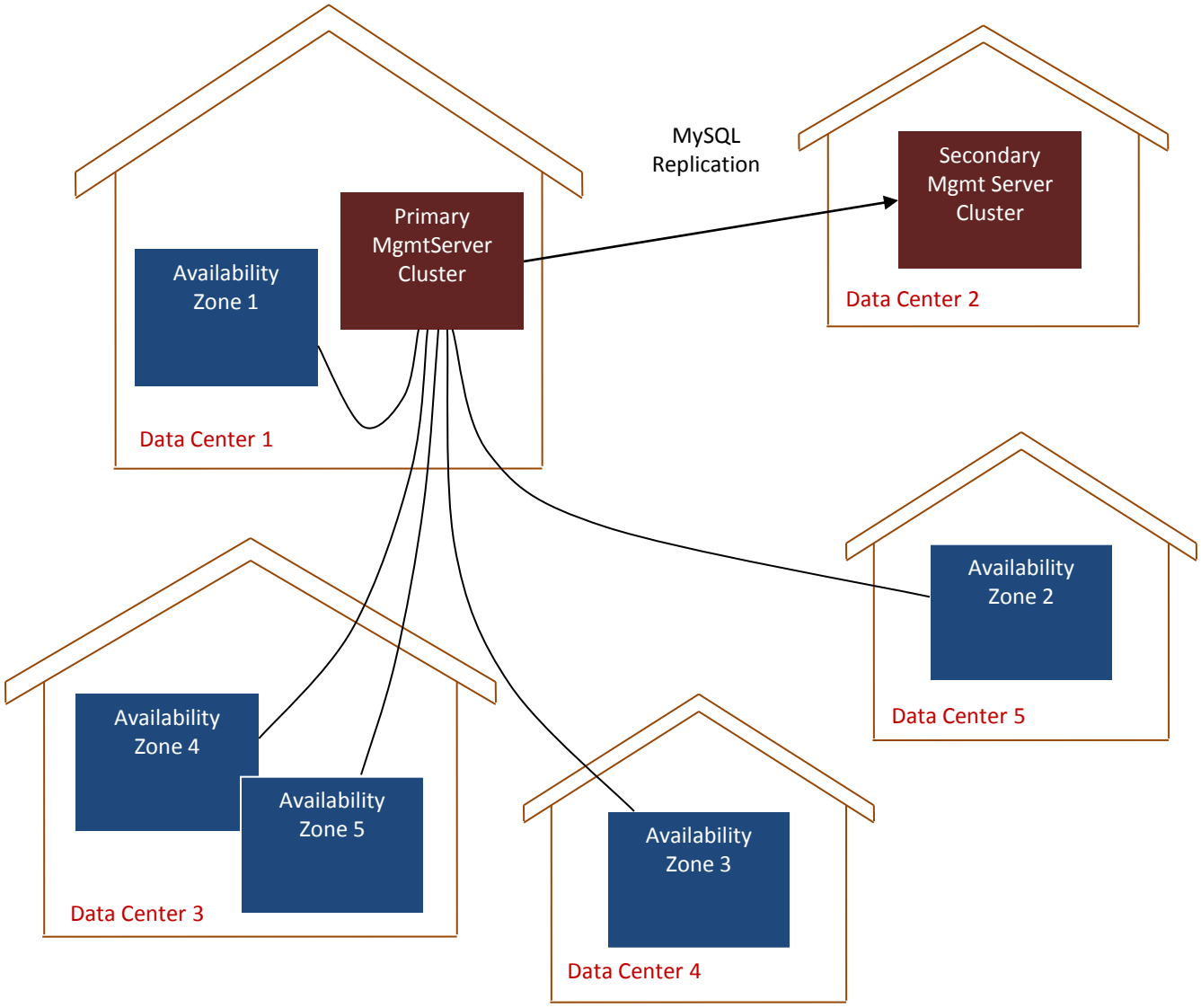
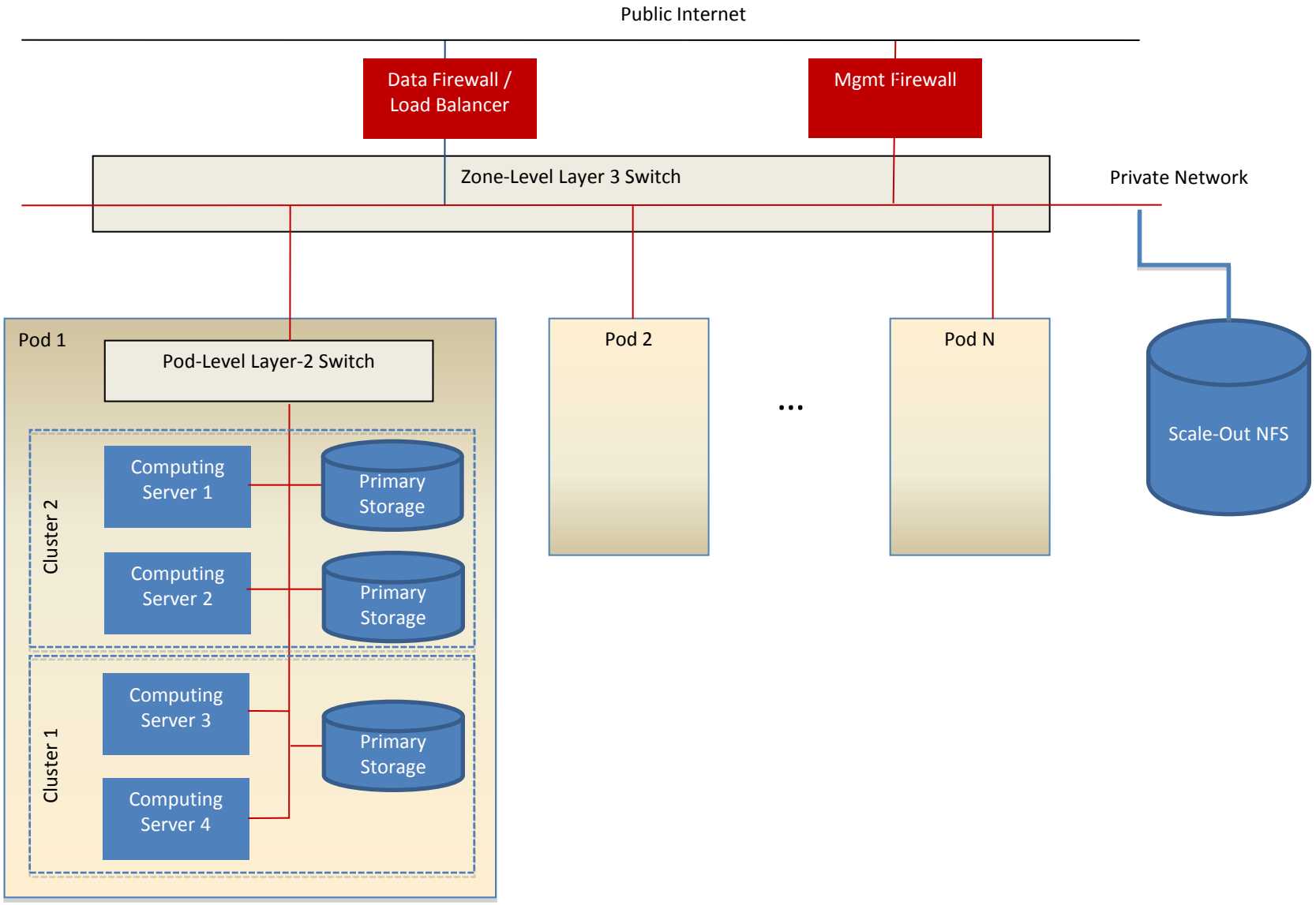
Software Defined Networks in CloudStack

