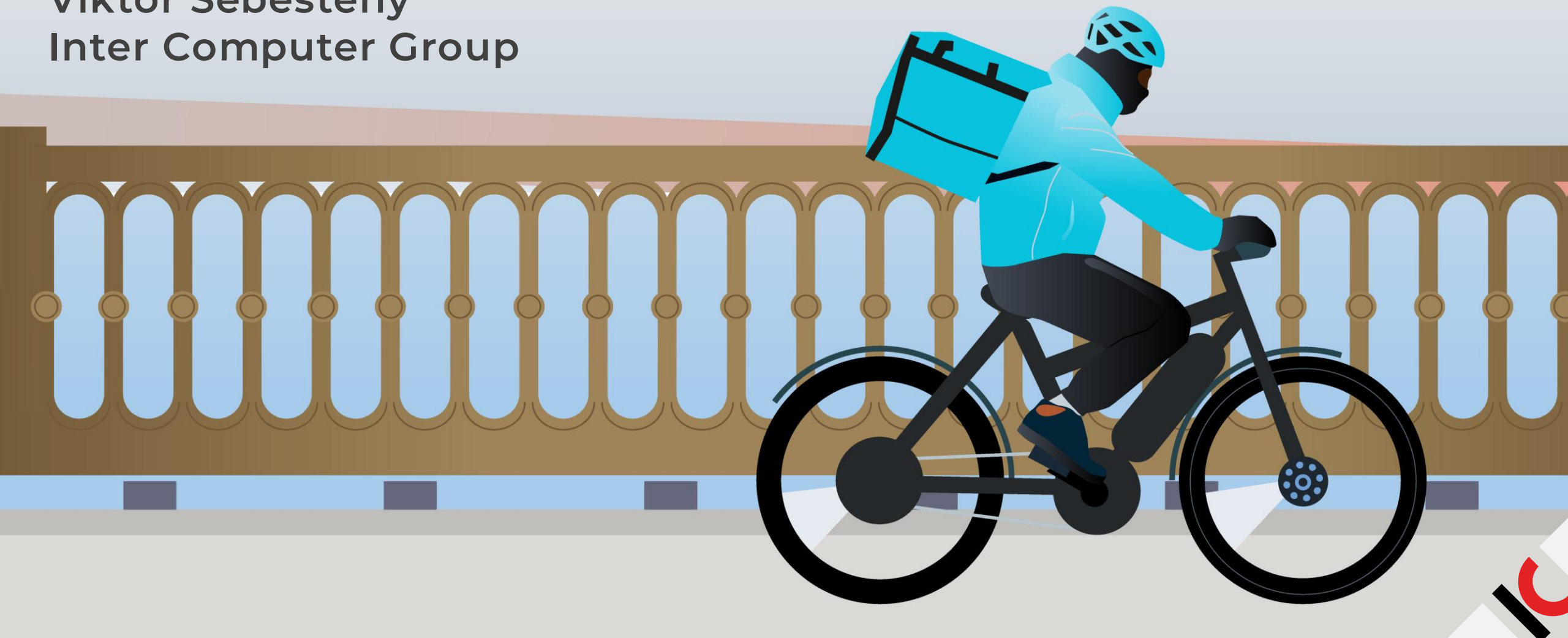
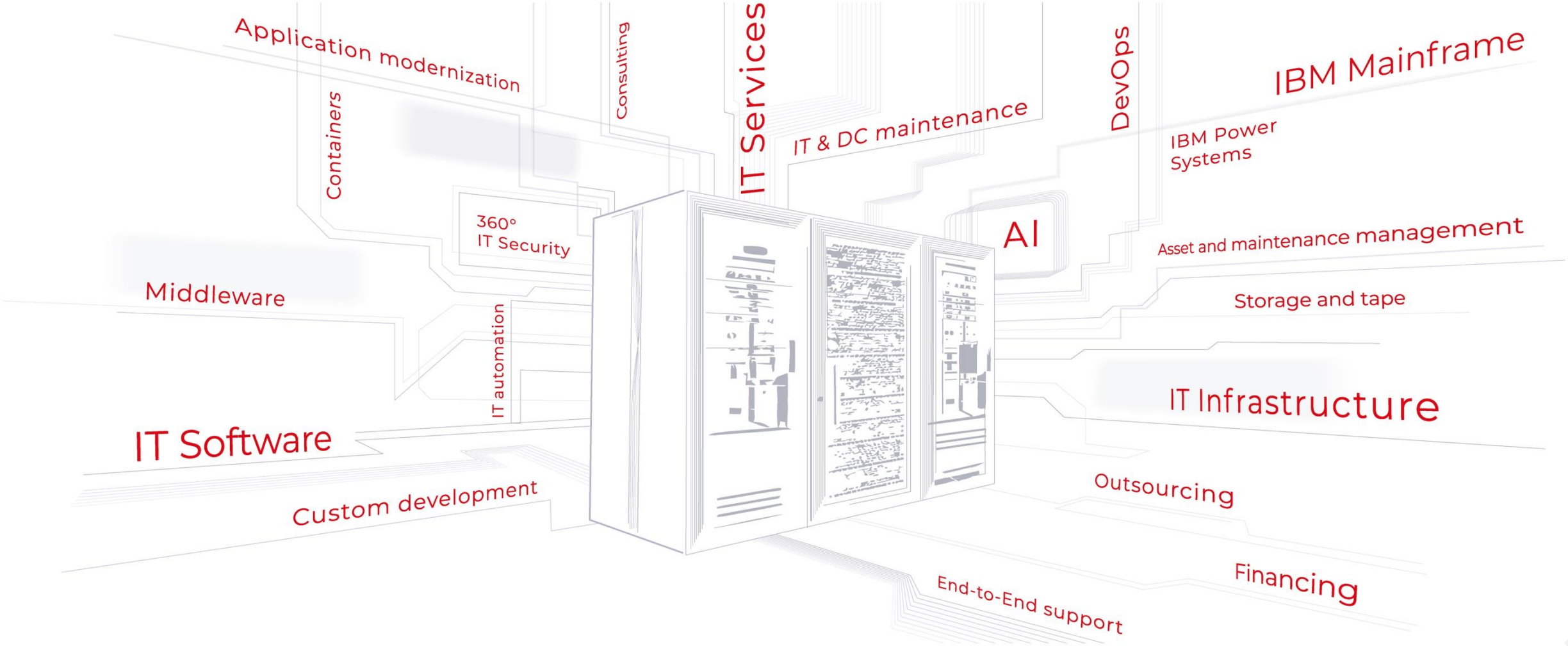
TERRAFORM, ANSIBLE, RHEL IMAGE MODE AND A FOOD DELIVERY GUY

