Telia

HYPER CLOUD

Hyper scalable infrastructure

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TELIA – HYPER CLOUD CASE

From racks and networks to design and built infrastructure

Data driven - driven by data: Telia understands the need for hyperscalers to access fast local, regional and global networks from within a low-cost, green and sustainable infrastructure. Cloud and big data require robust, scalable application and storage portfolios to individuals or businesses and enterprise with a high fibre count across many networks in what is a 'cloud-powered web'.

Telia can provide highly efficient, low OPEX white space with cold/hot aisle environments for cloud scale compute and storage infrastructure needed for analysis of Big Data datasets and other purposes.

Yet, Hyperscalers look for regional scalable expansion and to work with credible partners and suppliers who can form part of their ecosystem support in addition to Colocation facilities. Telia has the capability to deliver and be an ecosystem partner within the right kW or MW project to establish single-client data centre facilities within or outside of urban environments while still being supported via the Telia Helsinki Data Center infrastructure and its substantial connectivity.

Telia Helsinki Data Center can work with you to implement your needs from white space to rack solutions. We can deliver kW to MW speed of growth and deployment, all with a low and secure operational total cost of ownership (TCO).

Telia is a world-class company with the world's #1 internet backbone and global reach. Finland is known for its ease of doing business, good governance, political stability, and sustainable, green power with a world-class, reliable power grid. Low cost, low risk, secure infrastructure and location.

1 **Low opex, TCO, tax**
Competitive network pricing, low corporation tax at 20% (2020), power prices 30–40% less than FLAP markets. Ten-year PPAs.

2 **Speed and market reach**
Speed to market and reach. Low-risk, stable location and environment. Networks able to reach 800 million people in 50 ms.
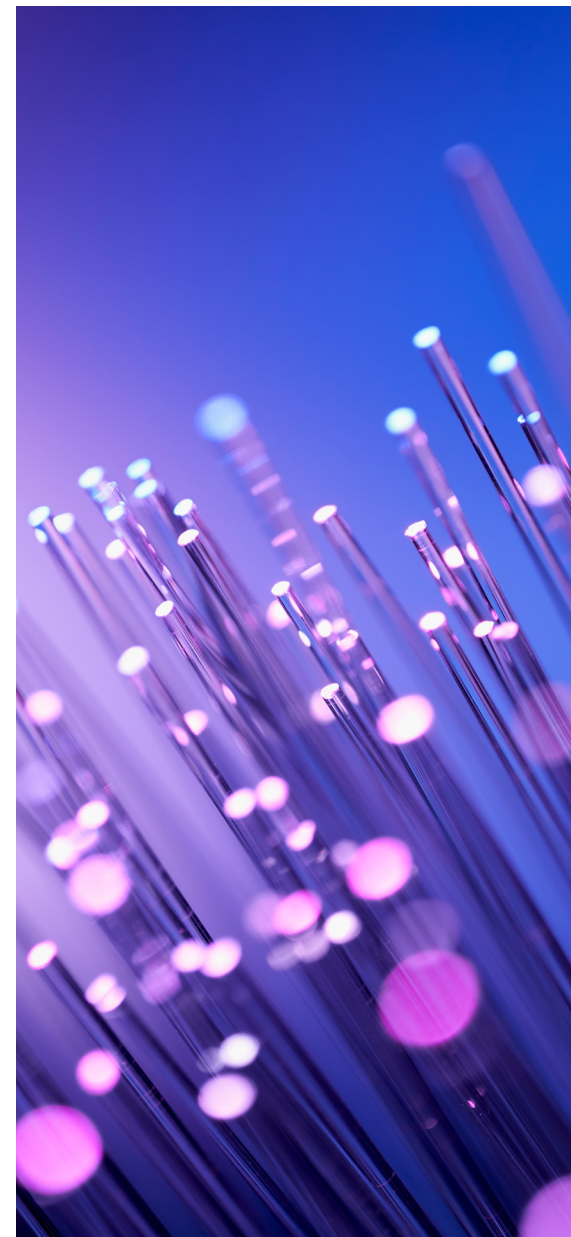
3 **Proven ecosystem**
Multi-country data centres. Workforce to deliver and operate. Government and municipal support. Tech and ICT heritage.

