

Rittal – The System.

Faster – better – everywhere.



STATE-OF-THE-ART INFRASTRUCTURE FOR HPC

ENCLOSURES

POWER DISTRIBUTION

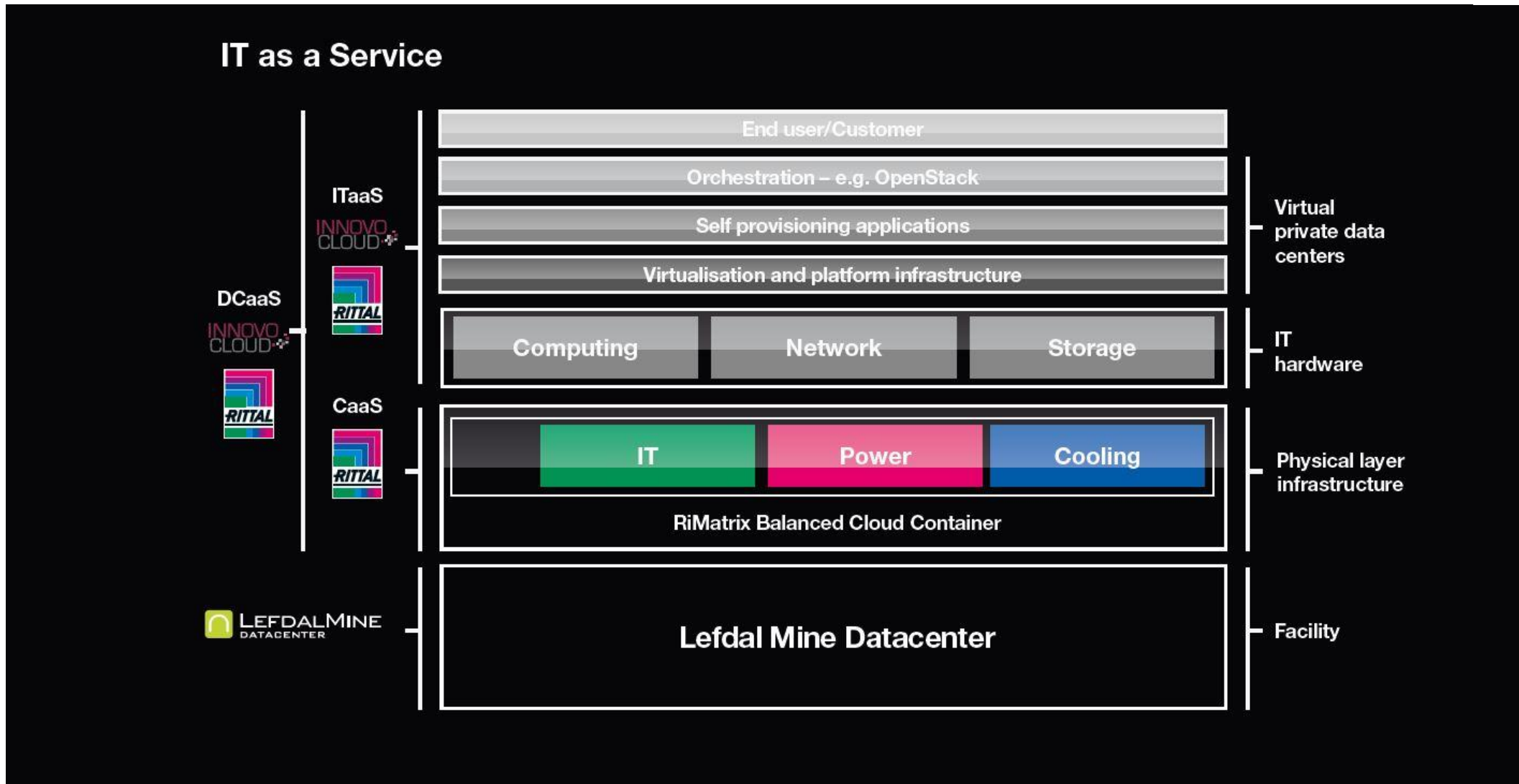
CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES



