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3 types of SDN

3 types of SDN

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SDN for LAN

SDN for WAN

SDN for Clouds

SDN for LANs

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- SDN for LAN is mostly an idea
- No real products are available -> OpenFlow is academic
- Anyhow, nobody needs it

SDN for WAN

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- SDN for WAN is in first steps
- MPLS LSPs are to be manipulated by a central controller
- Protocols drafts are quite old
- Early adopter products available Q1 2015
- Use cases are in big carrier backbones

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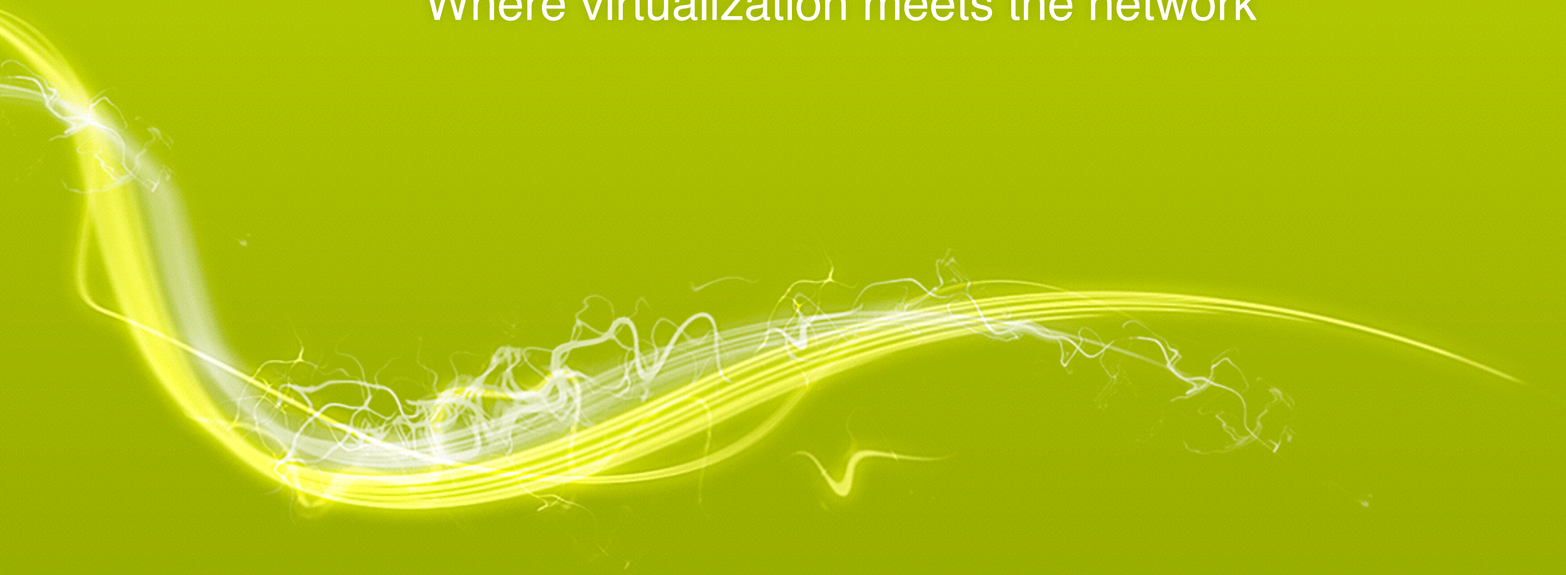
SDN for the cloud

Where virtualization meets the network



What is cloud computing?

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Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers over a network.

Cloud computing vs. virtualization environments

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Cloud computing is classic virtualization in a much higher scale and fully automated.

Cloud computing is meant for 1000s of virtual systems.

