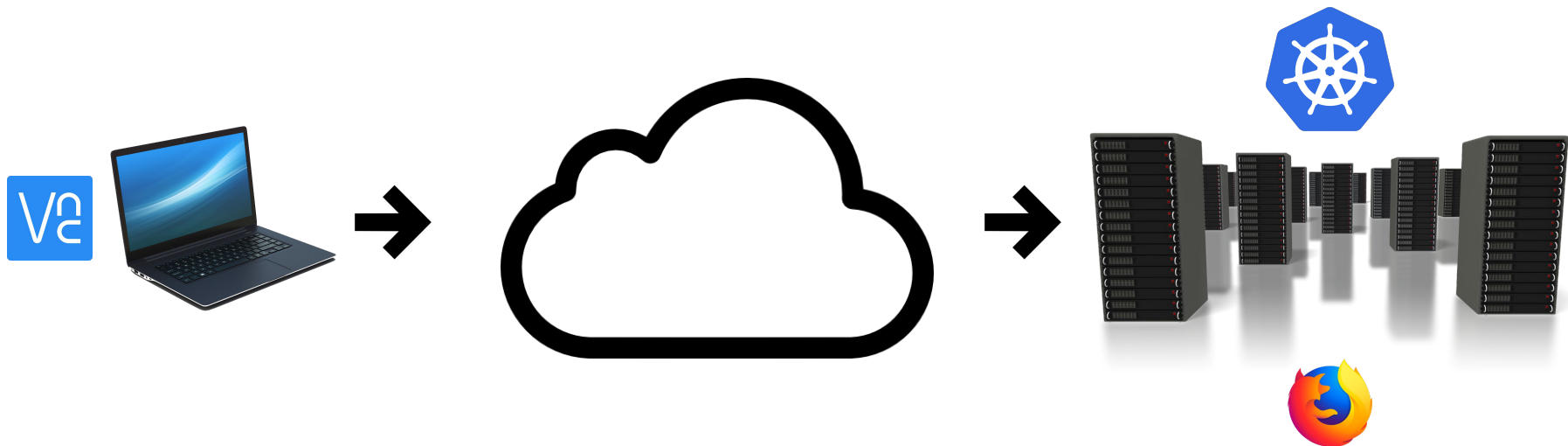# Kubernetes On Desktop

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The main idea

Workload offloading to the nearest (kubernetes) node via service remotization

Challenges

- Connection quality (bandwidth, ...)
- Security (authN, encryption)
- Resource availability
- Real-time connection
  - audio/video synchronization
  - responsiveness

Pros and Cons

- Less HW resource for users
  - Battery health
  - Support for old HW
- Controlled execution
- Distributed OS

- Bandwidth consumption and latency
- Network dependence
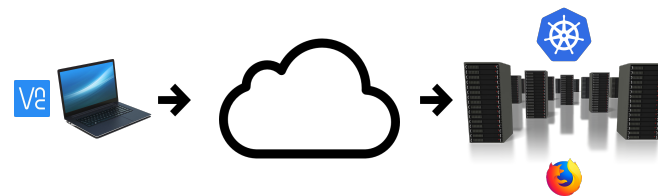 - What about L3 mobility?

Datacenter-side Technologies

Ad-hoc Docker with VNC and SSH server plus the desired application
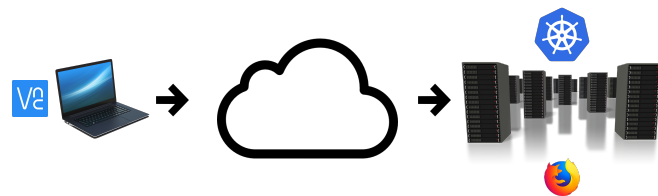
Kubernetes