Rittal & iNNOVO Cloud



ENCLOSURES

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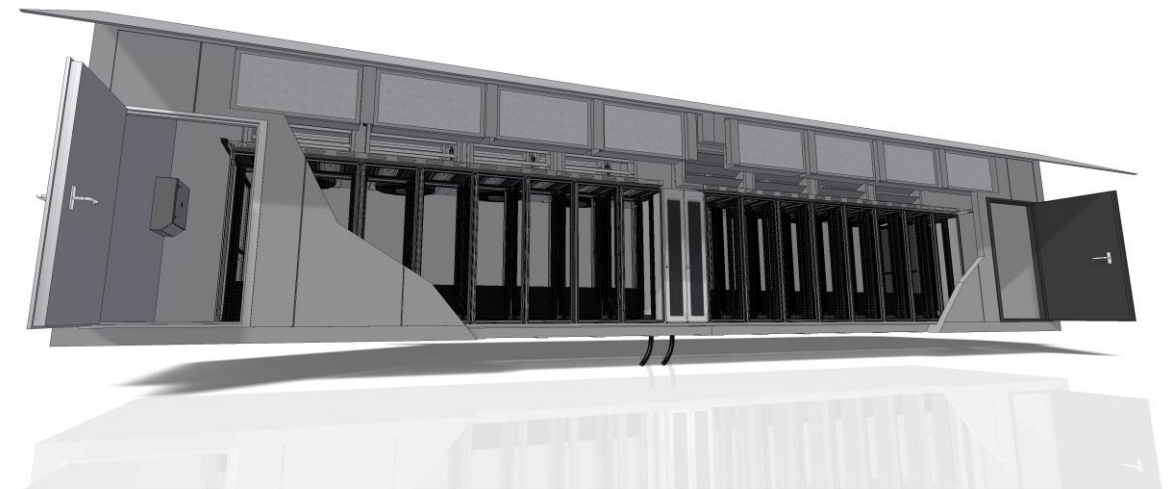
IT INFRASTRUCTURE

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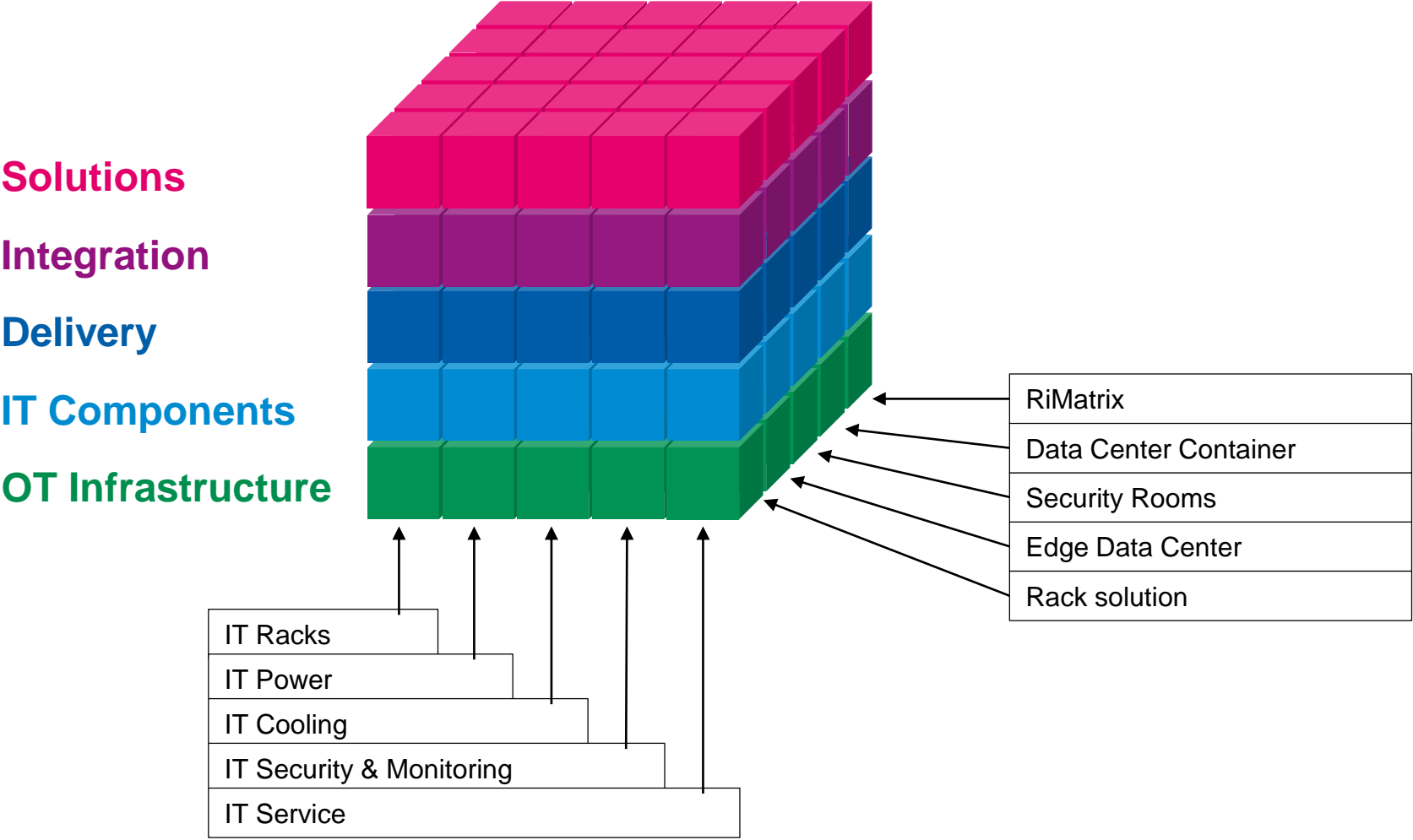


