

From Traditional Silos to Software-Defined Data Center

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The logo for ipSpace, featuring the text "ipSpace" in a white, cursive script font. The background consists of several overlapping, diagonal bands of color in shades of orange, yellow, and brown.

Who is Ivan Pepelnjak (@ioshints)

Past

- Kernel programmer, network OS and web developer
- Sysadmin, database admin, network engineer, CCIE
- Trainer, course developer, curriculum architect
- Team lead, CTO, business owner



Present

- Network architect, consultant, blogger, webinar and book author
- Teaching the art of Scalable Web Application Design

Focus

- Large-scale data centers, clouds and network virtualization
- Scalable application design
- Core IP routing/MPLS, IPv6, VPN



The Challenges

- Increase flexibility while reducing costs
- Faster application deployments
- Compete with public cloud offerings

Application Centric Infrastructure



Software-Defined Data Centers



Application
Centric
Infrastructure



OPEN
MOLIGHT

ONS

Defined
Centers

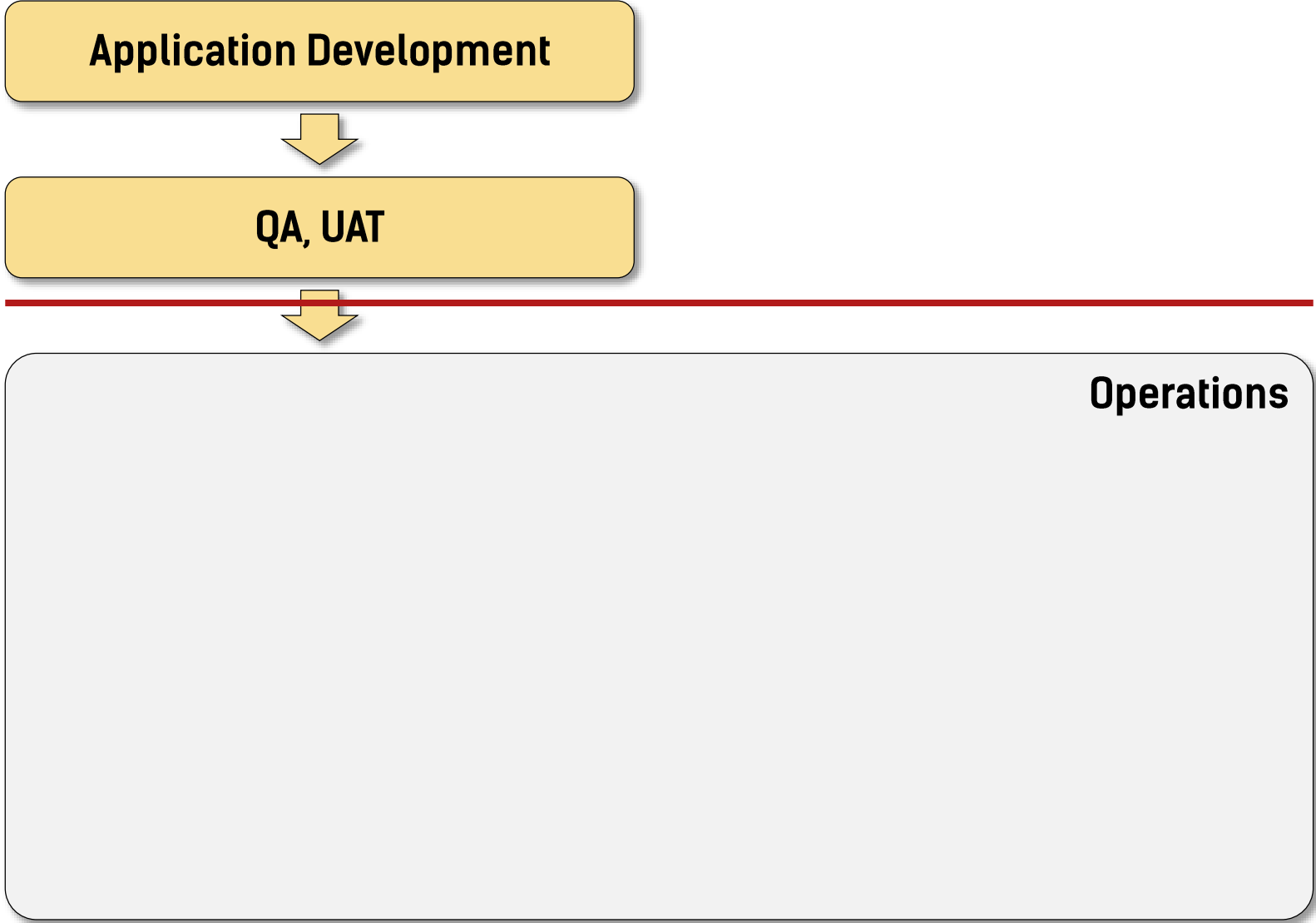
There is no
silver bullet

SD-WAN
& NFV
SOFTWARE DEFINED NETWORKING
& VIRTUALISATION