Viktor Sebestény
Inter Computer Group



INTER COMPUTER GROUP

INTER COMPUTER GROUP COMPETENCIES



IBM · Hewlett Packard Enterprise · Lenovo · vmware · Red Hat · Microsoft Hyper-V

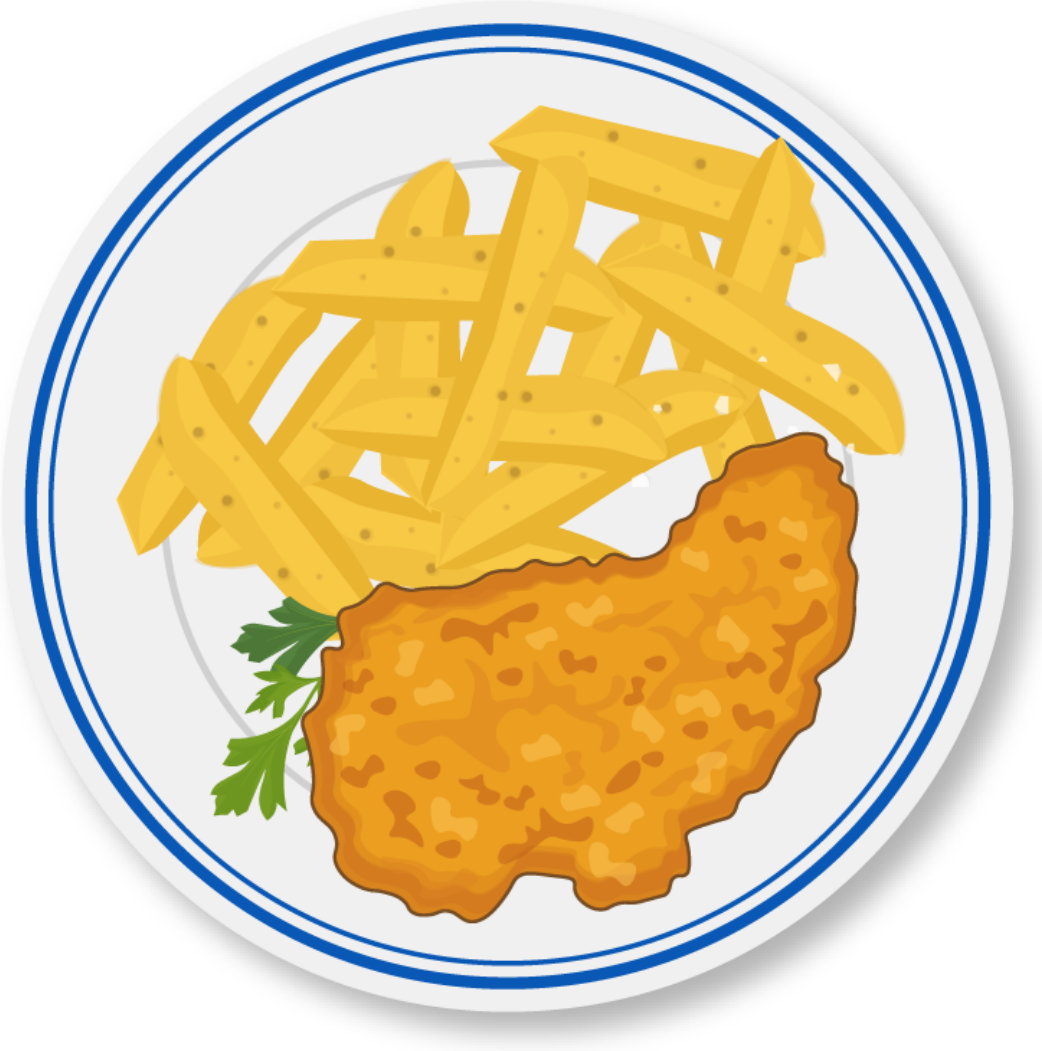
WHAT IS THE MOST POPULAR HUNGARIAN FOOD?