iNNOVO & Rittal

STATE-OF-THE-ART PHYSICAL INFRASTRUCTURE FOR HPC, Edge and Fog



Solution Stack



The Edge Market

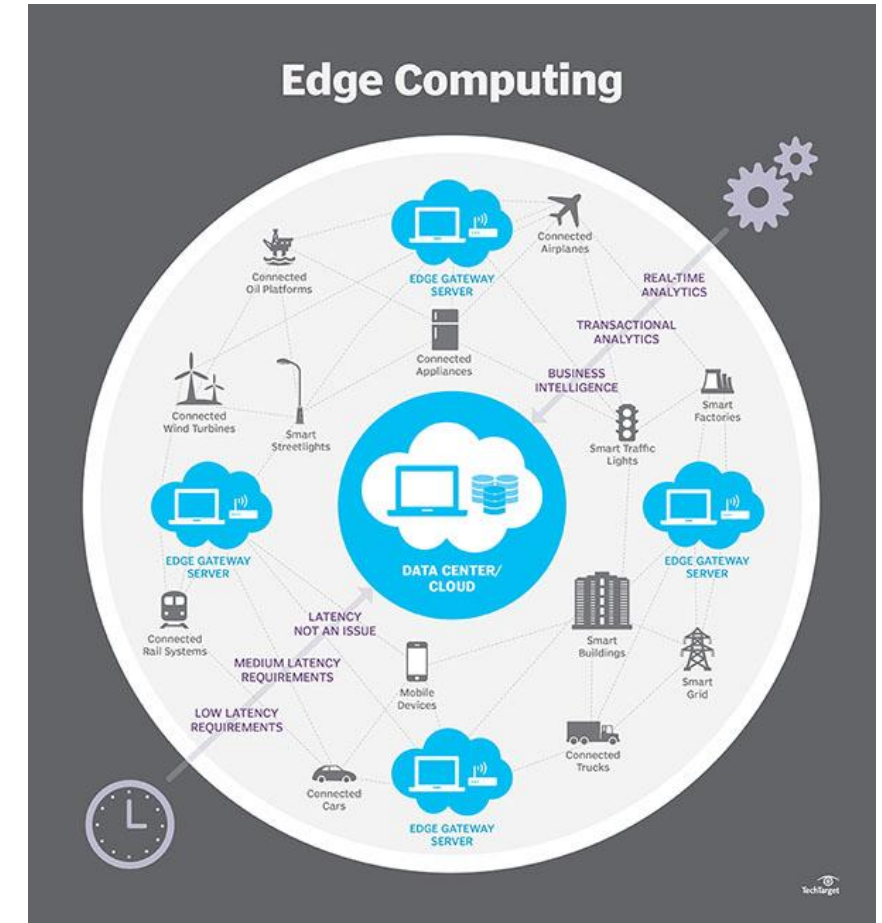
Why are we looking at EDGE Market?

