EuroSkills
Test Project

ICT Specialists (39)
Module C – Modeling a fault-tolerant
geo-distributed network infrastructure

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INTRODUCTION

Any modern enterprise, regardless of its scale, cannot perform successfully on a market without usage of information systems and business critical services which are running on top of complex IT infrastructure. The more opportunities and agility an IT infrastructure provide for automating business processes, the more difficult and complex it becomes.

It is obvious, that modern IT infrastructure challenges require modern tools and solutions to meet business objectives. Some of such modern tools enable engineers to run production-like infrastructure simulations to develop, test and assess changes and new approaches build a brand-new infrastructure deployment or examine how existing deployment can be extended using IaaS offerings and hybrid infrastructure methodologies.

TEST PROJECT OVERVIEW

SkillsCloud Company is the leader in the API development for SCADA systems data analysis market. This year, company finished migration of their solutions to a public cloud but still, there are some cases when SkillsCloud API must be integrated with customers' on-premises infrastructure, in order to comply with local regulations.

In 2021, **Chemisch Thermische Prozesstechnik GmbH** (**CTP**) plans to implement a project to integrate local SCADA monitoring with SkillsCloud data processing engines. To achieve this goal, CTP negotiating a separate infrastructure that will be responsible for collecting and storing SCADA data to make a secure, scalable and fault-tolerant solution that allows data exchange between local data collection systems and the SkillsCloud API.

Within current project, your team is responsible to implement a simulated infrastructure scenario according to initial design and industry best practices.
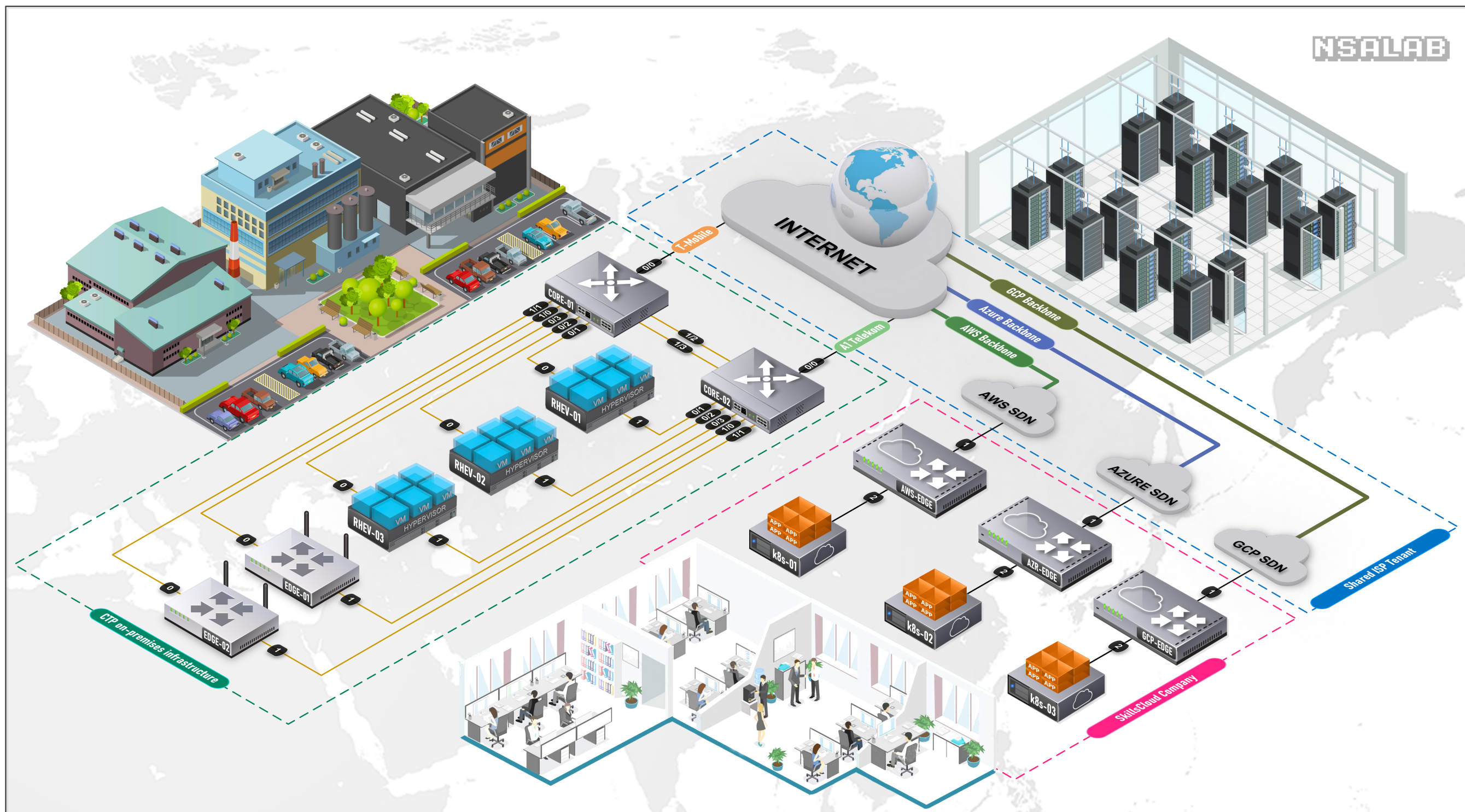
INSTRUCTIONS TO THE COMPETITOR