Stew - pörkölt?

Goulash soup – gulyás leves?

Wiener schnitzel

- Bečki odrezak
- Dunajski zrezek
- Бечка шницла
- Șnițel vienez
- Vídeňský řízek
- Viedenský rezeň
- Виенски шницел
- Bécsi szelet



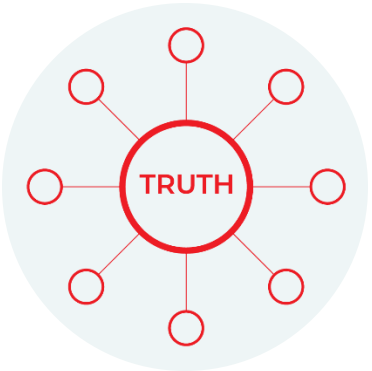
WHAT IS INFRASTRUCTURE AS A CODE?

```
01 # Infrastructure as Code is a process of managing and provisioning computer
02 # infrastructures and application through machine-readable definition fi
03 # instead of using interactive configuration tools or other manual
04
05 resource "IaaC" {
06   attribute1 = "Store infrastructure configuration is script f
07   attribute2 = "Easy to edit and distribute"
08   attribute3 = "Automatically provision and create new reso
09 }
10 resource "Configuration" {
11   attribute1 = "Single source of truth"
12 }
13 resource "Cost" {
14   attribute1 = "Saves times and resources"
15   attribute2 = "Fewer configuration mistakes, improving
16   attribute2 = "Provision the same environment every tim
17 }
18 resource "Git/CVS" {
19   attribute1 = "Use CVS to manage and keep track of in  as
20   attribute2 = "Include IaaC in  CI/CD pipeline"
21 }
```

WHY USE IAAC?

Store configuration
in script files

Easy to edit and
distribute



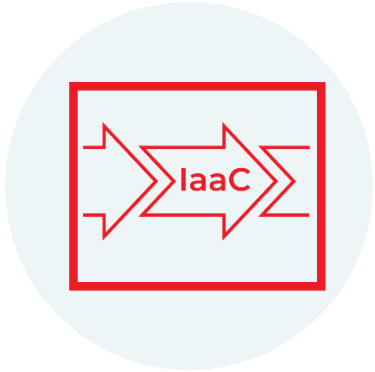
Single source of
truth

Automatically provision
and create new resources

Repeatable

WHY USE IAAC?

Use Git/CVS to keep track of the infrastructure changes



Include IaaC in the CI/CD pipeline

Fewer configuration mistakes

Saves times and resource

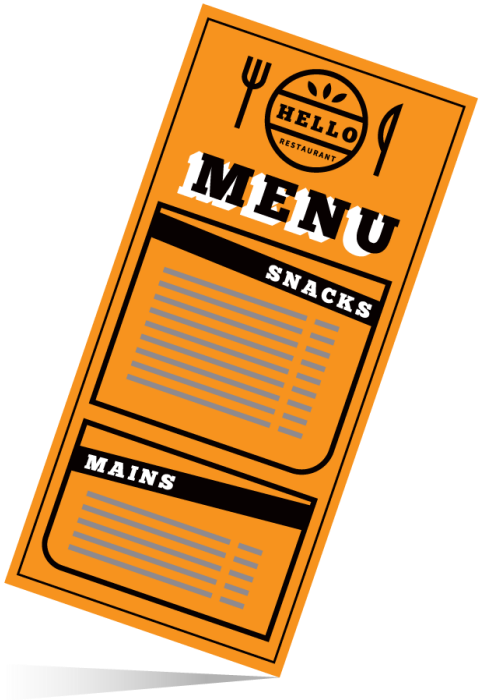
WHO SHOULD NOT USE IAAC?

IT organization with a
very static infrastructure

If you have only one server

WHO SHOULD USE IAAC?

Serious cloud and kubernetes users



Self service / Dynamic infrastructure

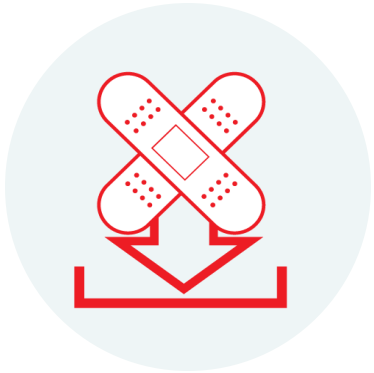
Works best with immutable infrastructure

WHAT IS IMMUTABLE INFRASTRUCTURE?