EDGE Market is the next big wave of Cloud!

- EDGE Market 2017 – 1.47billion USD
- CAGR – 35.4% - Market worth 6.72 billion USD 2022
- Asia market itself: \$32 billion USD by 2022

- By 2019, 43% of IoT data will be processed at the edge
- By 2025, 80 billion connected IoT end-points

Source – IDC Q4 2017, Gartner Q4 2017

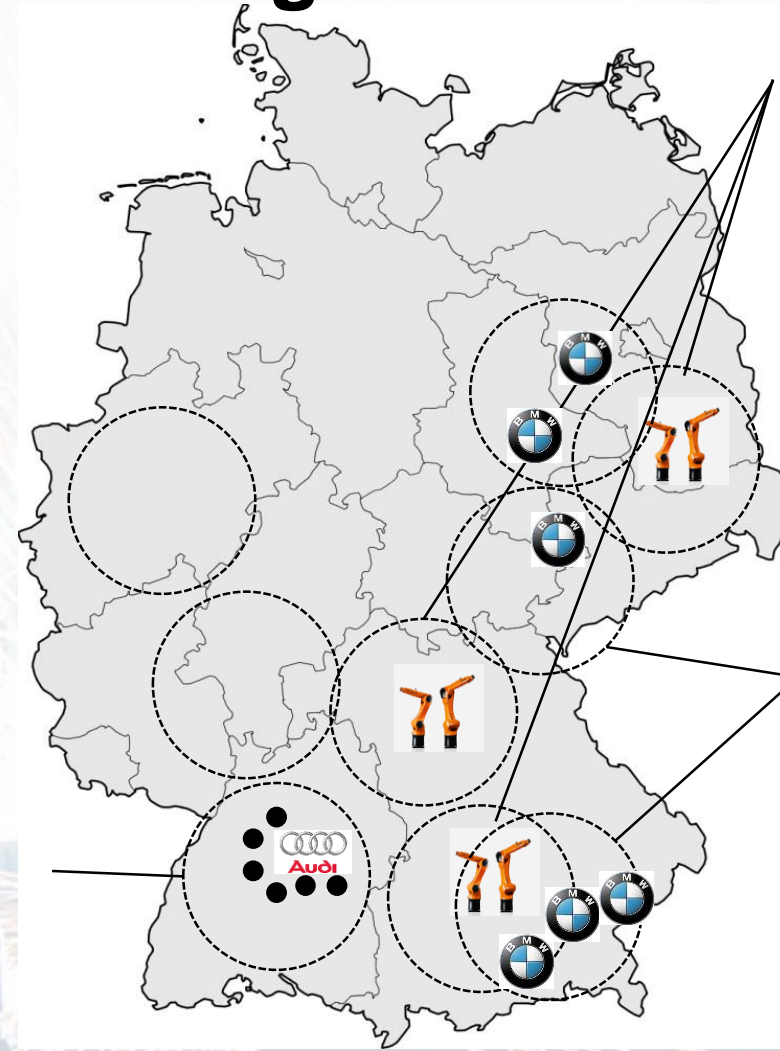


Use Cases

Assumption: if in 2025, if each physical asset has a Digital Twin that produces data in real time, then