Client-side Technologies

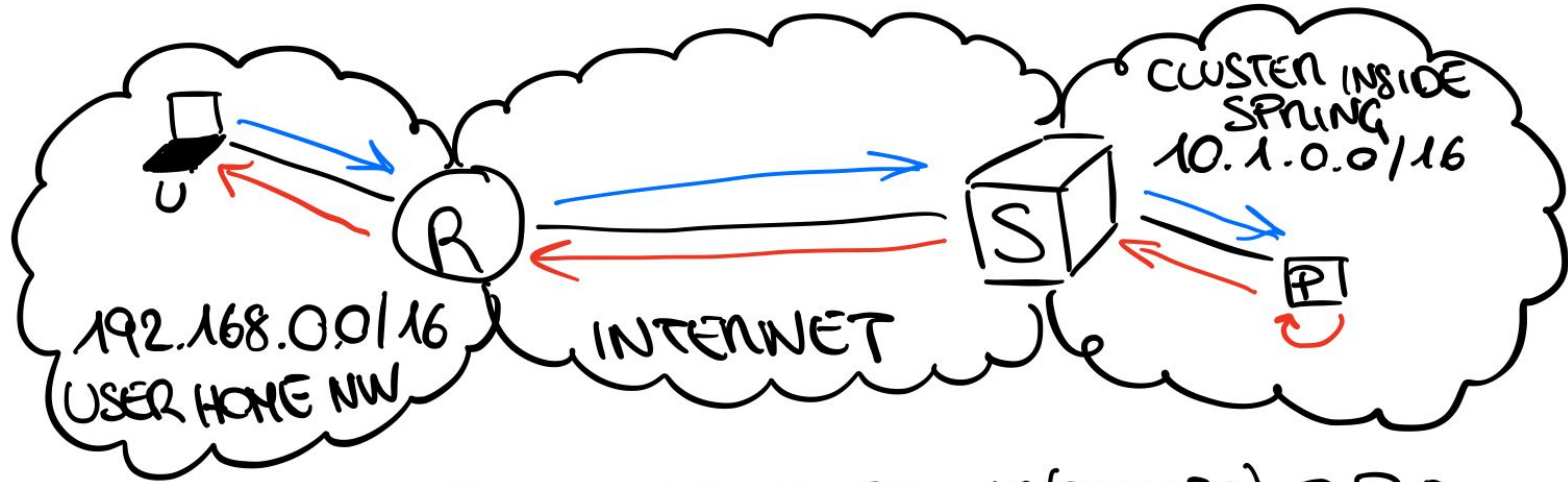

VNC client

SSH client

PulseAudio server

General Scenario

CLUSTER INSIDE SPRING
10.1.0.0/16

192.168.0.0/16
USER HOME NW

INTERNET

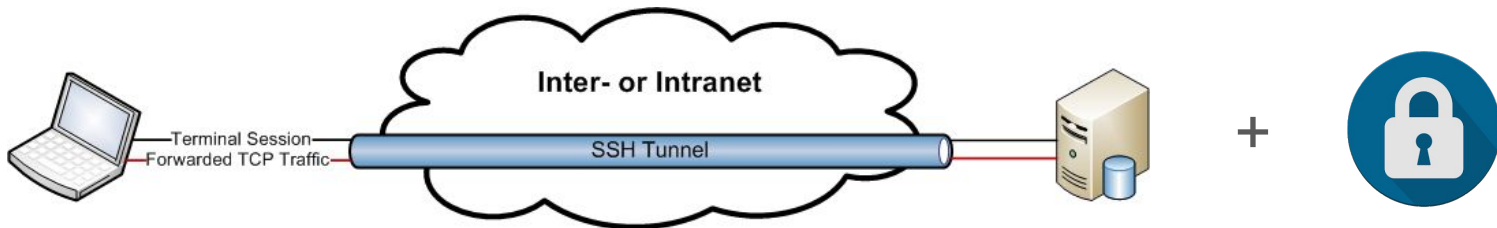U = USER , R = ROUTER, S = SPRING (SERVER), P = POD

→ = VNC FLOW
← = PULSE AUDIO OVER SSH TUNNEL FLOW

Security

Secure authN based on:

- SSH tunnels via one-time certificate directly copied into the pod using trusted kubernetes authN
  - Audio always encrypted
  - VNC can be encrypted or clear
- One-time password authN for VNC access

Persistency

User's preferences and home directory folders are treated as kubernetes mountable volume in the generated container.

- Volumes refer to user specific namespace and privileges
- Only needed volumes are mounted
- User will retrieve all his file among different application executions

Firefox preferences folder

User Documents folder

User Download folder

…
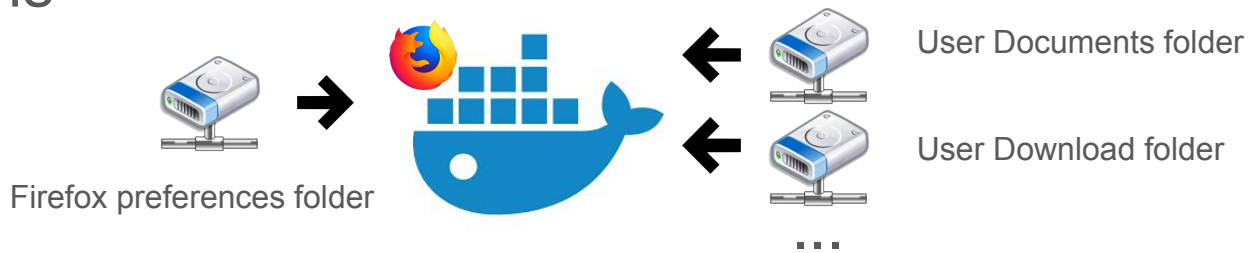
Application analysis - Firefox

Firefox container specifications

Docker compressed size	218 MB
Docker installed size	580 MB

Connection parameters

Compression (0-6)	3
Quality (0-9)	4
Encoding	Tight (default in VNC)
Encryption	Only audio
Home network	20Mbit

Incoming:

Curr: 11.62 MBit/s
Avg: 8.81 MBit/s
Min: 0.00 Bit/s
Max: 20.79 MBit/s
Ttl: 418.07 MByte

Outgoing:

Curr: 412.96 kBit/s
Avg: 332.77 kBit/s
Min: 0.00 Bit/s
Max: 677.32 kBit/s
Ttl: 21.55 MByte

Application analysis - Firefox

Libreoffice (complete suite) container specifications

Docker compressed size	425 MB
Docker installed size	1,2 GB

Connection parameters

Compression (0-6)	3
Quality (0-9)	4
Encoding	Tight (default in VNC)
Encryption	Only audio
Home network	20Mbit

Incoming:

```
..      #|          #
##   ||##        ###..
```

Curr: 4.04 kBit/s
Avg: 120.30 kBit/s
Min: 0.00 Bit/s
Max: 3.41 MBit/s
Ttl: 443.72 MByte

Outgoing:

Curr: 2.83 kBit/s
Avg: 27.27 kBit/s
Min: 0.00 Bit/s
Max: 138.34 kBit/s
Ttl: 22.71 MByte

Conclusions

- Bandwidth strictly related to specific application
- Bandwidth consume can be limited
  - Compression, Quality & encoding
- Good performance with respect to 20Mbit Network
- Opened to improvements
- Innovation
- User cloud environment (Home, ...)

Thanks for your attention

netgroup-polito/KubernetesOnDesktop