Components are replaced rather than modified

Requires stateless application

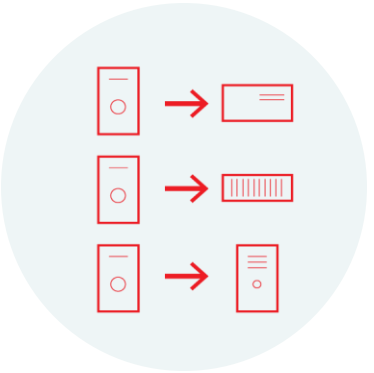
WHAT IS IMMUTABLE INFRASTRUCTURE?



No patching or in place upgrade

In case of unexpected events, components are redeployed

Lower complexity, easier troubleshooting



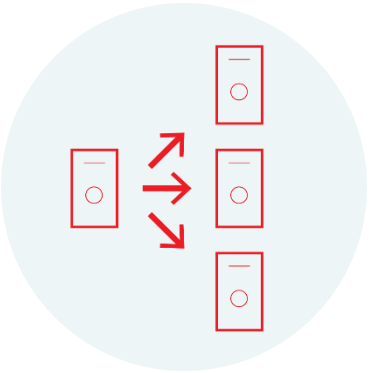
No configuration drifts, consistency

BENEFITS OF IMMUTABLE INFRASTRUCTURE

Less application downtime

Increased security, reduced attack surface

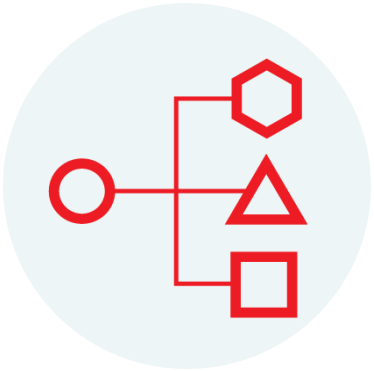
Policy enforcement



Seamless scaling

WHAT IS TERRAFORM?

IBM IaaC solution developed by Hashicorp



3000+ integrations

Statefile to keep track of the configuration

Dependency mapping

Only creates what is new or changed

HOW DOES IT WORK?

CODE

Plan

Apply

Our needs

HOW DOES IT WORK?

K8S
VM RHEL 9.1

CODE

Plan

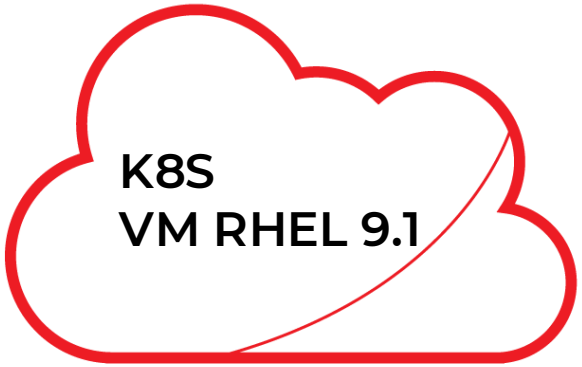
Apply

Our needs

HOW DOES IT WORK?

Terraform file

- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - RHEL 9.1



CODE → Plan → Apply → Our needs

HOW DOES IT WORK?

Terraform file

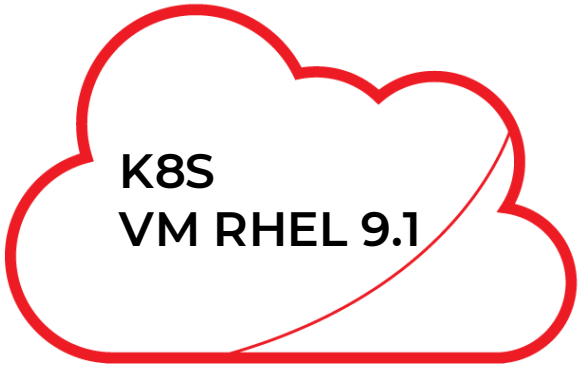
- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - RHEL 9.1

Terraform plan

Day 0:

Create all of them:

+ K8S
+ VM
+ VPC



CODE → Plan → Apply → Our needs

HOW DOES IT WORK?

Integration plugin

Terraform file

- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - RHEL 9.1

Terraform plan

Day 0:

Create all of them:

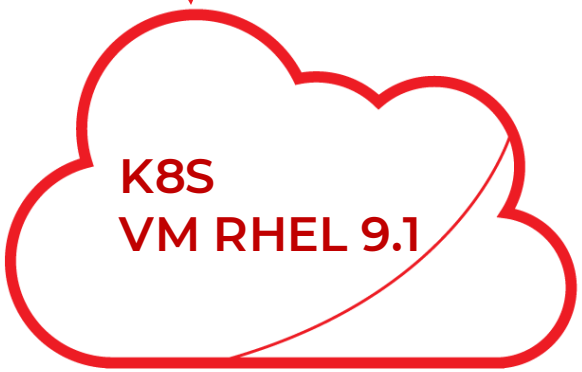
+ K8S
+ VM
+ VPC

Terraform apply

Creates and starts up the resources

Output:

- Logs
- URLs
- Dashboards urls

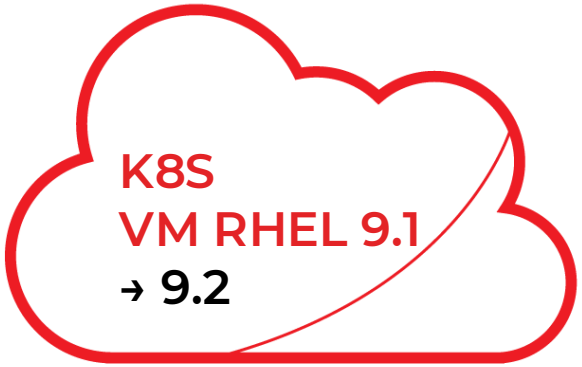


CODE → Plan → Apply → Our needs

HOW DOES AN UPGRADE WORK?