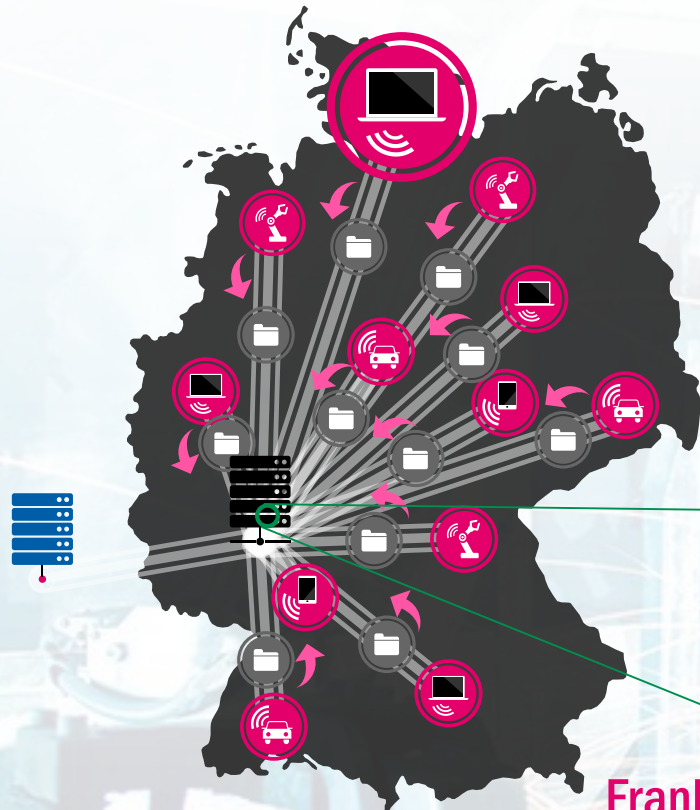
- the data must be stored, processed and analyzed and the production processes must be controlled (in real time).

for HPC (aaS)- Application in Manufacturing



HPC applications at the Edge

Current data center infrastructure does not scale for industry 4.0 and (I)IoT



- Estimate IDC: 30-40% of the IoT computing power is critical and/or latency (i. e. in the ms range) that cannot be controlled by a central data center.
Source: Data Age 2025: The Evolution of Data to Life-Critical, International Data Corporation (IDC), April 2017
- IoT data avalanche intensifies low bandwidth expansion in Germany
- Dependence on US cloudproviders and unresolved questions on the data sovereignty of European companies



Frankfurt is most important Internet hub

The world's largest Internet peering node, i. e. connectivity to major carriers and cloud providers (DE-CIX)

The current centralized data center IT infrastructure cannot cope with the immense flood of data alone.

- Extremely expensive network expansion, i. e. very high CAPEX upfront investment > 1 billion euros
- Significant challenges for the current German digital backbone in Frankfurt: provision of electricity capacity and availability of the required space in Frankfurt are at the limit, e-mobility aggravates the shortage of electricity in Frankfurt.
- Network coverage not guaranteed as many companies are located in remote areas

HPC (ITaaS) Edge

Consumption of HPC (aaS)

1

Dynamic Colocation:

- Decentralized structure in the sense of Hyperscale, Spine, Leaf and Edge
- Mobile solutions, flexible and scalable
- technical support hotline, operation, maintenance and replacement
- 24/7 monitoring, security and service