Classic approach to virtualization

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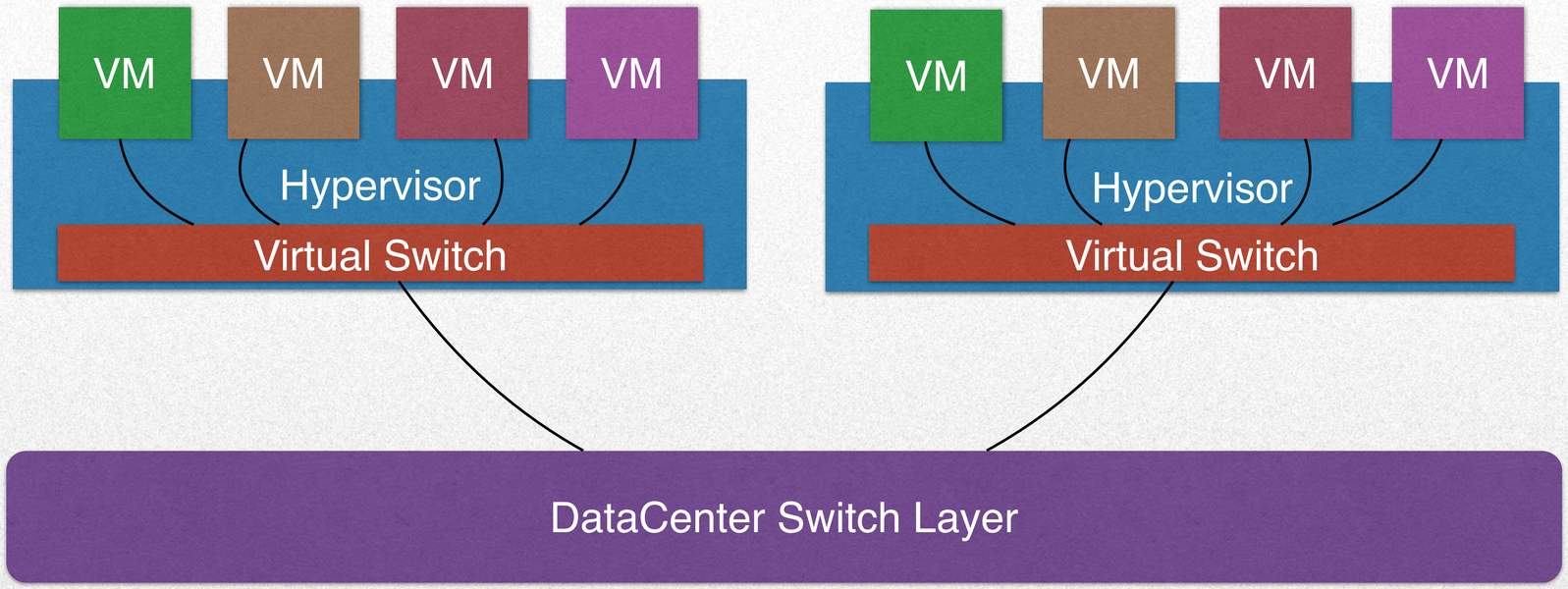

- ✦4 VMs per Server
- ✦each from a different customer
- ✦each customer has its own VLAN
- ✦preconfigured to each server

This scales only up to 4096 VLANs,
and only to as much hosts as the Datacenter Switch Layer can learn mac addresses