- Initial topology will be pre-built and read-only access to this topology will be granted to each team using infrastructure simulation platform. Teams will be able to run and configure VMs but will not be able to change topology layout. All ISP devices will be running on the separate shared tenant and will not be accessible by teams.
- Test project marking process will be fully automated, so make sure that following credentials policy is respected:
  - Default user: **admin** (Linux and Cisco VMs)
  - Default password: **Passw0rd!**
- Save your configurations frequently and make sure that all your configurations are still working as expected after equipment rebooting. Before you will submit your work, make sure that all configuration also saved inside topology file as well.
- Implement all tasks to the best of your ability, in line with **industry best practices** (in terms of security, high availability and scalability) within the limitations imposed by software images used.

TEST PROJECT GUIDELINES

Examine initial and desired state of the infrastructure for CTP and SkillsCloud Company. Implement all required configuration to meet basic reachability requirements, which can be found at the end of this document. Note that simulated public cloud providers do not allow GRE traffic (IP/47) to traverse inside their networks.

Make sure that all reachability conditions are still met in event of any redundant component failure (server links, core switches, edge routers, on-premises internet service providers) in various combinations. Duration of connectivity loss might not be longer than 10 seconds.
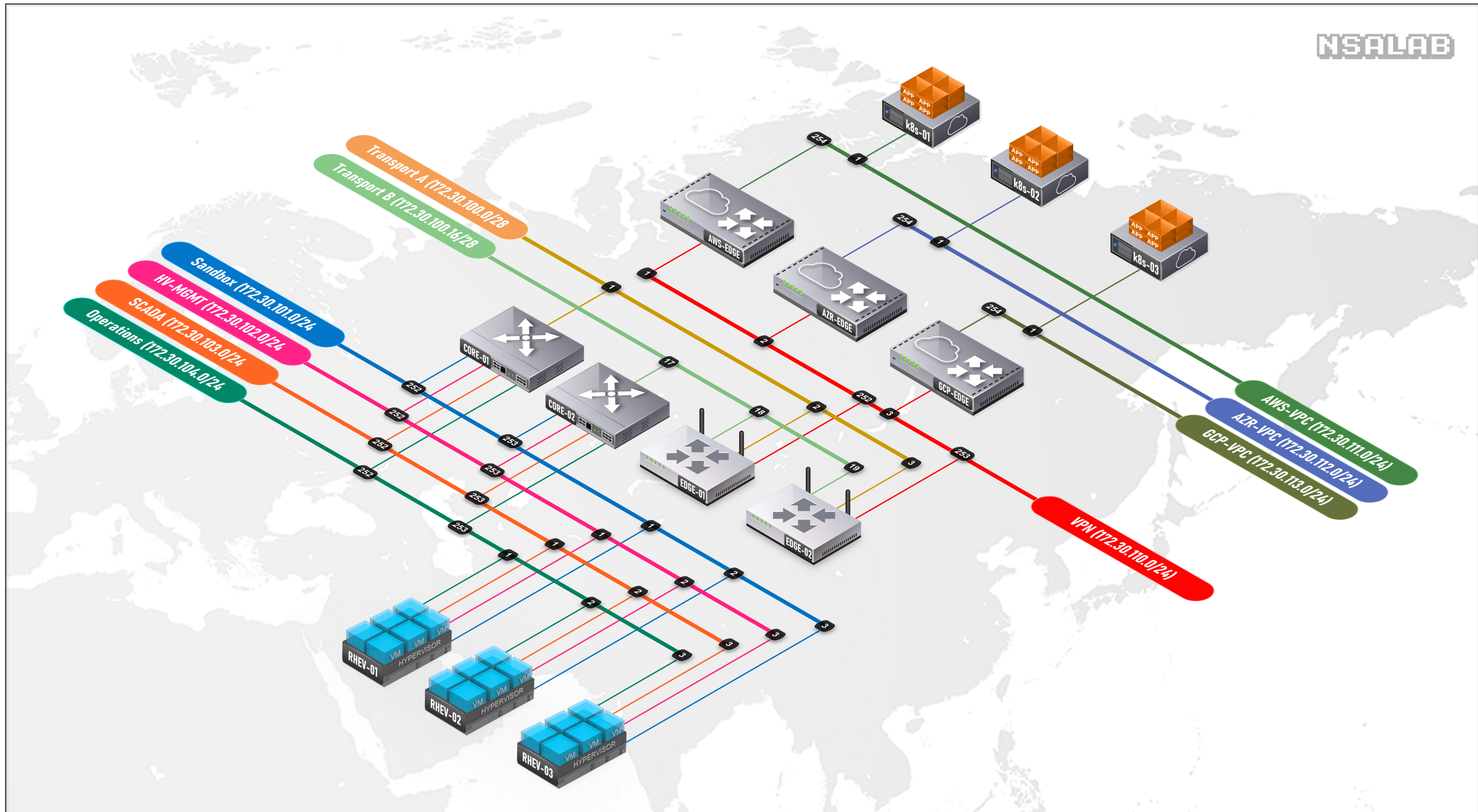
worldskills
Europe