4 **Sustainable and scalable**
Sustainable green power from a world-class power grid and infrastructure. Ability to scale, permit, power, people availability.
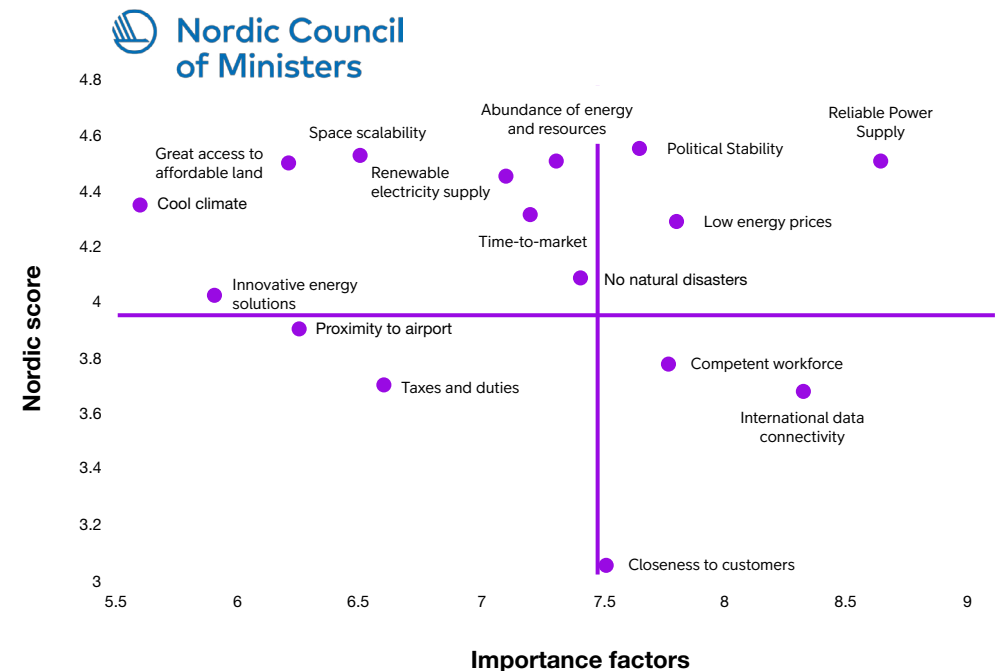
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NORDIC VALUE FOR HYPERSCALE AND CLOUD DATA CENTRES

Nordic value for colocation and enterprise data centres

The important site selection factors and Nordic region's scores are illustrated in the attached picture from Nordic Council of Ministers report Data Centre Opportunities in the Nordics (report prepared by COWI A/S).

Telia offers the right quadrant in the enterprise and colocation segment. It can also include parts of the other quadrants into a Telia Value Proposition:

- Reach 800 million people in 50 ms via Telia Carrier – the #1 global internet backbone – and the Telia Helsinki Data Center.

- Telia can design, build and operate dedicated new facilities with a tailor-made business model. Telia is willing to take on the roles of site search and selection, land purchase, design and build, and data centre operations. Linking remote client sites to the Telia Helsinki Data Center networks and infrastructure provides a strong market and regional offer.

- Cool climate, less than 20 km from Helsinki Airport

- All Telia companies are 100% hydro-powered

- Skilled workforce and proven operations. Telia successfully operates a number of data centres in Europe in addition to its 95 telecom infrastructure sites and high-technology real estate properties. Finland's world-class education system and ICT heritage provide a pool of highly educated and skilled employees. Finland's education system is ranked among the best in the world (PISA).

Source: COWI, Analysis of Data Centre Investment Opportunities in the Nordic Countries (2018).ia's Value Proposition for Hyperscalers & Cloud segment includes all the right-hand quadrant values and also majority of left-hand quadrant capabilities.

3

TELIA HELSINKI DATA CENTER

"One of the greenest open (LEED-certified) data centres in the world..."

"The digital bridge between Europe and Asia"

Finland's largest open data centre

34,340 m^2 footprint, 15,000 m^2 of IT white space, up to 5,000 racks, 200,000 server positions

Certifications: ISO 27001, ISO 14001, ISO 9001, ISO 45001, ISO 22301, PCI DSS

The only data centre in Finland with LEED Gold Data Center v4 and CEEDA Design and Operate GOLD certification

100% renewable electricity 24-megawatt IT capacity. 30+ years life. 100-megawatt site capacity.

Heat reuse project in progress – waste heat to be recycled into the district heating system (ERE)

Potential ERE heat capacity to warm over 20,000 homes PUE < 1.2 (water cooling) with added heat recovery

2N power distribution with N+1 redundancy. Dual 110 kV grid connection and dedicated 50 MVA main transformers.

Quality - 100% uptime operational record

Carrier-neutral facility

Quality of service capacity availability with global reach

"WORLD-CLASS DESIGN AND OPERATIONAL EXCELLENCE"