Classic approach to virtualization

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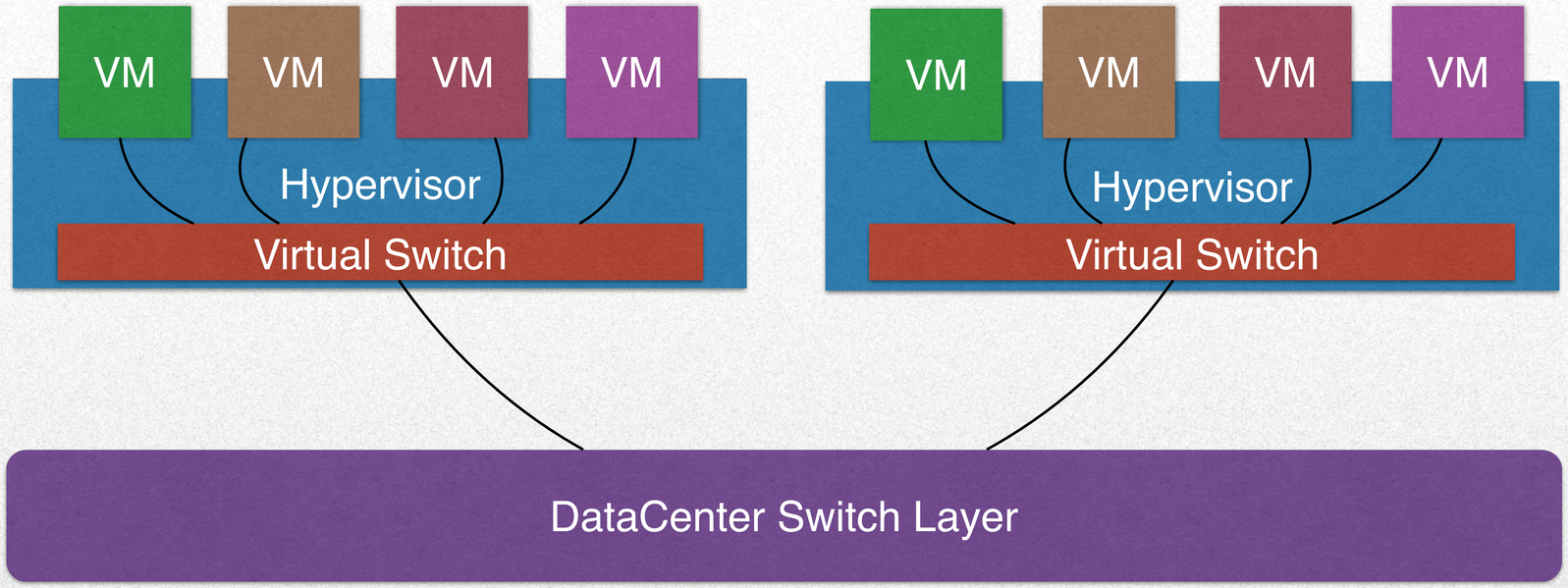

Automatisation approaches:

- ✦Configure VLAN to server via orchestration
- ✦Overlay: VXLAN

Scaling approaches:

- ✦Multiple clients per VLAN
- ✦Breakup in multiple independent domains
- ✦Nonstandard-compliant hacks

Virtualize the network - step 1

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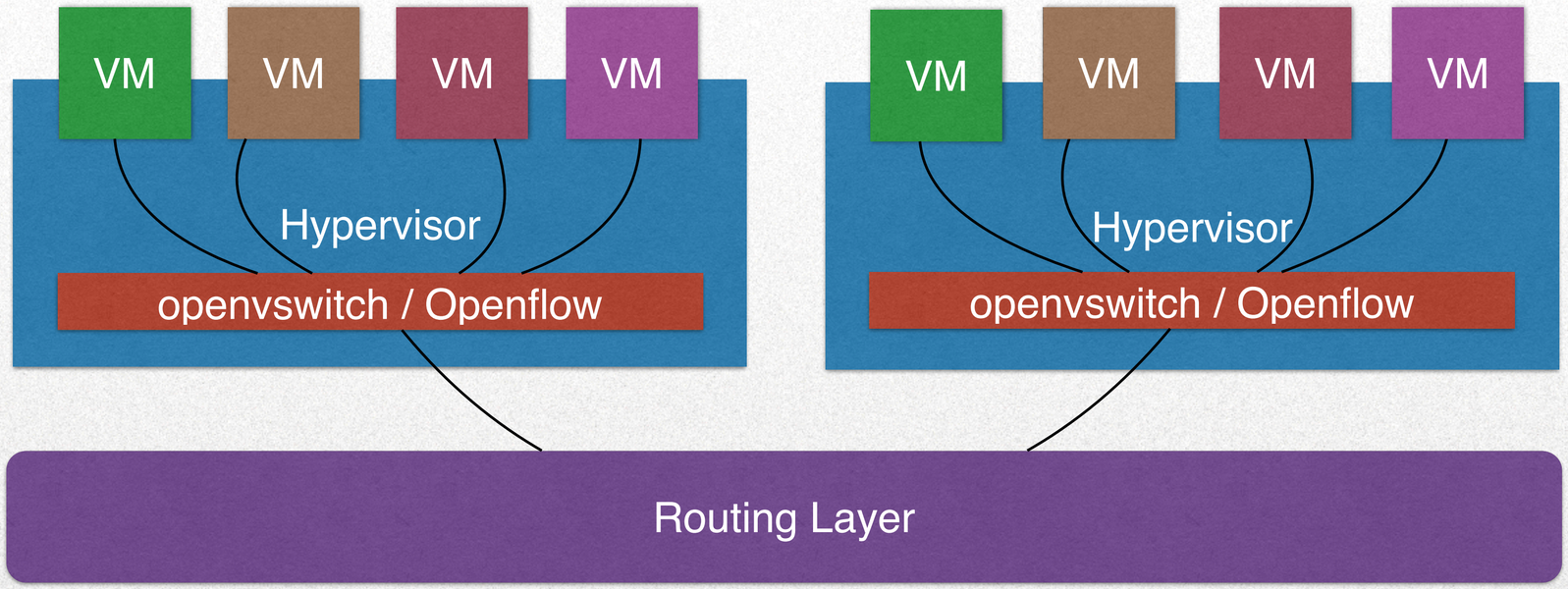