Terraform file

- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - **RHEL 9.2**



CODE | Plan | Apply | Our needs

HOW DOES AN UPGRADE WORK?

State file

Terraform file

- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - **RHEL 9.2**

Terraform plan

Day 2:
Check and create all of them:
+ K8S ✓
+ VM ✓
+ RHEL 9.2

K8S
VM RHEL 9.1
→ 9.2

CODE | Plan | Apply | Our needs

HOW DOES AN UPGRADE WORK?

Integration plugin

Terraform file

- K8S resource
  - Host:
  - Domain:
- VM resource
  - CPU: X
  - Mem: y
  - **RHEL 9.2**

Terraform plan

Day 2:
Check and create all of them:
+ K8S ✓
+ VM ✓
+ RHEL 9.2

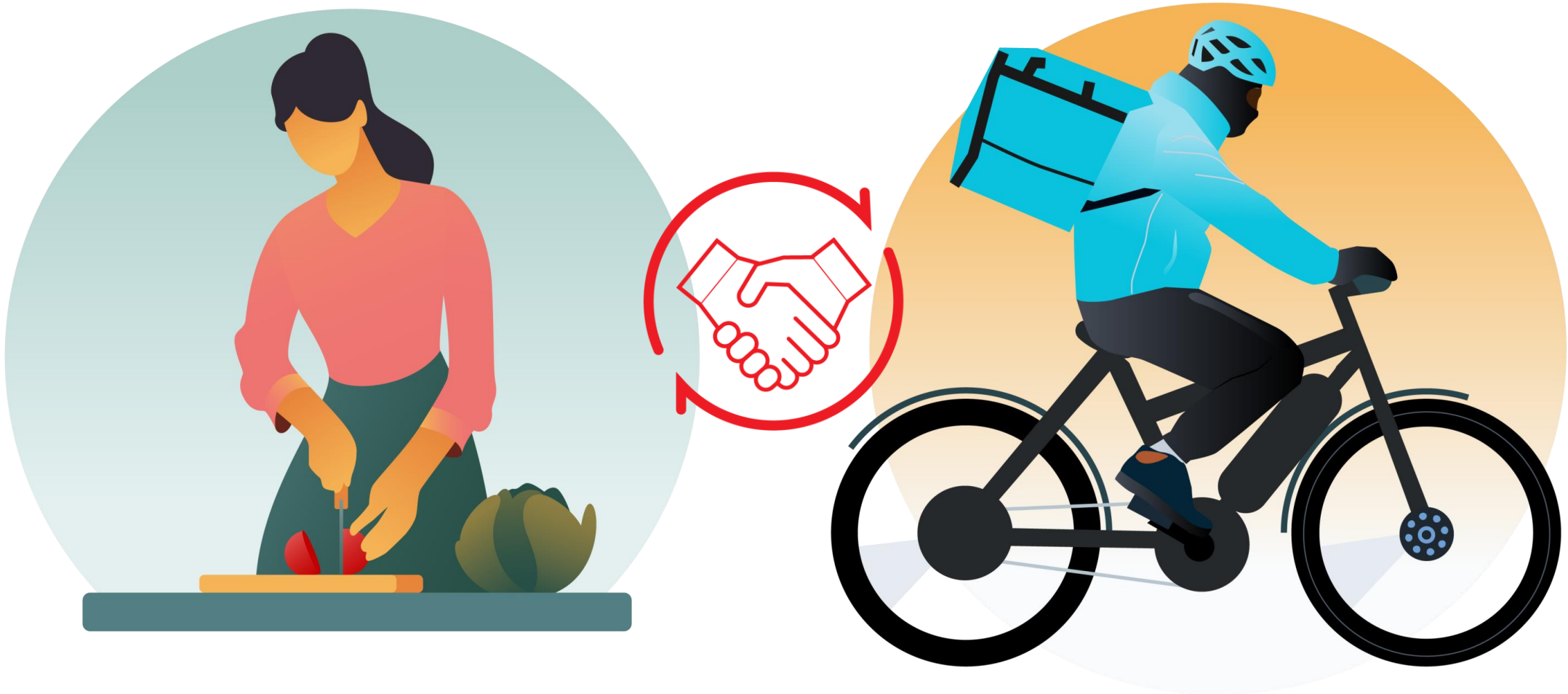
Terraform apply

- Creates and starts a new VM with **RHEL 9.2**
- Removes old RHEL 9.1 VM.