2

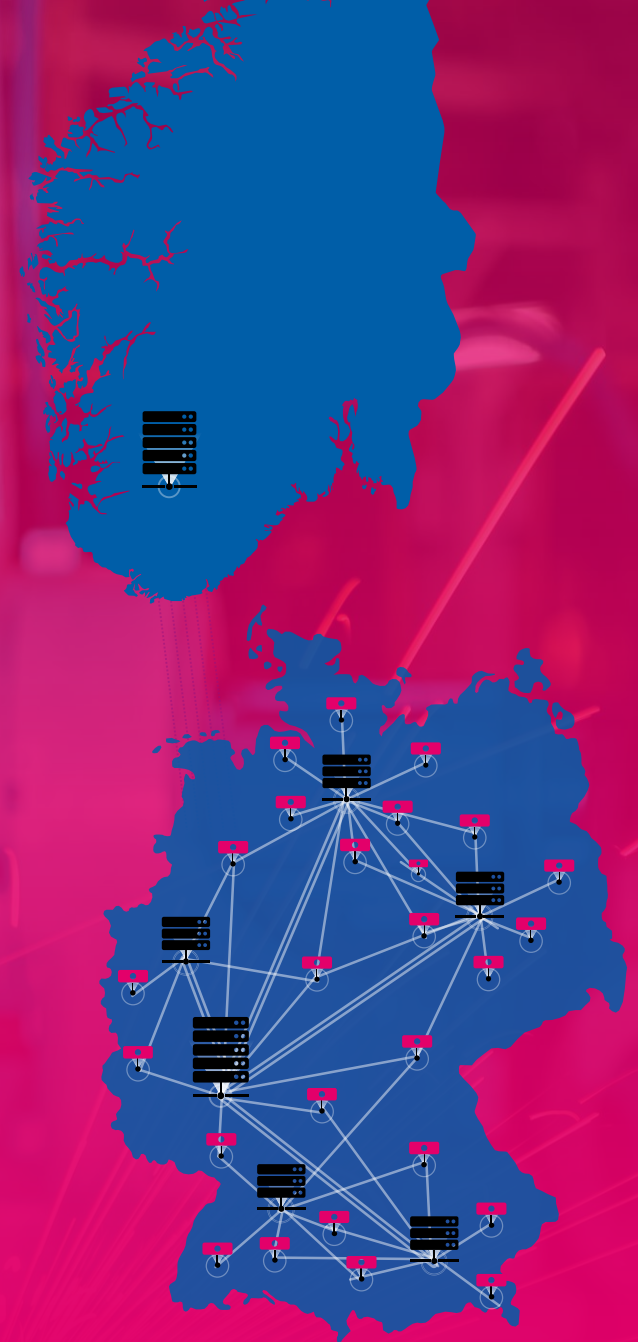
Two cloud service areas:

Infrastructure as a Service (IaaS):

- Flexible rental and scaling of IT infrastructure on-demand, including financing services
- Expansion capacity of Leaf/Edge as a virtual pool across all locations Establishment of value-added platforms, establishment of an ecosystem

Software as a Service (SaaS), in Development:

- Industrial Data Space
- Industrial Analytics
- 5G Video Analytics
- Medical data space
- Partner Offering



Modular and Containerised Solutions

Our Offering



The Container Datacenter

- DC near premise for low latency workload and high data sovereignty requirements
- Turn-Key delivery in 8-12 weeks instead of 100 weeks of planning and construction for a DC room or Brick & Mortar facility
- Highly flexibel: DC can be transported to any requested site
- On request: fully opexed on a pay as you go basis

Highly secure BCC IT Container

- Early Fire Detection, Fire extinguishing in place, F90 container enclosure available on request
- Alarm systems, video surveilleince within the container available on request
- Access Control to container can be synced to existing access control system

Full scalable OT & IT

- DC Containers available with Chiller Container, UPS Container and generator for maximum autonomy
- Ready for 200-300 KW redundant IT capacity in 10 Rittal TS-IT Racks
- IT Equipment can be scaled and shaped according to the individual Use Case and Cloud Purpose



Modular and containerised

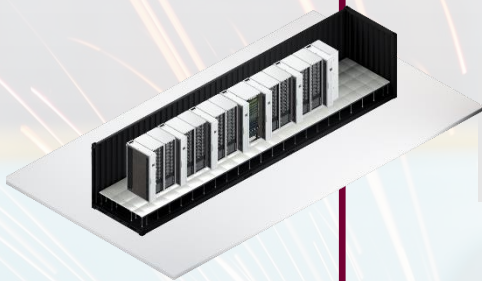
Edge DC Enclosure: BCC IT Container

Deployment Options



+ Cloud Orchestration

- + bare metal Deployment e.g. Ubuntu MaaS with CoreOS/Kubernetes
- + or Multi Region OpenStack/Azur Stack (automatisierter self-service)
- + or VMware (auf Wunsch: full managed)