The default switch is getting replaced with a encapsulating switch

Virtualize the network - Step 1

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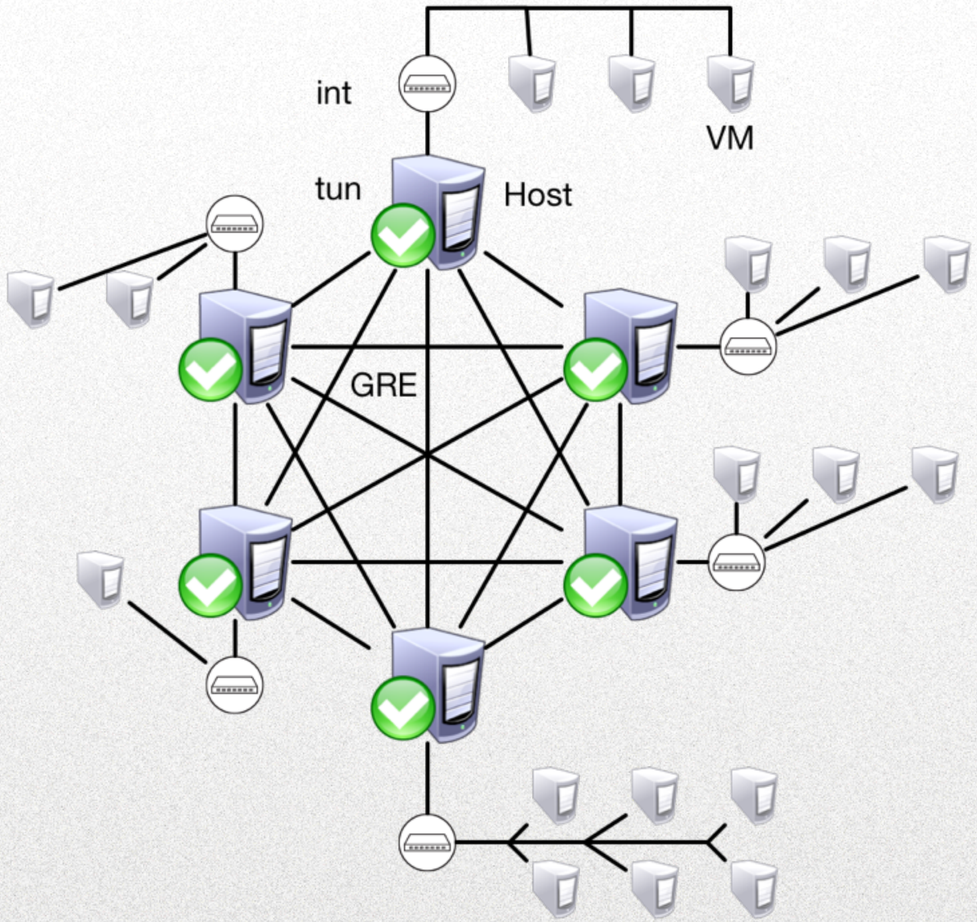

A full mesh of either GRE-tunnels
or VXLAN or $overlay is created

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„Netzwerk? Die einzig richtige Lösung ist Routing und MPLS“