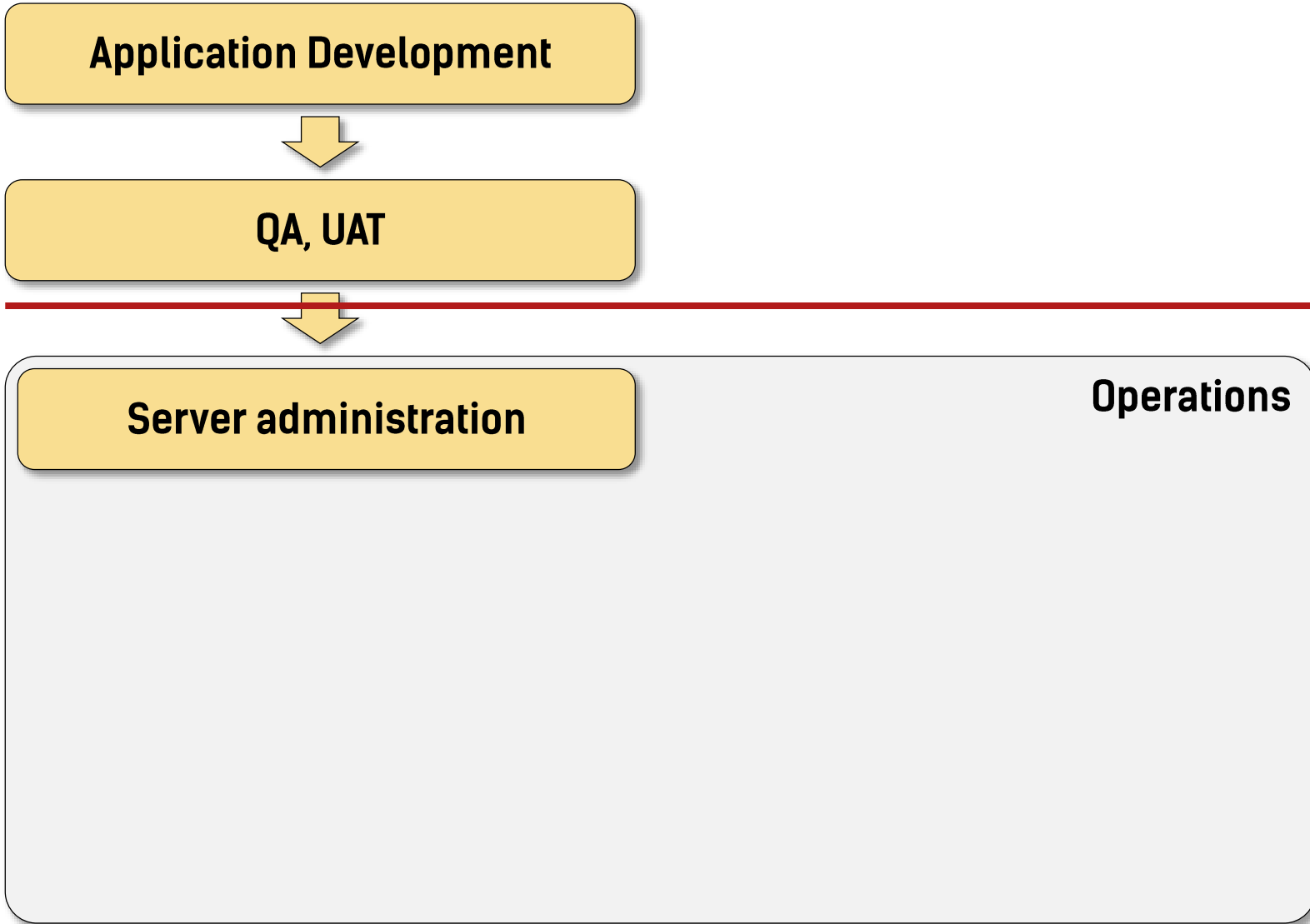


ipSpace

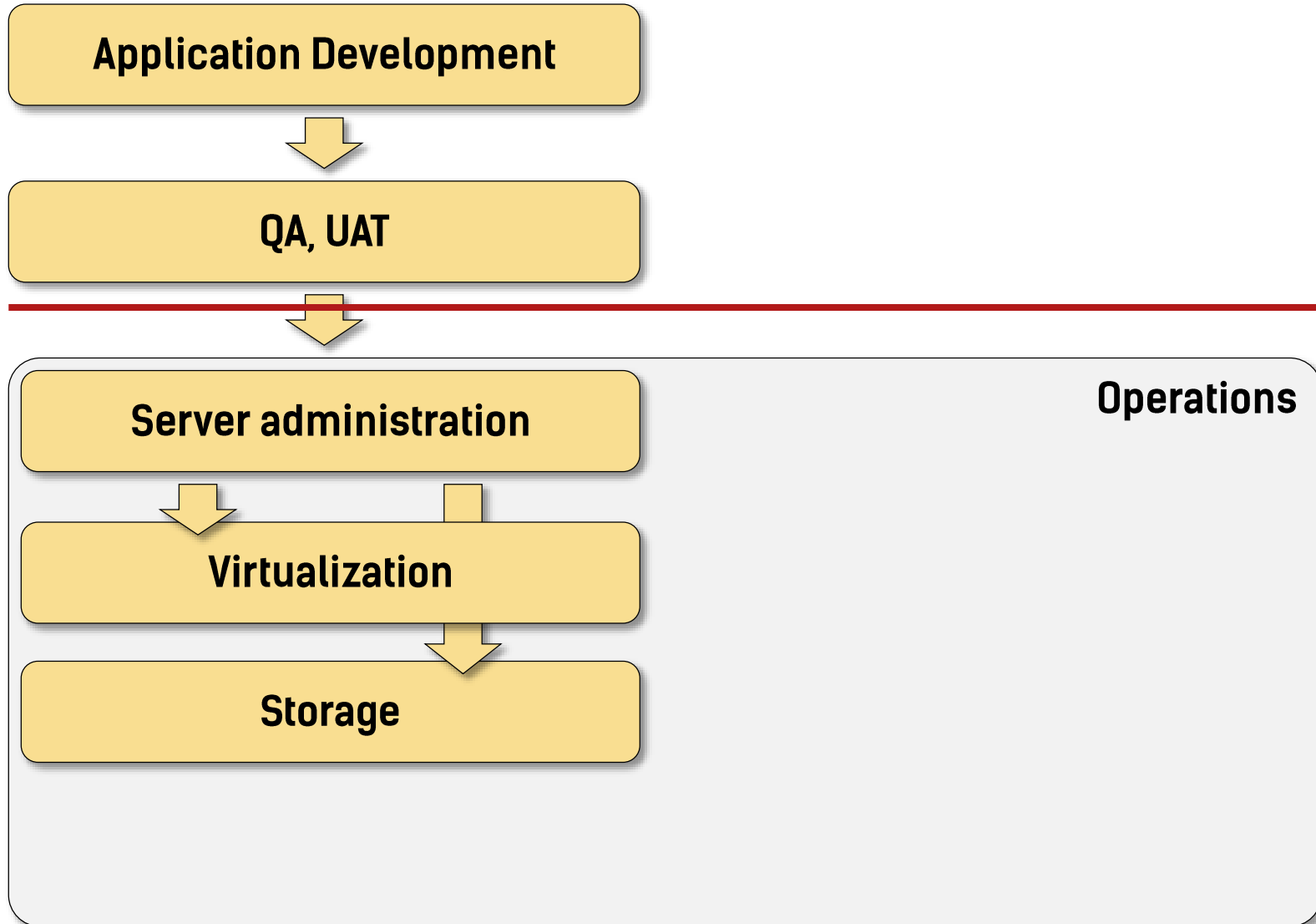
The Real Culprit



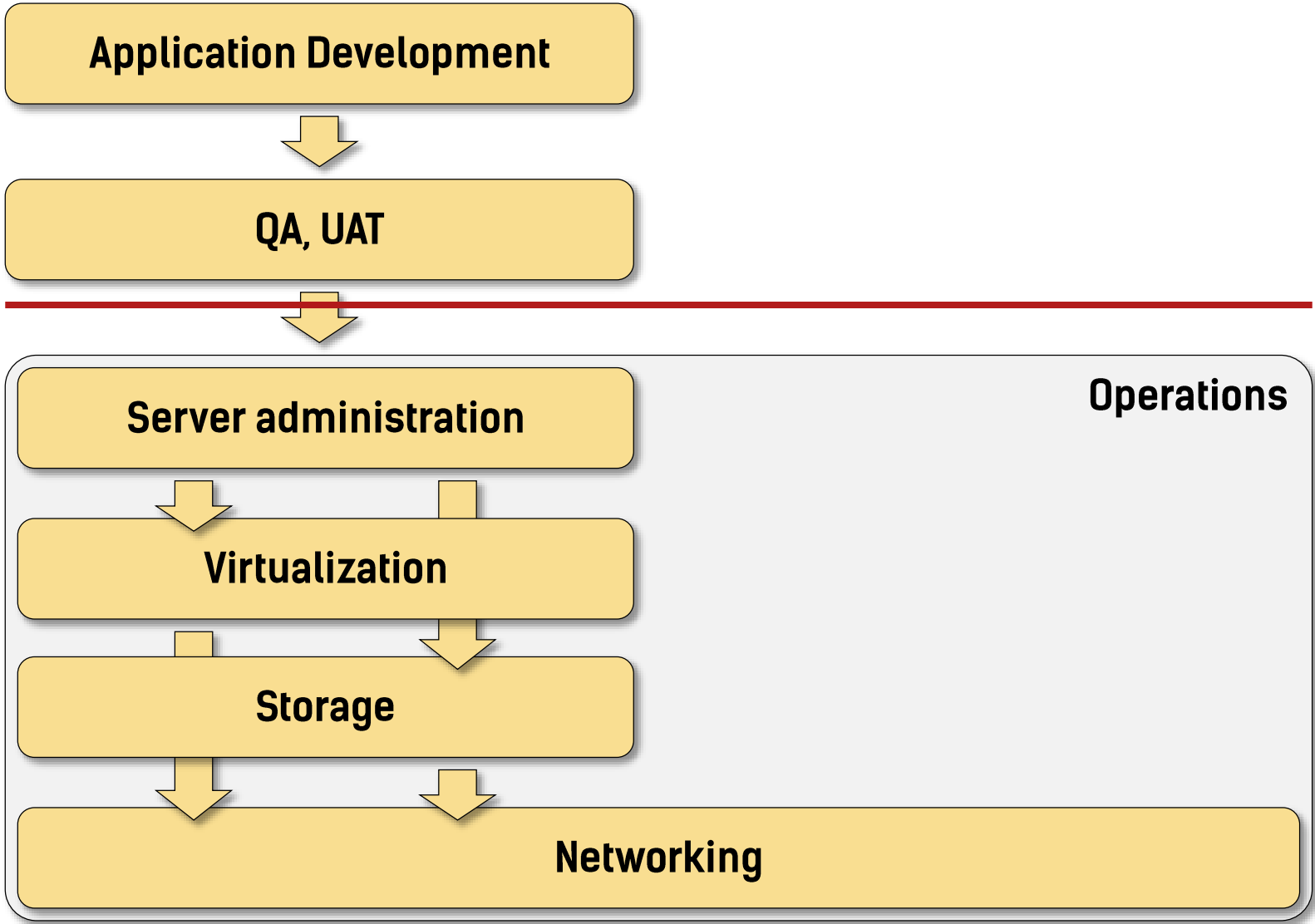
The Real Culprit



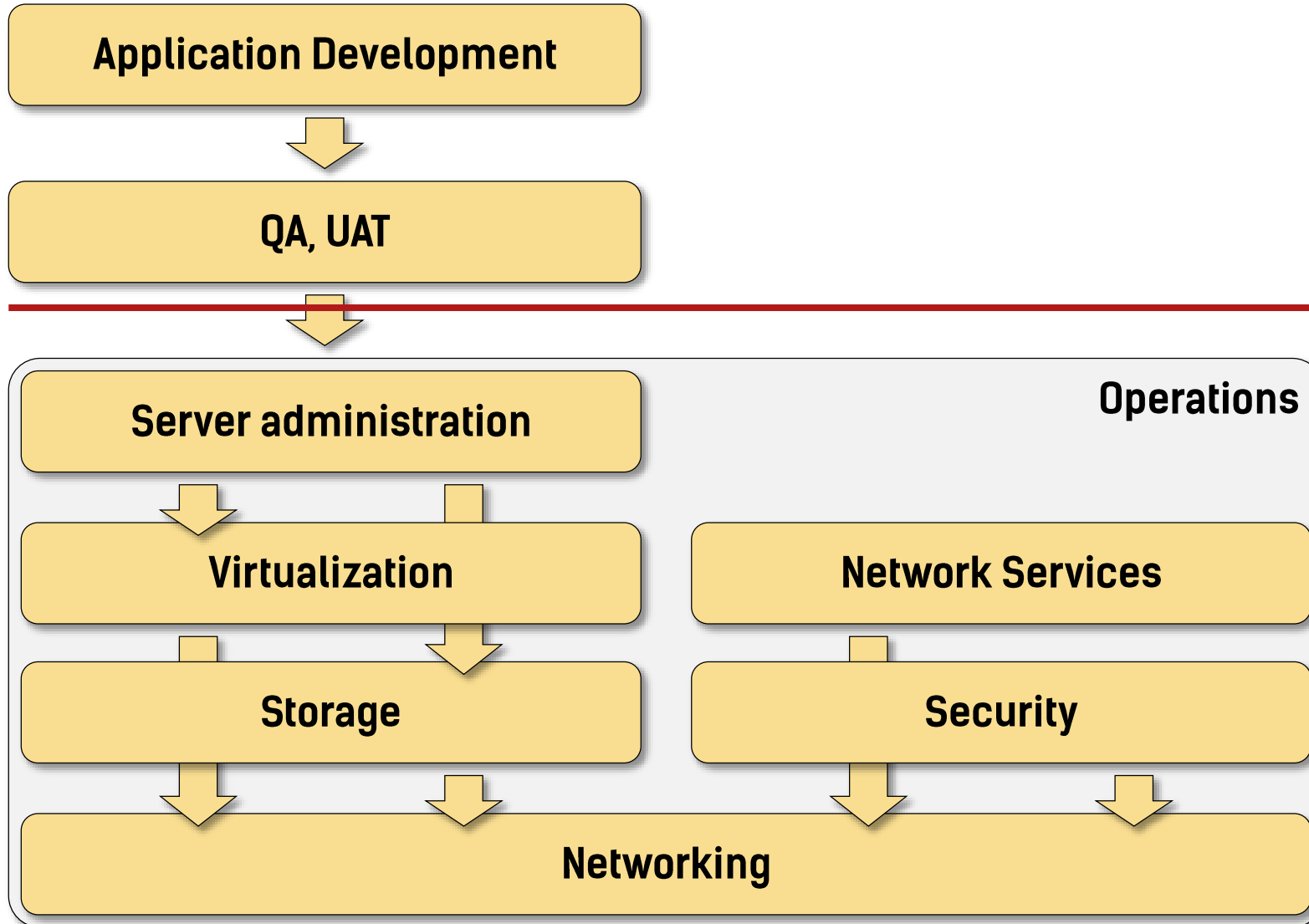
The Real Culprit



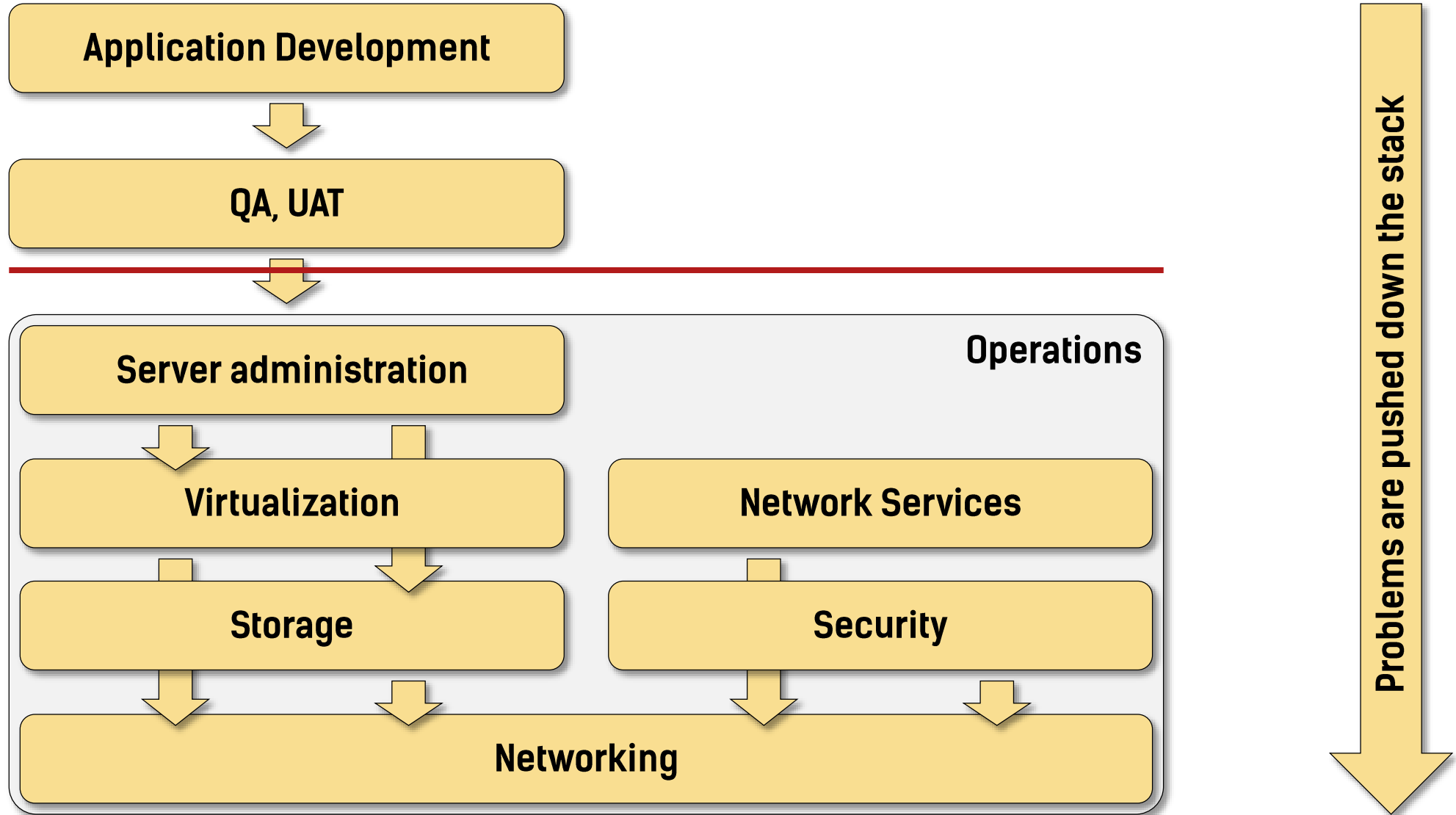
The Real Culprit



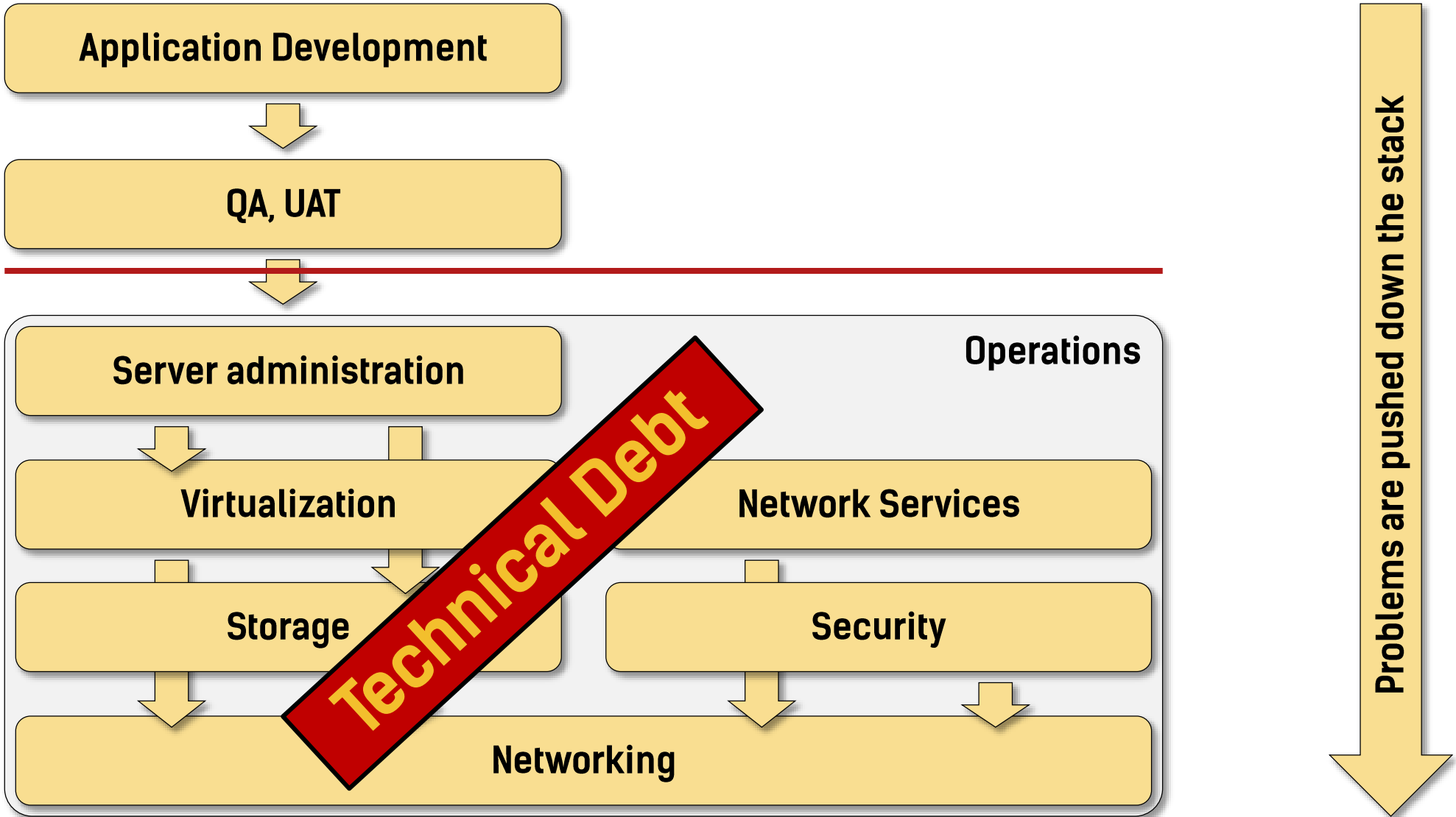
The Real Culprit



The Real Culprit



The Real Culprit



We Need to Re-Architect Application Development

Start Small

Virtualize Everything

Virtualize Everything

- Bare-metal servers
- Network services appliances (firewalls, load balancers)
- Slowly remove the legacy non-x86 servers