NSALAB

INTERNET

T-Mobile

GCP Backbone

Azure Backbone

AWS Backbone

A1 Telekom

CORE-01

0/0

1/1
1/0
0/3
0/1

1/2
1/3

CORE-02

0/0

0/1
0/3
1/0
1/1

0

VM VM
VM HYPERVISOR
RHEV-01

0

VM VM
VM HYPERVISOR
RHEV-02

1

0

VM VM
VM HYPERVISOR
RHEV-03

1

0

EDGE-01

0

1

0

EDGE-02

1

CTP on-premises infrastructure

AWS SDN

1

AWS-EDGE

2

AZURE SDN

1

AZR-EDGE

1

GCP SDN

2

GCP-EDGE

2

Shared ISP Tenant

APP APP
APP APP
k8s-01

2

APP APP
APP APP
k8s-02

2

APP APP
APP APP
k8s-03

2

SkillsCloud Company

NETWORK INFRASTRUCTURE CASE

Legend

	Router IOSv		External net Custom Bridge		Ethernet Access Link
	Switch IOSvL2		RHEV node Alpine Linux		Ethernet Trunk Link
	Router CSR1000v		k8s node Alpine Linux	**1**	Port number Gi [X] eth [X]

RECHABILITY REQUIREMENTS

DESTINATION SUBNET

SOURCE SUBNET

Source \ Destination	Sandbox	HV_MGMT	SCADA	Operations	AWS-VPC	AZR-VPC	GCP-VPC	Cloudflare
Sandbox	Allow all traffic	Deny all traffic	Deny all traffic	Allow return traffic only	Deny all traffic	Deny all traffic	Deny all traffic	Allow web traffic only
HV_MGMT	Deny all traffic	Allow all traffic	Deny all traffic	Allow return traffic only	Deny all traffic	Deny all traffic	Deny all traffic	Deny all traffic
SCADA	Deny all traffic	Deny all traffic	Allow all traffic	Allow return traffic only	Allow web traffic only	Allow web traffic only	Allow web traffic only	Deny all traffic
Operations	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic
AWS-VPC	Deny all traffic	Deny all traffic	Allow return traffic only	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow web traffic only
AZR-VPC	Deny all traffic	Deny all traffic	Allow return traffic only	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow web traffic only
GCP-VPC	Deny all traffic	Deny all traffic	Allow return traffic only	Allow all traffic	Allow all traffic	Allow all traffic	Allow all traffic	Allow web traffic only

Legend

✓ Allow all traffic	⊘ Deny all traffic	↩ Allow return traffic only	🌐 Allow web traffic only