–Tom Eichhorn - 2010

SDN for scaling clouds

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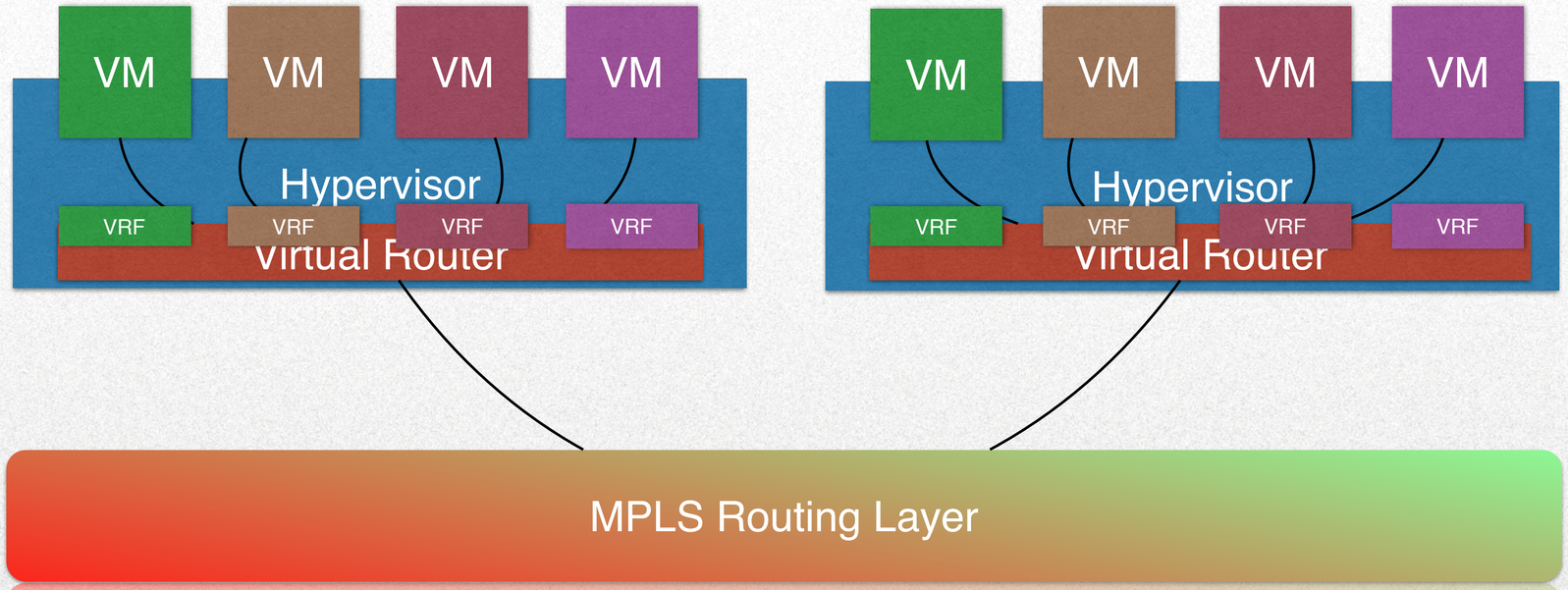

We replace the whole switching stack with a routing stack.

Each virtual machine has a /32 IP and knows its router.

VMs get separated by MPLS VPNs

What can we do with routed cloud networks?