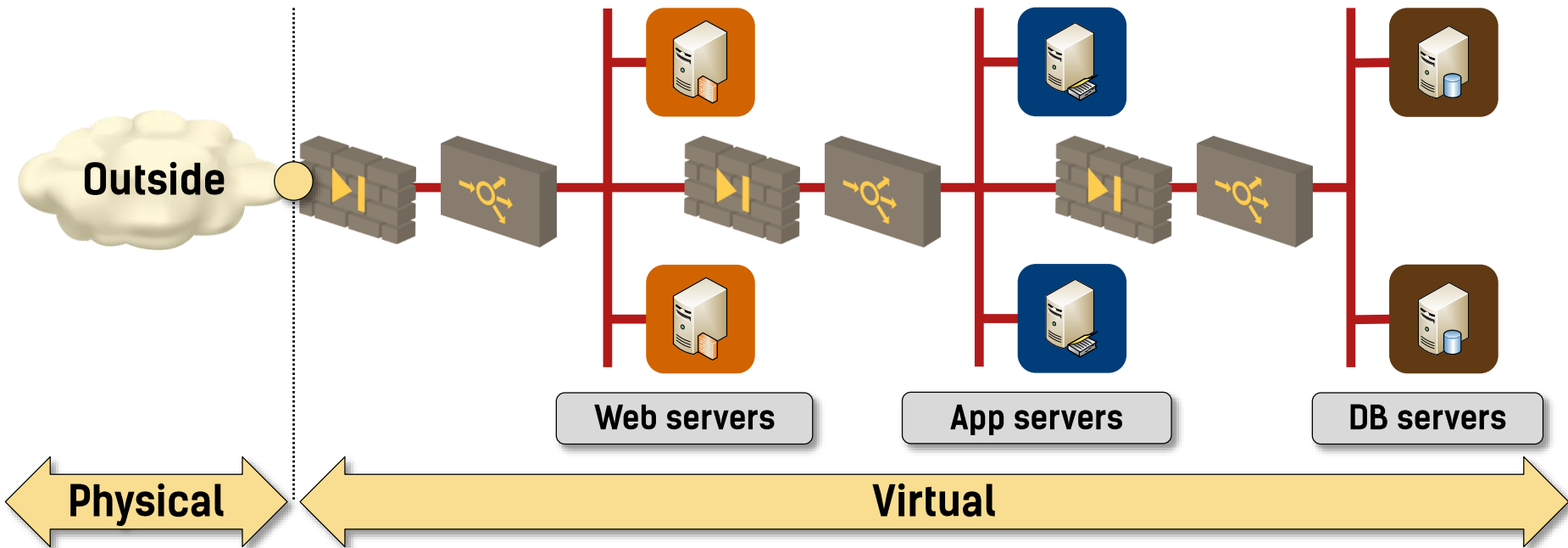
Minimize Complexity & Standardize

Minimize Complexity & Standardize

- Standard building blocks (1-2 rack pods)
- Optimized for maximum performance
- Modern servers with plenty of RAM and CPU cores
→ high virtualization ratio
- 10GE connectivity with FCoE or iSCSI/NFS
- Equidistant network fabric (most cases: 2 x 10GE ToR switch)
- One pod → one failure domain → one private cloud
- Treat multiple pods as multiple data centers

