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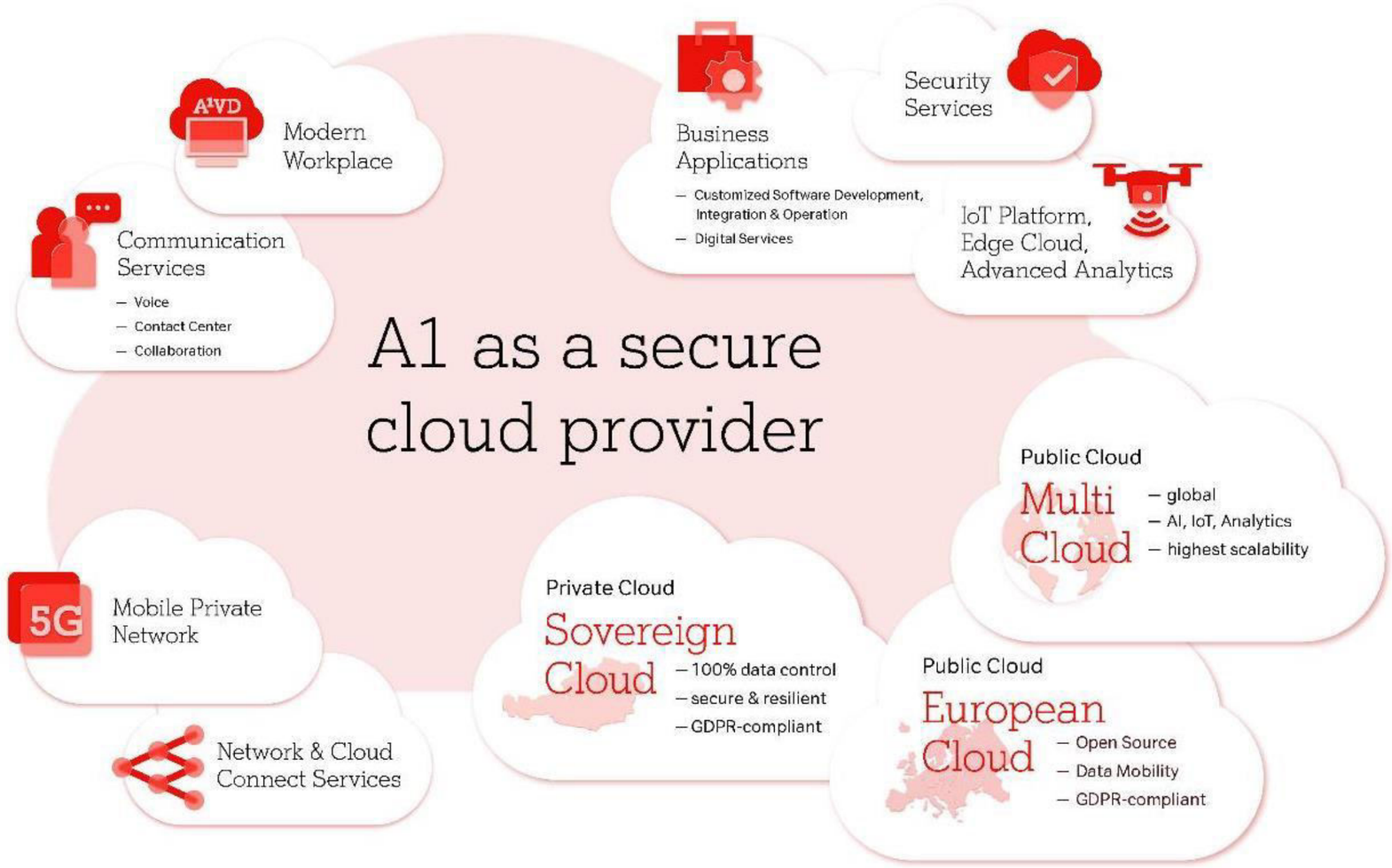
Direct Liquid Cooling

Balancing AI Growth and Energy Consumption

A1 Cloud Services - The Journey of Digital Transformation



For our environment. For our future.

	Achievements		Targets **A1 Austria** 2025	
Decarbonization	-7%	Reduction of direct and controlled CO_2 emissions[1)] (2018 – 2021)	-40%	Reduction of direct and controlled CO_2 emissions[1)] (vs. 2019)
Energy efficiency	+31%	Energy efficiency through infrastructure optimization (2018 - 2021)	+25%	Maximum of power consumption despite the expected +200% data volume (vs. 2021)
Renewable energy	+720 MWh	Self-produced solar power (2021)	+1.200 MWh	Self-production through expansion of PV systems (vs. 2021)
Resource protection	178.000	Number of recycled devices (seit 2004)	+30%	Recycled and refurbished devices (vs. 2021)

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Exoscale Over Time

Becoming a European Cloud Provider.