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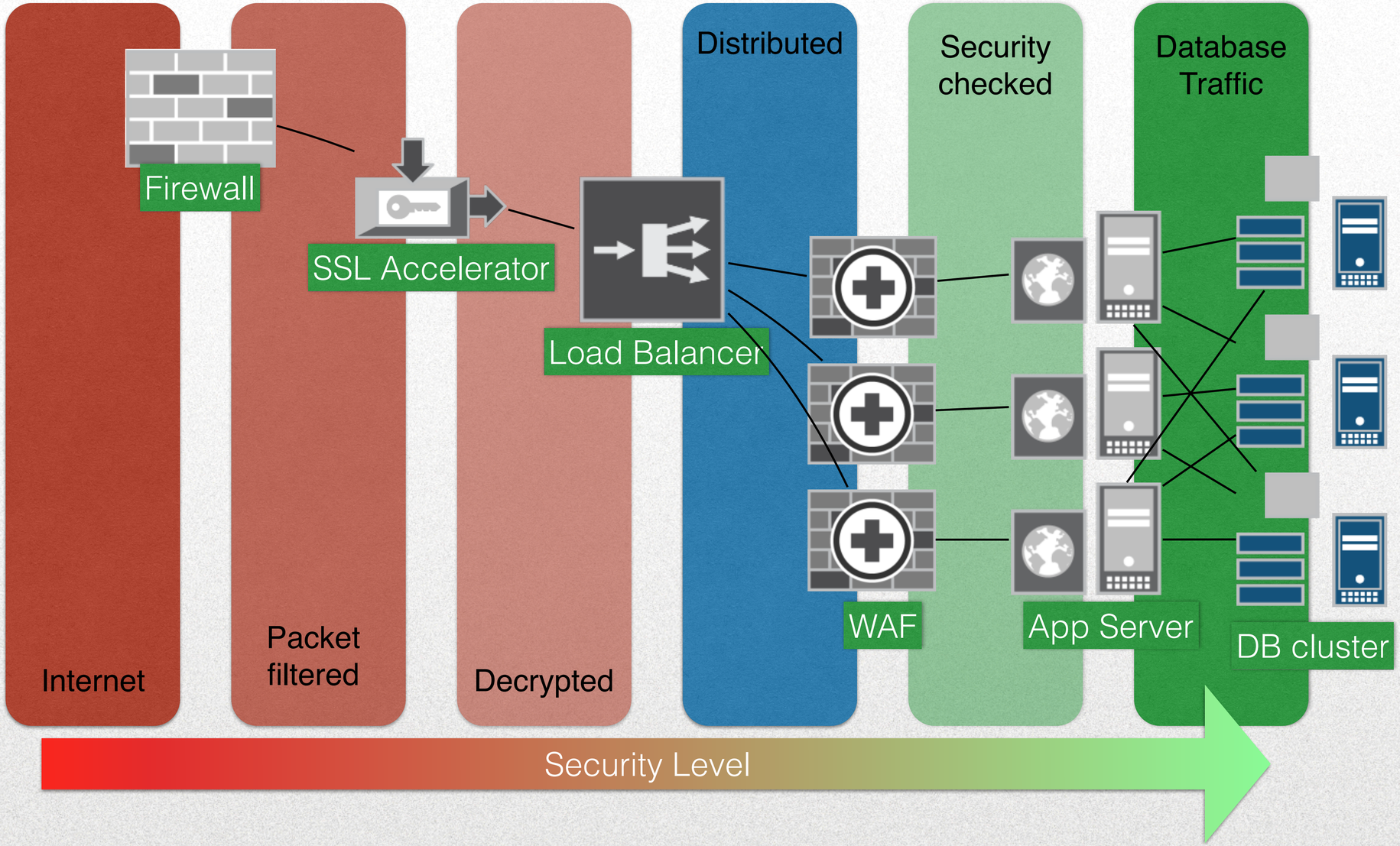

What can we do with routed cloud networks?

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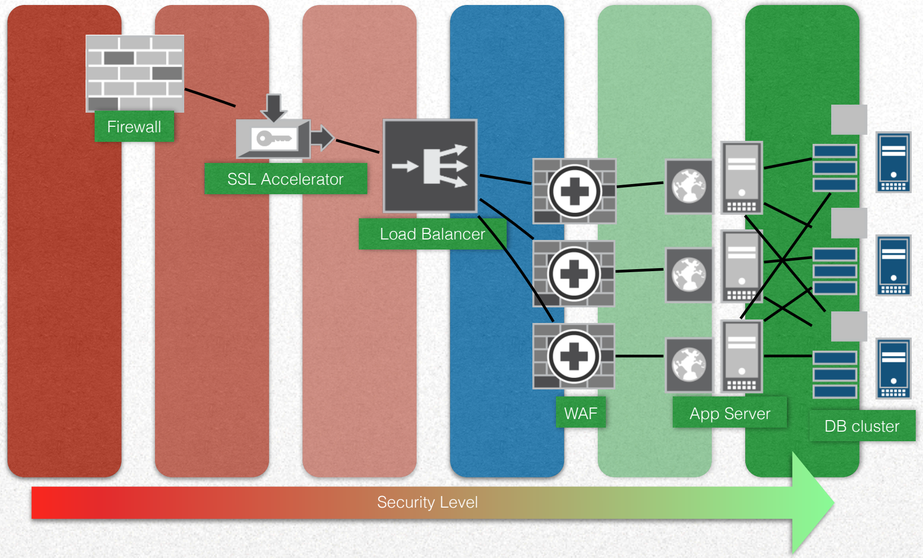

Individual network designs:

- ★ Multiple security zones
- ★ Either physical or virtual appliances
- ★ Customer specific instances of NFV

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Questions?