K8S
~~**VM RHEL 9.1**~~
→ 9.2

CODE | Plan | Apply | Our needs

ANSIBLE AND TERRAFORM



ANSIBLE AND TERRAFORM

- Deploy infrastructure with Terraform
- Apply settings and fine tunning with Ansible
- Install software and application with Ansible

- Deploy infrastructure upgrades with Terraform
- Manage everything else with Ansible

WHAT IS IMMUTABLE RHEL?

First step to modernize your IT

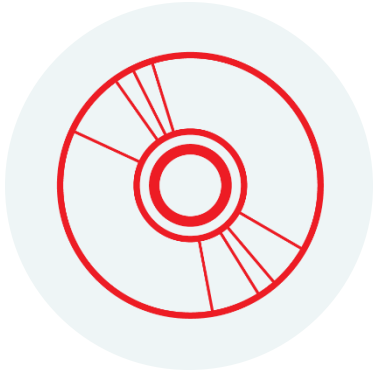
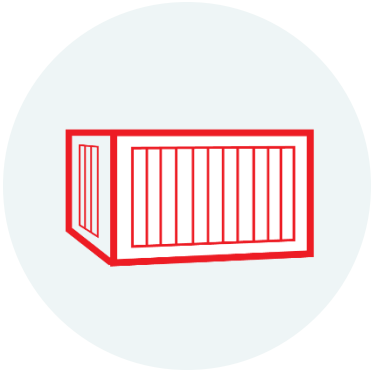


Image mode



Container technologies

Read only filesystems for the binaries

HOW TO COOK YOUR FIRST IMMUTABLE RHEL?

1. Ingredients

2. Edit container file

3. Steps

HOW TO COOK YOUR FIRST IMMUTABLE RHEL?

1. Ingredients:

- Podman or Podman Desktop
- Access to RH container registry
- Access to a private or public container registry
- A computer to host your immutable VM

2. Edit container file

3. Preparation

HOW TO COOK YOUR FIRST IMMUTABLE RHEL?

1. Ingredients

2. Containerfile:

```
FROM registry.redhat.io/
rhel10/rhel-bootc:10.0

ADD local_etc /etc

RUN dnf install -y httpd
RUN systemctl enable httpd
```

3. Preparation

HOW TO COOK YOUR FIRST IMMUTABLE RHEL?

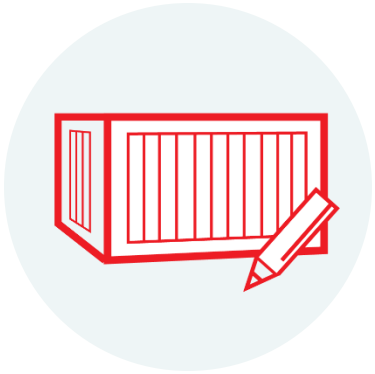
1. Ingredients

2. Edit container file

3. Preparation:

1. Run *podman* to create the container
2. Push the image to the registry
3. Create disk image
4. Move the disk image to the host
5. Fire up the new VM