2011 — Foundation

Incubating with Veltigroup

2013 — OpenCloud Launch

Launch at Cloud Expo Europe

2015 — Second Zone

Zurich deployed

2017 — A1 Digital Acquisition

Capacity increase and European expansion

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2019 — European Expansion

Sofia & Munich Zones

EXOSCALE powered by Lenovo

2021 — SKS & DBaaS

Major expansion of product portfolio

2023 — 10 years

2024 — European Expansion

New Zones

2025

Blockstorage

Support Plans

Sustainabillity Reports

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ISO 27001 Certified

DATA CENTER LOCATIONS

Close to all major European nodes.

Features:

- Multihomed on all locations
- Several peering connections
- Internal 400 Gbps backbone
- GDPR-compliant

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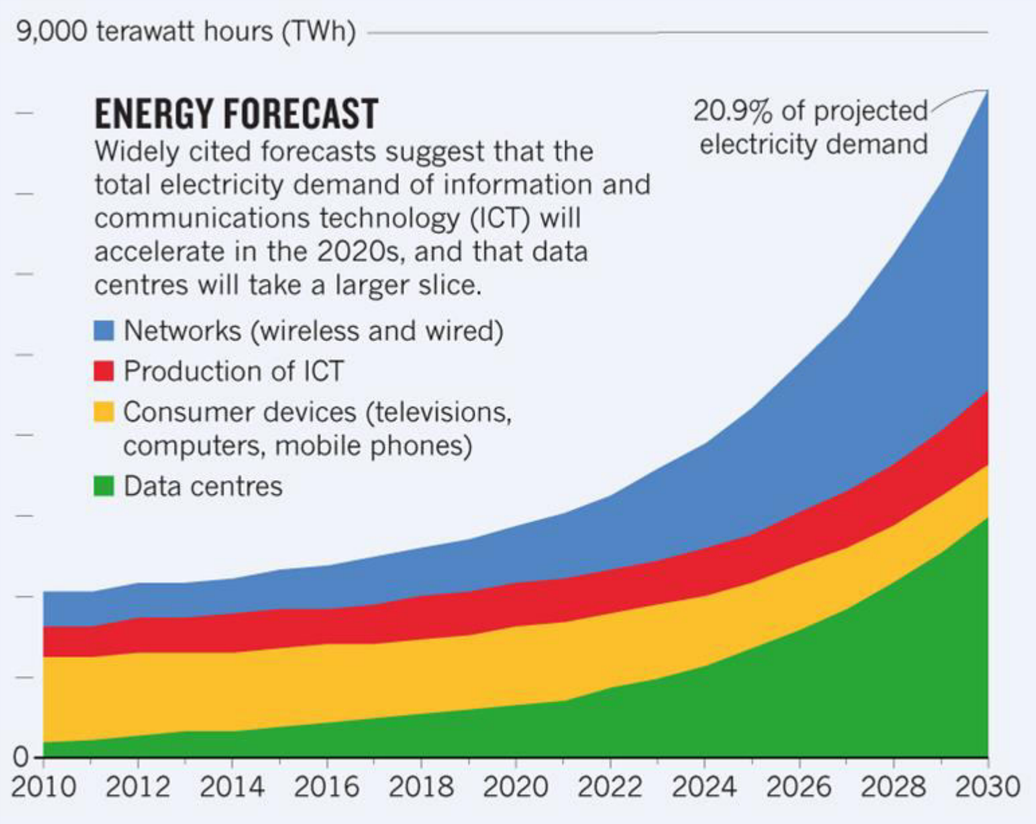
Significant increase in energy consumption



Data Center Energy Use - AKCP Monitoring

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Evolution

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DLC Server Rack without Air Condition - 100 % water cooled

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5 key innovations to implement next generation hardware the sustainable way

+

1 Methodology to measure it transparently

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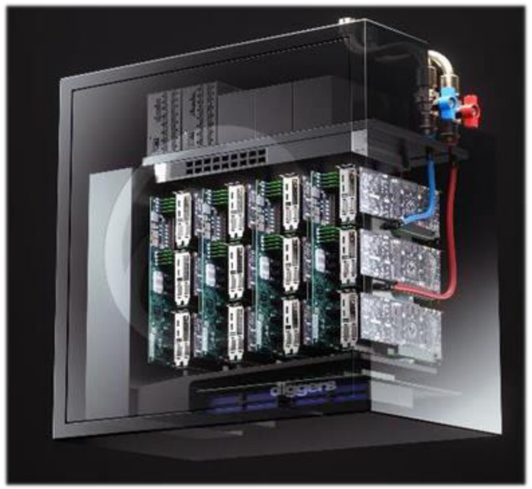
#1 – No Air Conditioning

Full DLC concept, making Air Conditioning obsolete.