CEEDA
DESIGN OPERATE
GOLD

TELIA FINLAND
TELIA HELSINKI DATA CENTER

CEEDA DESIGN-OPERATE COLO GOLD
SEPTEMBER 17, 2019

U.S. GREEN BUILDING COUNCIL
LEED GOLD
USGBC

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TELIA HELSINKI DATA CENTER

FROM: Ready now: Pre-installed 12U and 52U racks up to 20 kW with fibre connectivity, PDUs and electronic locking. The Telia Helsinki Data Centre has white space certified by the Finnish Transport and Communications Agency (Traficom). Traficom represents Finland in the International Telecommunications Union (ITU) and the European Telecommunications Standards Institute (ETSI).
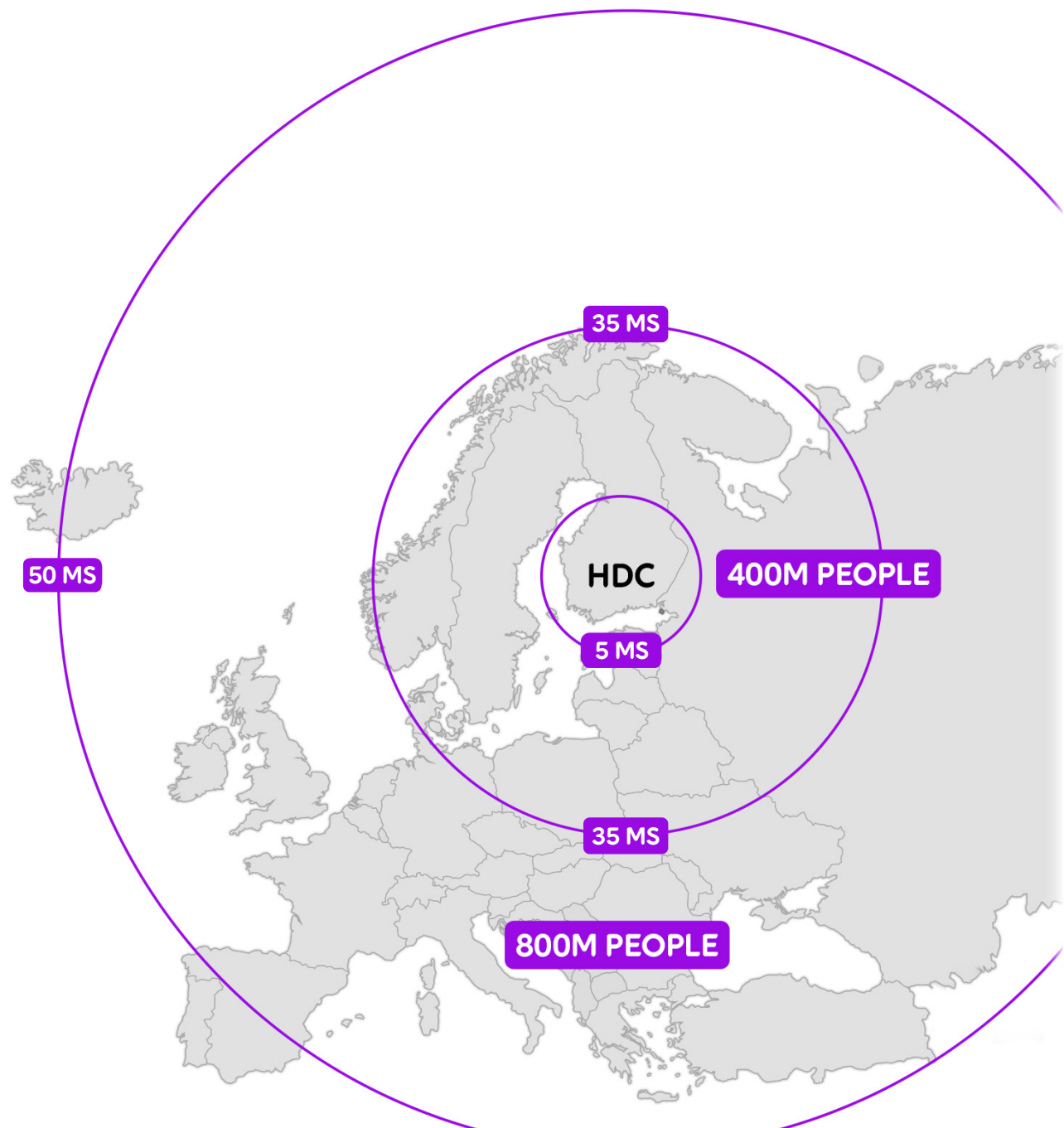
TO: Dedicated client halls - 1 MW - 4 MW outfitted to your requirements, up to two floors with 14 MW.

Data driven driving data
Dedicated interconnect connections: Telia Cloud Connect (Managed Cloud), Megaport, MS Azure, Google Cloud (not routed via Sweden, 5 ms),
AWS (Amazon Web Services)
Access to LINX ESPANIX
MSK-IX AMS-IX DE-CIX Net Node

Telia cloud 9 First Finnish IaaS with ISO 27001 security certification. Data is stored and stays in Finland.
Telia Cygate Managed Services Provider (MSP), NaaS, 24/7 monitoring and management.

35 MS

50 MS

HDC

400M PEOPLE

5 MS

35 MS

800M PEOPLE

4

NORDIC FINLAND
TELIA HELSINKI DATA CENTER

HIGH-PERFORMANCE OPERATIONAL ENVIRONMENT

HIGH-PERFORMANCE DATA CENTRE

HIGH RANKINGS

HIGH RETURNS

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