UPGRADING YOUR FIRST IMMUTABLE RHEL



1. Modify the container file or use a new base image

2. Run *podman* to create a new version of your container

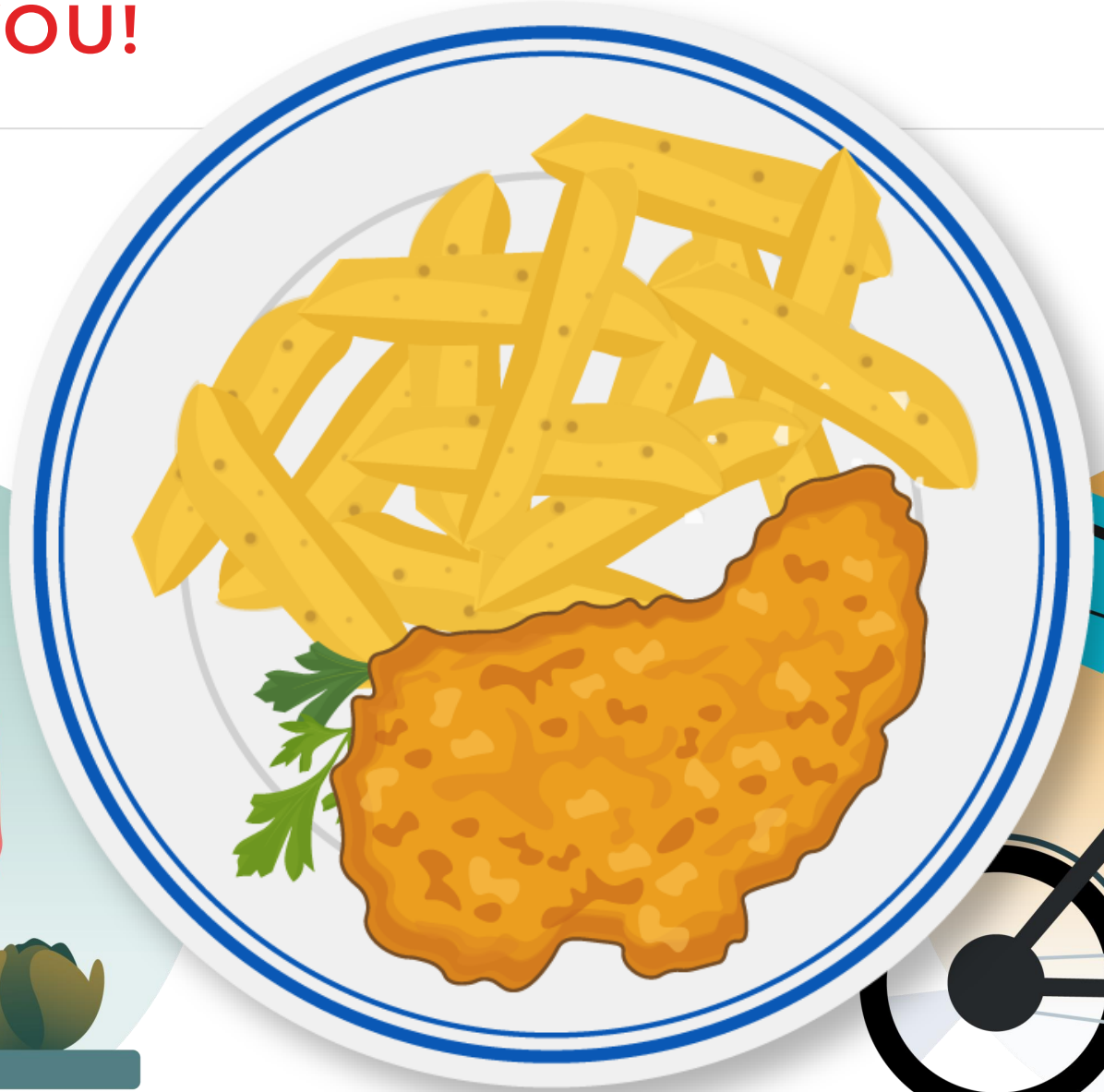
3. Push the image to the registry

4. On the immutable VM run *bootc switch* to download the latest boot image

5. Reboot the immutable VM

THANK YOU!

INTER COMPUTER GROUP



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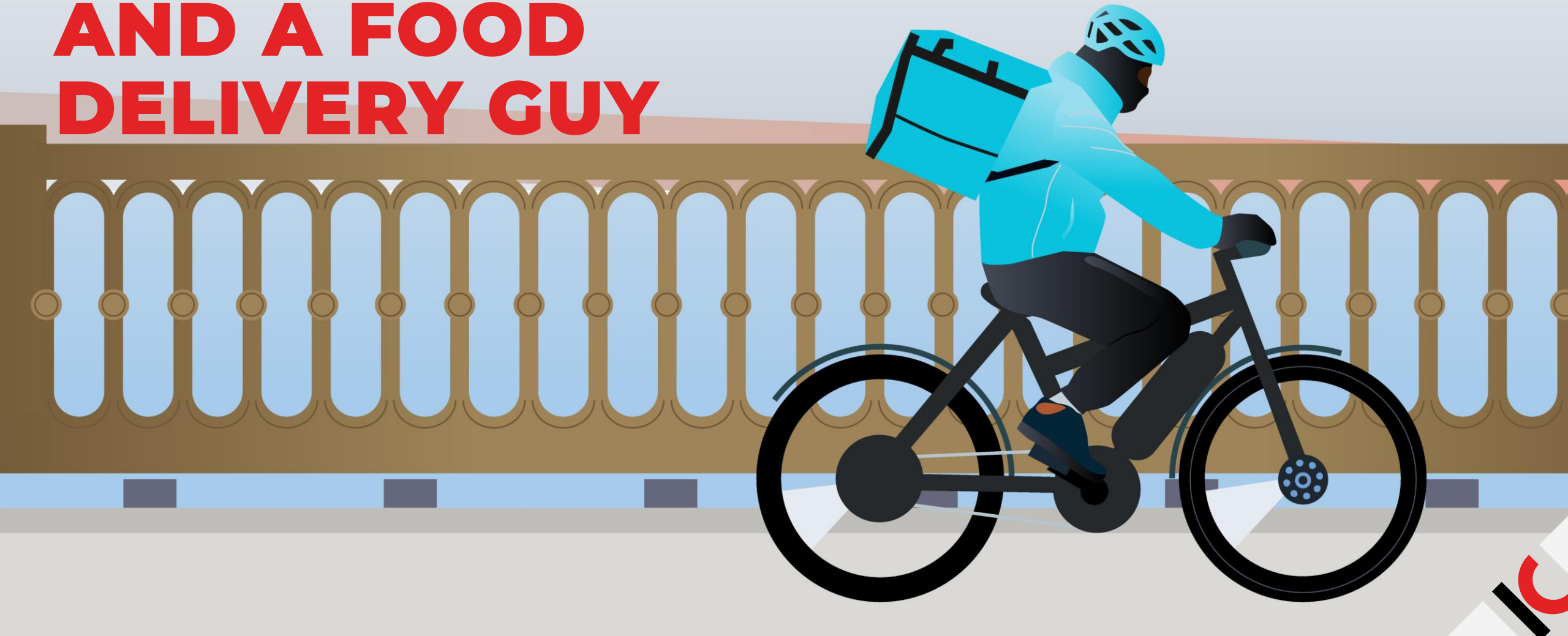

