Seminar topics

1. Environment and sustainability. The climate discussions is a hot topic today.

• *How could cloud computing help in this context?*

One advantage of cloud computing is that data from a number of organisations and people can be stored in the same place and on the same machines, rather then everyone having their own servers, in that way optimising storage and the capacity of the machines. (Salid and Raza, 2013)

Several big organisations have built data centers in colder parts of the world to take advantage of the cold weather and air to cool their servers instead of wasting energy on cooling. One example of this is Facebook - they set up a center in Luleå in Sweden where they are using just this method (Vincent, 2016).

Microsoft had another idea, where they created data centers to be located underwater, using cooling directly from the water itself. They also talked about this as an advantage of a large part of the world being located near coasts, so the data centers could be in close proximity. (Roach, 2018)

Besides taking advantages of cold countries and areas for cooling, that several organisations are now doing, there are also organisations using the heat generated by servers for heating other buildings. This way can help reduce the energy costs of normal heating. Examples of this is Facebook - that connects a data center in Denmark to a district heating system, some companies in Stockholm also being connected to district heating, and Amazon, that has connected to a hotel in Seattle. (Miller, 2017)

• *Are there any issues with cloud computing in this context?*

As Sajid and Raza (2013) points out, the energy cost are very high for large computer centers where the servers for a cloud system are located. These cost are of course rapidly rising as cloud services are becoming more popular and are being used for many more operations and applications online. The large server centers are using up a lot of power, both for the amount of running servers and for the cooling needed for them.

In fact, according to an article by Trueman (2019) by 2025 the energy used for data centers will take up more than three percent of the world’s total carbon emissions.

- *How could we gain a better use of could computing in the future? Some innovations that not yet come to use?'*

Even though some large organisations have started to build their data centers in places and ways to reduce energy costs (as mentioned above) there is still a lot of work to be done to reduce the carbon emissions from data centers. Using only renewable energy is a way that this can happen, as well as continuing work of different ways to optimise and achieve the cooling system. (Trueman, 2019)

Kurzweil (2014) theorised about how cloud computing in the future could help us evolve as humans in the way of being constantly connected to the cloud. He talks about nanobots that could be installed in our brains to be able to connect to the cloud and in that way expand the possibilities of our minds. This is something he can se happen på 2030.

2. The rise of the artificial intelligence

- *How could cloud computing sustain the grows of AI technology?*

In a TED talk Agüera y Arcas (2016) shows how they with AI technology have created a software that can not only read an image of something, like a bird, and indeed recognise it as a bird, but can also get the information of a bird and through the technology and information of other images create its own image of birds.

These kind of things are becoming possible through cloud computing, since in the cloud there can be such a large amount of data for AI technology to draw upon.

- *Could you find any threats of this? Have the cloud providers any ethical responsibilities regarding that they provide computing for more advanced AI services?*

If we are talking about things like controlling cars, giving directions or even things that are helping people in a medical aspect, the area of AI becomes another big issue for privacy and security. The cloud providers as well as organisations that choose to have their AI services using or located "on the cloud" needs to have a high standard for security, making sure that personal and sensitive information is secure. (Insight, 2018)

3. Cloud computing and the data - Privacy and personal integrity

- *Who owns the data in the cloud? What problems could occur if we don't have control of our own data (if we are a company running web services at a cloud provider)? What inflict does GDPR mean for cloud computing?*

Clouds are growing and more and more data is put there instead of locally. Private, personal information and data, and we are not sure how secure this data is from attacks or identity thefts. By uploading data to cloud services people and organisations are trusting the provider without being sure of their version or thoughts around privacy. You could be using a service online (application) without knowing the cloud provider behind that service, and through that not knowing the cloud's privacy policy. There is also the global questions about privacy, since the data storage for the cloud service can be located anywhere in the world, which privacy policies are being used? Different countries and continents are looking differently on privacy. (Timmermans, Stahl, Ikonen and Bozdag, 2010)

A big problem is of course that data centers which hold the cloud services might be located in a completely different part of the world than the organisation using the services, and might therefor follow different privacy rules (Timmermans, Stahl, Ikonen and Bozdag, 2010).
GDPR has had a large impact for many different aspects of privacy issues, and the same is true for cloud services. A large part about the effect of GDPR for companies that have a large portion of their operation or storage using cloud services are that they are responsible that the cloud provider they are using are following the rules around privacy for their location. GDPR has strong rules both on how organisations should protect people's privacy as well as giving them the opportunity to get access to the information a company might have about them. (Insight, 2018)

- *What do you think when someone tell you "Well I do not care about digital privacy - I have nothing to hide!" when talking about privacy in the context of cloud computing and social media? Do you agree? Is it a problem to think so or will it easy up things for innovation and the development of technology?*

Even if you feel you have nothing to hide, you have things that you should hide, or rather protect, like your identity – in terms of identity theft – your bank details, passwords and so on. We have seen so many different scams throughout the years, and if you think you shouldn't hide or protect your information you are of course at a higher risk for this.

A lot of people might not realise how often they are in fact connected to a cloud service and that the information they have could be in danger of being seen by someone else. Another part is the fact that since data is usually shared and backed up through several different locations and services, it is hard to be completely erased, therefor data might continue to exist somewhere even after we think we might have deleted it. This makes it even more important to protect our data and think about what we are uploading to the cloud. (CEPIS, 2011)

4. Cloud computing providing services helping people with disabilities

An area that is really interesting and that has a lot of promise is how cloud computing together with new technology can help people with different disabilities. In his TED talk in april, Kapur (2019) showed a live demo of a new device that can “read” your voluntary inner speech to get answers from online or help you communicate without actually speaking aloud. This device, located just under your ear and jaw reads your muscle structure as you “speak internally” and can then feed back answers to your inner ear. The live demo at the TED talk used this to ask what the weather was like and after just a few moments the person could answer this question by having that answer directly answer through the device since it is using cloud services to be connected online. But the real potential of this was shown with a video taken av an ALS sufferer that could use this device to communicate and give commands to their computer, after not being able to speak aloud for years.

Looking further at the potential of how cloud computing can help in this aspect, Rockman (2018) gives an overview of several new technologies that are on the way or already available. Besides the really incredible braille watch Dot, that is a smart watch the creates braille text for blind users to be able to read messages and other information directly from their watch, is some other technology on the way. A Chinese product in development is a helmet that with sensors and cameras (similar to self-driving cars) can help visually impaired people navigate. This helmet uses cloud servers and AI to recognise the wearers surroundings and feed back information to them directly into their ear.

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