The Vision

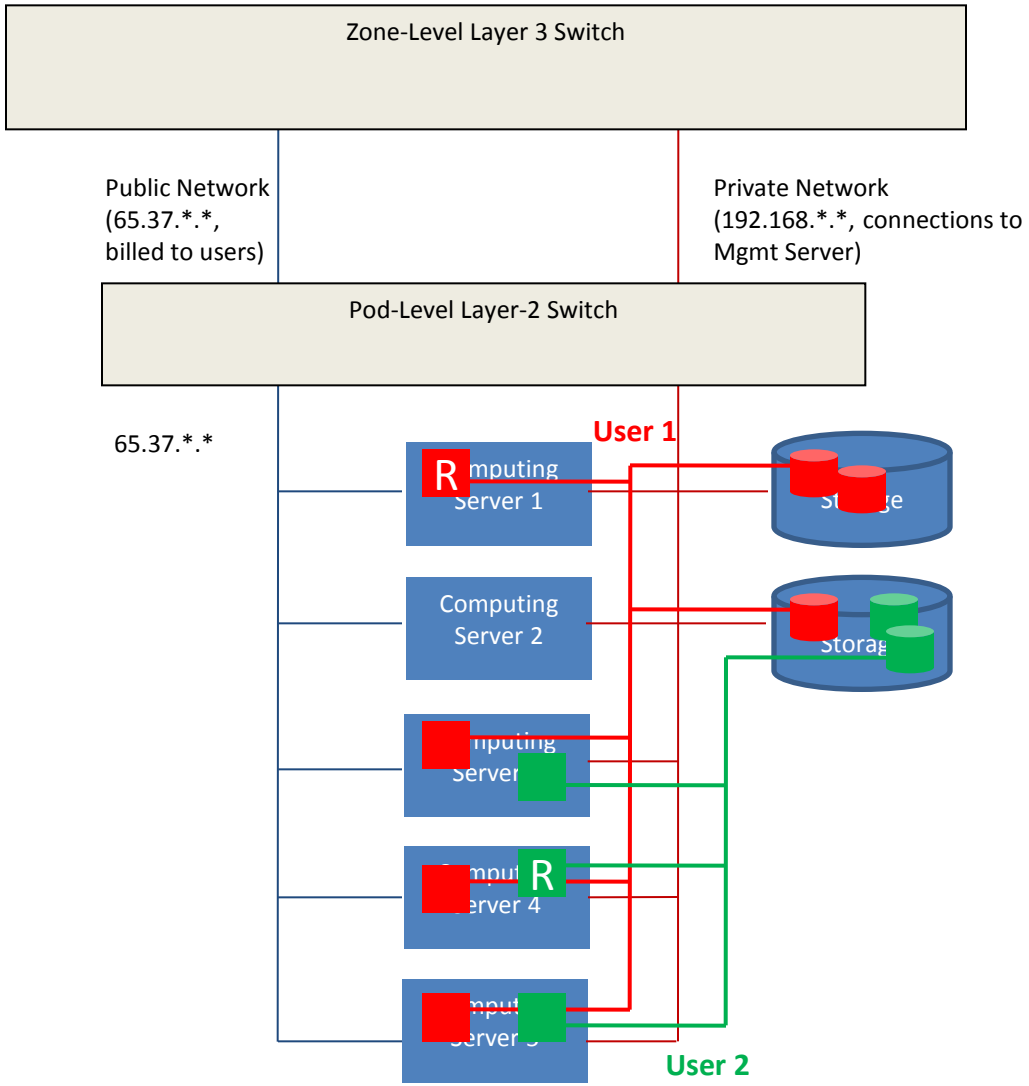
Multi-site Deployment Architecture



Physical Network within One Availability Zone



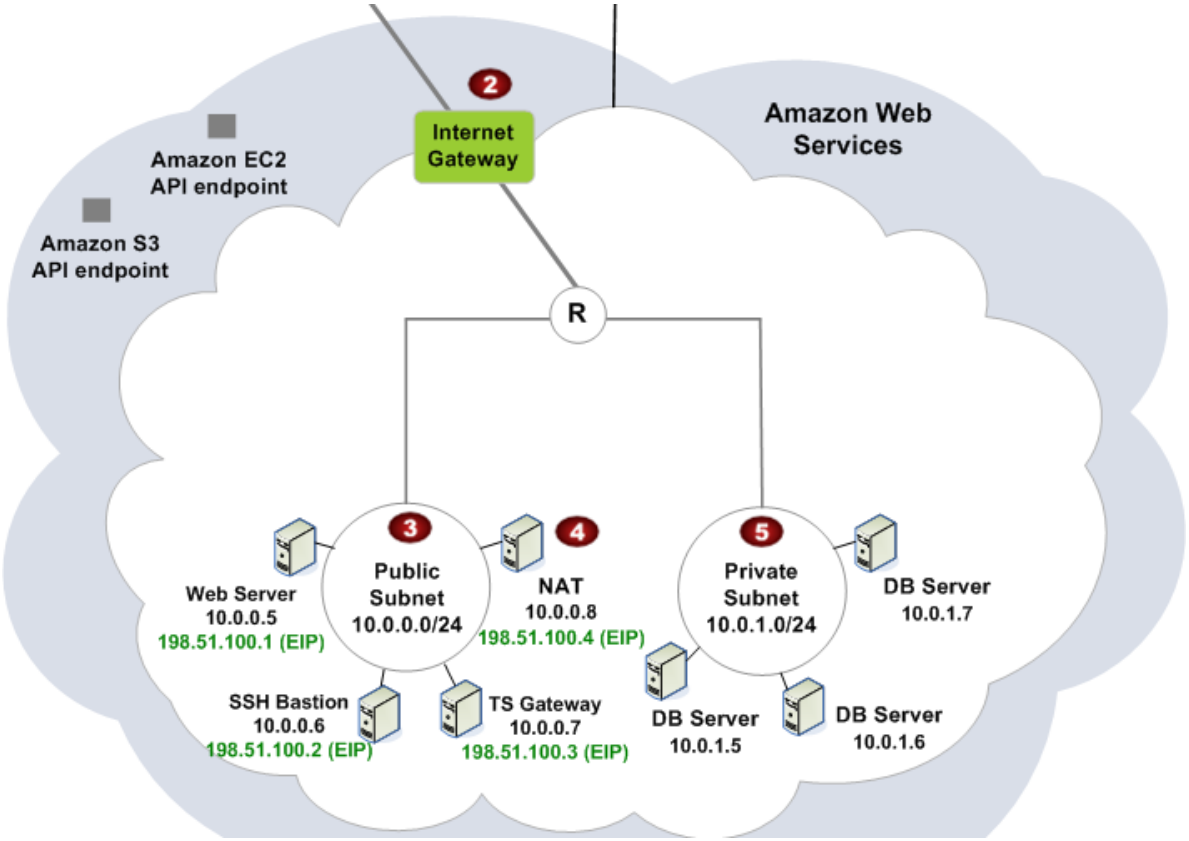
Virtual Network overlay



VLAN issues

- Virtual Network isolation (green for Tenant 1 and red for Tenant 2) realized using VLAN today
  - Tenant-specific VLAN can span pods
- Tenant can have multiple isolated virtual networks to realize multi-tier app
- VLAN = Big Problems
  - 4K VLANs = few hundreds of tenants
  - All switches have all 4K VLANs provisioned
    - See broadcast /multicast even if VLAN is not used.
  - Traffic Tromboning across DC
  - Cannot stretch multi-tier app across DC

AWS VPC



Large-scale production deployment of SDN

Open vSwitch (OVS)

- Multi-layer virtual switch supporting OpenFlow protocol
- High performance production quality replacement for Linux bridging code
- Default networking stack forXenServer 6.0 onward
- DVS and layer-2 cloud networking supported via GRE tunnels

CloudStack + SDN

- Phase 1 (Demo in ONS/Synergy)
  - CloudStack will orchestrate GRE tunnels to replace VLANs (achieve scale)
  - Based on XS 6.0
  - CloudStack contains embedded OpenFlow controller (not really, but something like it)
  - Live Migration, Virtual Router, multi-tier apps
- Phase 2:
  - KVM support
  - NS VPX for LB, NAT
  - Multi-hypervisor cloud
  - Support External Controllers (BigSwitch)
    - BigSwitch will write the integration code

Take this with a grain of salt. Just a vision statement

CloudStack + SDN

- Phase 3
  - VXLAN alternative to GRE
    - Perhaps NS will have it by then
  - NVGRE support
- Phase 4
  - AWS VPC semantics and API equivalence