![atnorth]

Demystifying Latency

Why choose the Nordics for your data center?

atNorth provides advanced hosting facilities from its key Nordic locations in Iceland and Sweden, delivering among the most cost effective and sustainable data center and colocation solutions in the market. Because of network latency concerns, traditionally companies have looked at Frankfurt, London, Amsterdam, and Paris (FLAP) to locate their data centers.

This is not the case anymore as Nordics locations can deliver a significantly better cost/performance solution than FLAP locations as this white paper will demonstrate.

What is latency?

In general terms, network latency is the time it takes for a requested packet of data to reach its destination across the network. With round trip latency describing the time it takes for the full loop of a data request being sent and received back through the same network connections.

Network latency is measured in milliseconds (ms – a thousandth of a second). Local Area Networks (LAN) usually deliver low single digit point to point latency. Wide Area Networks (WAN) usually have latency between physical locations ranging from single digits milliseconds (eg. 7 ms for links between Stockholm and Helsinki) to double digits milliseconds (eg. 45 ms between Frankfurt and Iceland).

What affects latency?

Intuitively the two main factors that affect latency are the distance between the sender and the receiver and the capacity of the physical connection between the two locations.

You might well think that the latency face value between two locations is the only factor that you need to keep in mind when evaluating a location for your data center, however there are other factors that can affect latency times.

If the network connection between your end points is spanning lots of networks, each network hop adds a degree of latency. For example, if you have end point devices such as IoT, or users running applications on smart phones, the number of networks to be transitioned may make the response times and user experience too poor. To overcome these problems, simply choosing a low latency location for your data center is not enough and you might need to develop a more holistic approach to your distribution model, for example by adding Edge Computing devices to your solution.

Addressing latency concerns goes beyond simply looking for data center locations that provide the best theoretical round-trip times. This is why it is important when choosing a data center partner that you look for a company that can provide you with expert advice and multiple location options, to help you find the solution that will deliver to you the best cost/benefits ratio.

How sensitive are your workloads to latency?

A very limited set of HPC/Grid computing applications, such as high frequency trading, tend to be very latency sensitive. Companies with these workload requirements usually leapfrog latency issues by investing heavily in operations that are as close to the source as possible. This allows them to receive the real time data, that is being published by the exchange institutions, quickly enough to gain competitive advantage.

Most organisations though, don't require the infrastructure high frequency traders need. Most workloads are easily served by sub 40 milliseconds latency times. This is why traditionally, many data centers have been located in one or more of the major European commercial centers such as Frankfurt, London, Amsterdam, or Paris (FLAP).

Latency difference between FLAPs and Nordics

FLAP data centers have been the norm until not so long ago, but is this still the case or are there any alternative options that allow for comparable performance at a more competitive cost?

Data centers in Iceland and in Sweden offer access to low latency networking, capable of addressing most workloads requirements, along with sustainable energy prices that sensibly reduce the total cost of ownership of your operations.

The table below shows the round-trip delay latency times between Iceland/Sweden and the FLAP locations:

	Frankfurt	London	Amsterdam	Paris
Reykjavik	45 ms	32 ms	30 ms	44 ms
Stockholm	20 ms	29 ms	19 ms	25 ms

As you will notice for each FLAP location there is at least one solution between Reykjavik and Stockholm which is below the 40 ms threshold. This means that regardless of your workload atNorth can help you build a tailored solution that will meet your demands in terms of performance at a more competitive cost than FLAPs and powers its infrastructure with 100% renewable energy.

Potential Use Cases and Services

As organisations look to reduce cost, streamline operations, and adopt new ways of working, a range of applications and use cases can be served from either Stockholm or Reykjavik with ease.

Simulations and Calculations

Extreme cost savings can be achieved while ensuring the sustainability of the most power hungry IT workloads that companies operate. such as simulations, CAE, CFD, AI, Machine Learning, Deep Learning, Risk Calculations, Monte Carlo calculations, and Natural Language Processing. Many of the traditional HPC workloads are not latency sensitive, because the extensive compute needed happens in the data center and 'only' the results are passed back to the user over the network. Indeed, whilst the computation is intensive with many iterations, the results themselves are relatively 'small'. Furthermore, the computation can take an extended amount of time, up to hours – depending on the complexity of the model and then the results are delivered to the user. There is no interaction whilst the job is being run, so latency is not an issue.

Remote Working

To make it easier for staff to work remotely, organisations are deploying clusters of servers to host virtualised desktop computers (VDI) to provide the same capabilities for users as they would enjoy using their office-based machines, but securely accessed from a home computer, laptop or even a tablet. This enables and empowers workers to remain fully productive, have access to all of their software applications and data and be able to continue working effectively, even if they cannot travel to the office.

DevOps and Containers

Many businesses are moving to agile software development practices and containerised applications which are much more portable and lend themselves to be run in a variety of locations both inside and outside of the corporate data center. Deploying containerised applications in atNorth's facilities in Stockholm and Reykjavik will provide the application agility and flexibility demanded by developers looking to build their next generation of business applications, with latency low enough to enable applications and services to run with ease.

Gaming and Entertainment

Gaming and entertainment workloads are usually perceived as latency sensitive workloads. The truth is that most of the applications can run within the 40 ms margin and can therefore easily be run from data centers in Stockholm. As previously mentioned, if your application needs to be distributed over different networks (4/5G), your latency might be affected by "last mile" and hiccup issues rather than by the data center location itself. This means that you will need an experienced data center partner, such as atNorth, to support you in building a solution that incorporates Edge Computing and IoT integration.

Industrial Automation

With latency below an average of 25ms from Sweden to most other European commercial centers, many other business platforms and applications such as manufacturing and ERP systems, industrial automation and operational monitoring can be hosted effectively from Stockholm.

Build a solution that looks beyond latency

A number of other factors need to be considered when looking at the Total Cost of Ownership (TCO) of deploying computing resources such as your required performance, data residency, data volumes, bandwidth charges for connectivity, energy cost/availability, sustainability, reliability as well as security.

Proximity to major commercial centers increases overall cost. If you are able to run your applications effectively from locations such as Stockholm and Reykjavik, you can avoid paying what you should really consider a FLAP TAX, the premium being paid for proximity to the European commercial centers such as FLAP. As is typical in major commercial hubs, things like real estate, energy and staffing are typically more costly the closer you get to the center. Nordics offer you a much more cost-effective solution, freeing resources that you can dedicate to other business critical applications.

atNorth offers you the perfect solution to your Data Center needs

atNorth's facilities in Iceland and Sweden offer customers large amounts of colocation space, with access to renewable energy sources and air/water cooling solutions, to meet any requirements. Our experts can help design a solution that can maximize your return on investment, with flexible configurations depending on the level of service you need. To find out how you can take advantage of our new Stockholm facility, or our existing site in Iceland, contact us now for a consultation with one of our data center experts.

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