+ HW Blobs as a Service

- + Container (incl. racks) with UPS and Chiller
- + Custom Hardware Stack (with n Blobs)



Container as a Service

Container (with or without racks) incl. UPS and Chiller

Commercial Offering

Pay-as-you-Go
Pay-as-you-Reserve

Mix: PayG + Mtl Rate
mit Mindestlaufzeit

Mtl. Rate mit
Mindestlaufzeit

German Edge Cloud

Edge DC Example: Cloudpark Höchst (Infraserve)



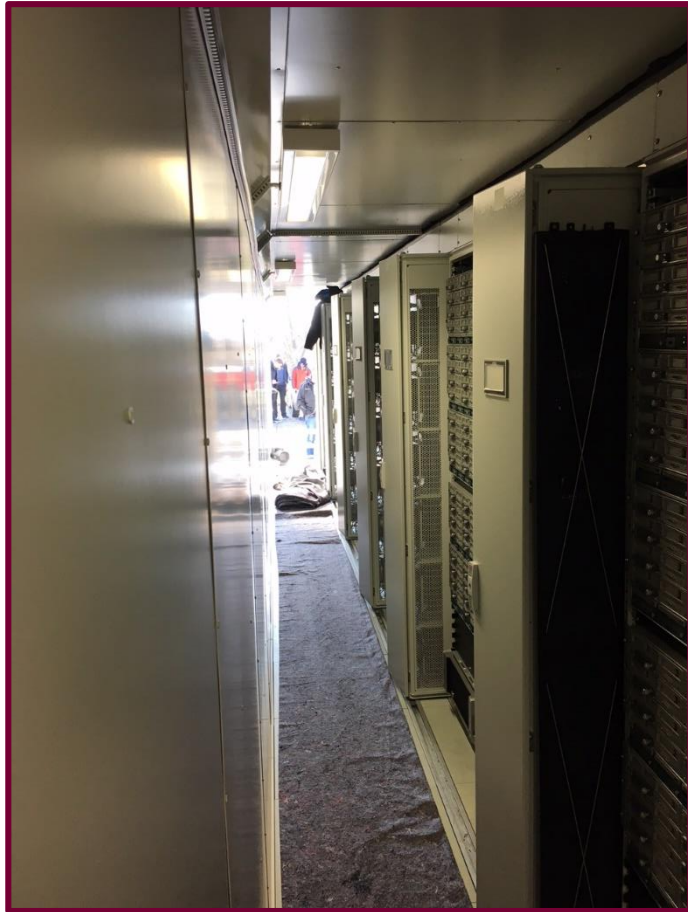
iNNOVO's Cloud Park in Höchst

Live Showcase for a containerized, scalable and modular Edge Datacenter



Edge Datacenter

Example: HPC/BD Container, 240 KW, 20 KW/rack, PUE 1,14



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25.03.2018
FRIEDHELM LOH GROUP