Better or on par with In-Row cooling or Immersion cooling for PUE and transfer to liquid ratio.



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#2 – Less materials

No copper design – full usage of Aluminum with benefits in scaling, recycling, corrosion resistance and many more

Recycling aluminium saves around 95% of the energy required for primary production vs 80% for copper

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#3 – Negative pressure reduces risk and impact of leakage

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#4 – No raised floor needed

Direct floor setup

Less datacenter environmental control required

Individual form factor to optimize space usage – standard rack design as well available

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#5 – Energy that can be reused

High inlet and outlet temperature (up to 50° C outlet temperature)

No fan design

Ensures huge advantages in terms of

1. Power consumption reduction (up to 50 %)
2. Waste heat utilization (up to 98 %)

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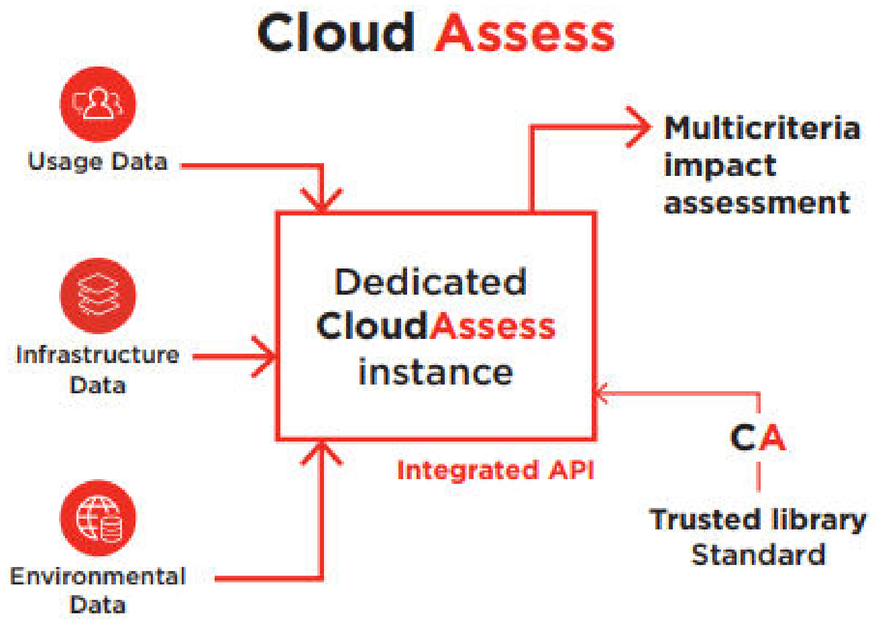
360 Degree



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The Journey Has Started

A1's Sustainability Commitment

- Pursuing green energy initiatives
- Reducing overall resource consumption

Potential Impact of Direct Liquid Cooling

- Up to 50% reduction in energy consumption
- Up to 98% heat recovery and reuse

Exoscale's Growing Demands

- Rapid annual growth driven by AI workloads
- Need for flexible, power-efficient data center solutions
- Diggers' approach aligns well with these requirements

Looking Ahead

- Clear migration paths for existing data centers
- Opportunities for decentralized data center deployments
- Emphasis on measurement and transparency through Cloud Assess

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THANK YOU!

German:

https://www.a1.digital/de/presse/exoscale-und-diggers-kooperieren-fuer-energieeffiziente-datacenter-kuehlung

English:

https://www.a1.digital/press/exoscale-and-diggers-collaborate-for-energy-efficient-data-center-cooling

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Key Innovations

1. **Full DLC concept**, making Air Condition obsolete – very high inlet and outlet temperature (up to 50° C outlet temperature)
2. **No copper design** – full usage of Aluminum with benefits in scaling, recycling, corrosion resistance and many more
3. **Negative pressure** reduces risk and impact of leakage
4. **Individual form factor** to optimize space usage – standard rack design as well available
5. **High outlet temperature** and **no fan design** ensures huge advantages in terms of
    1. Power consumption reduction (up to 50 %)
    2. Waste heat utilization (up to 98 %)