Decouple Virtual and Physical Worlds

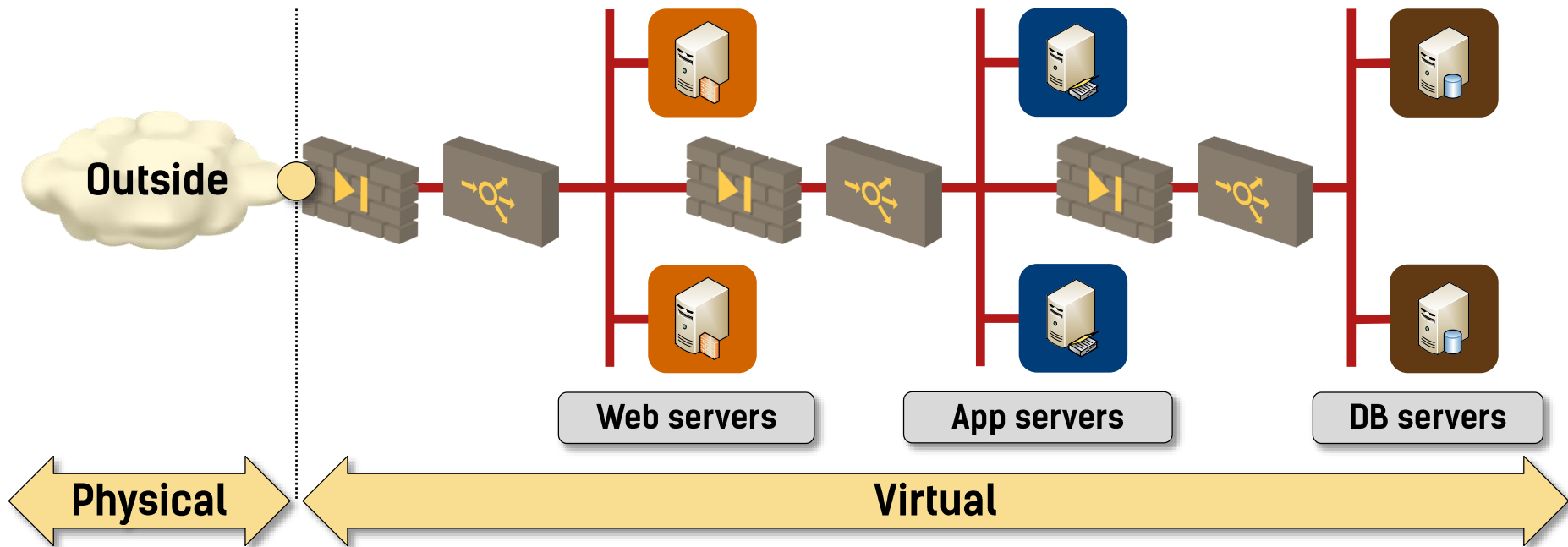
Decouple Virtual and Physical Worlds



- Simplified workload migration
- Automated deployment
- No interaction with the physical gear → no maintenance windows

Automate Everything

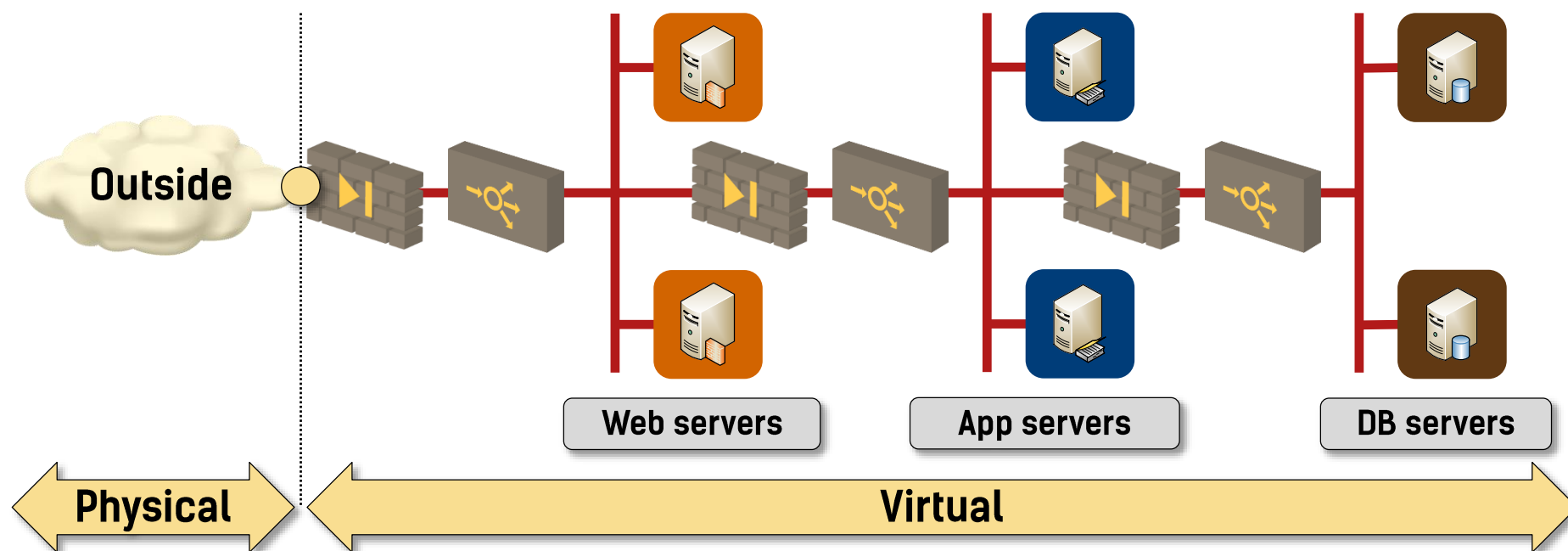
Automate Everything



- Application testing and deployment
- Creation of application stacks and network services
- Workload migration and disaster recovery

Start with the Application Development

Start with the Application Development



- Create realistic application development environment
- Include network services and security in development process
- Insert realistic latency and bandwidth constraints in QA & UAT
- Automatic migration Dev → QA → UAT → Prod

**Don't Forget:
Business First**

Focus on the True Business Needs

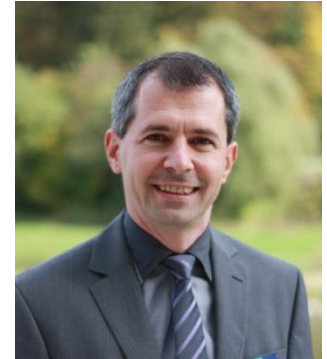
**Good Enough Is
Usually Good Enough**

Charge for the Services

**Reassign
Responsibilities →
Become a Utility
(Service Provider)**

Stay in Touch

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