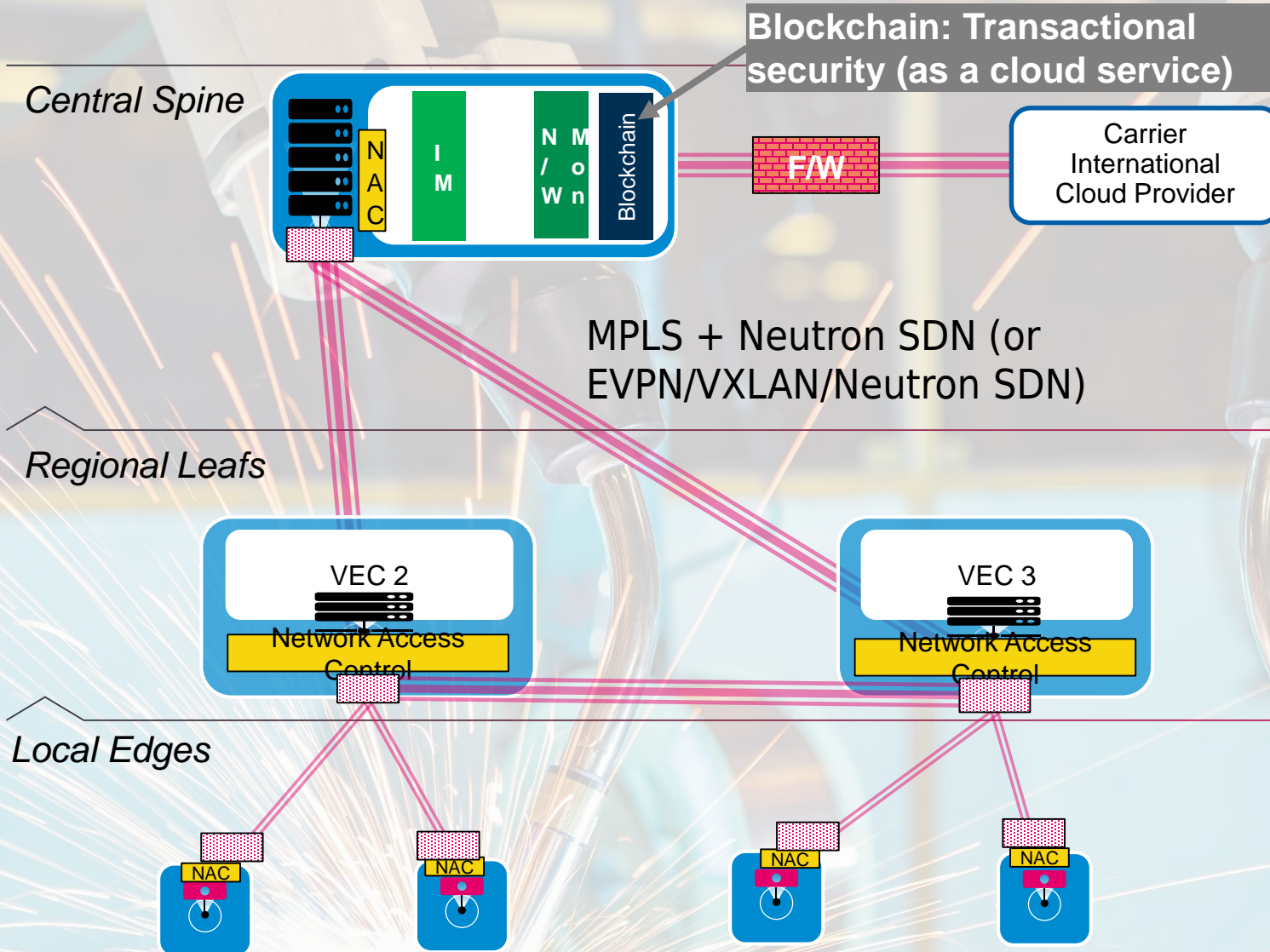
Lefdal Mine Datacenter

Level 3 LMD & iNNOVO Cloud Container


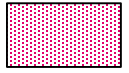
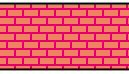





HPC IaaS Use Case – Architecture

Multi Layer Sicherheitsarchitektur from Edge to Cloud



GEC N/W Sicherheitsarchitektur Legende

-  **LWL Encryption**
various suppliers available on the market
-  **Layer 2 encryption (opt.)**
Point-2-Point or Point-2-multipoint
- MPLS/
SDN
(EVPN/
VXLAN/
SDN) **L2 L3 Networking**
 - Tagged MPLS, German manufacturers available (e.g., Ciena), n*100Gbps Port Routing,
 - Openstack Neutron SDN BCP on top
 - customer-tenant separation VLAN/VPN
-  **Firewall (HW/SW)**
 - customer Zoning via vFW (SDN) oder pFW
 - External access control
-  **Network Access Control**
At each location (Edge, Leaf, Spine) mit controlled access to GEC N/W
-  **Identity Management / secure Auth.**
 - E.g. CyberArk, protect4use
 - PKI Infr. For authentication
- Information Security Management System**
-  **Network Monitoring**
z.B. snort, inkl. Intrusion Detection & Protection