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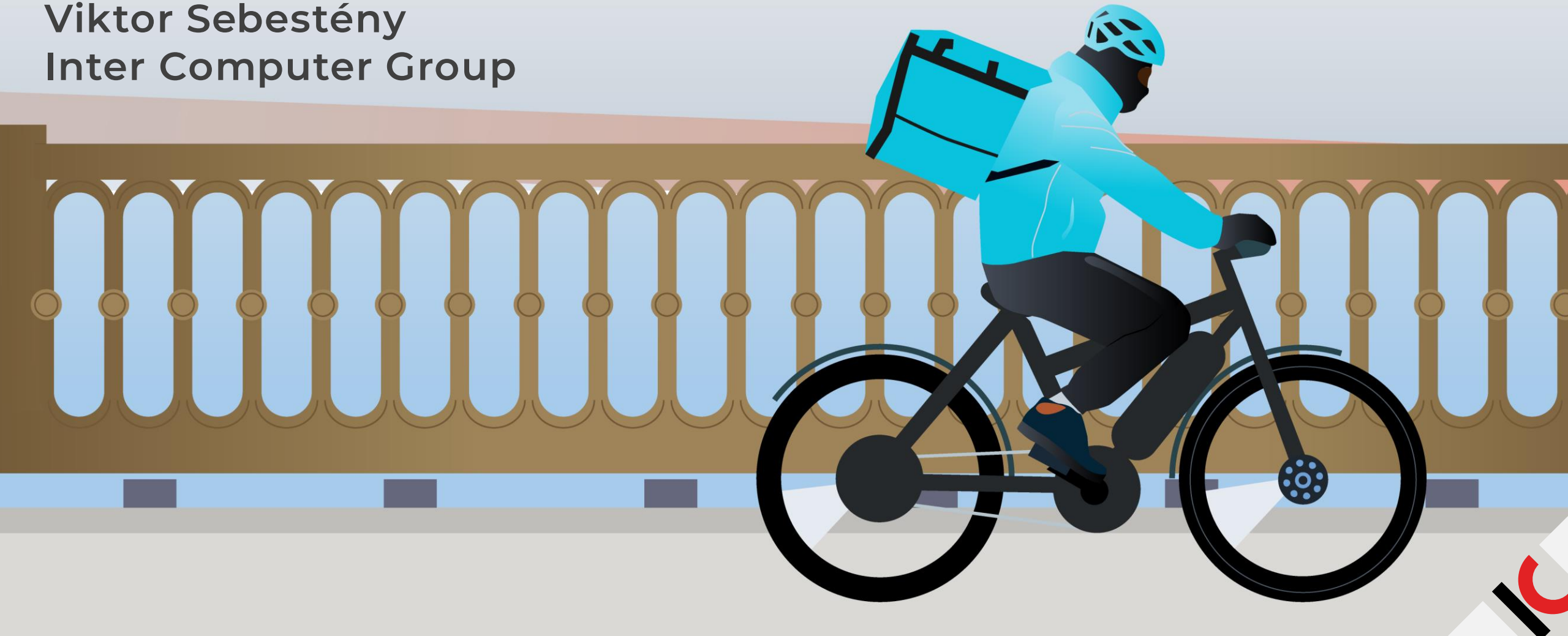
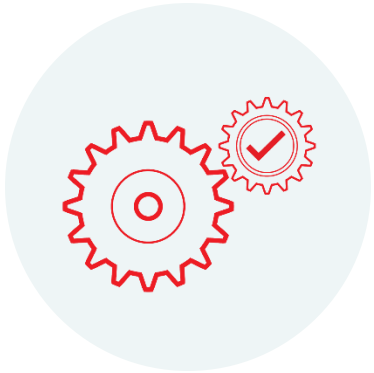
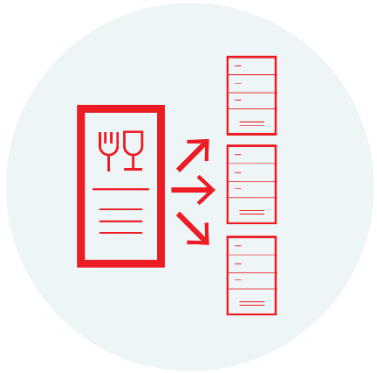


WHY IMMUTABLE RHEL MATTERS

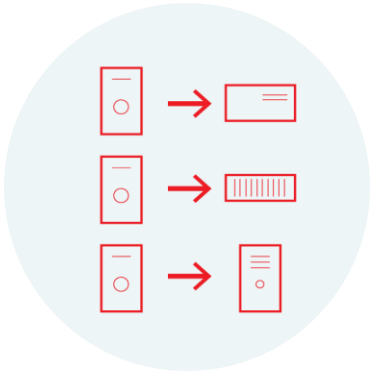


Operation optimization

Enhance security



Consistent deployments



No configuration drifts