Intro

We have to be critically here and ask ourselves if applying our own thinking to understand our own thinking process is a viable train of thought… At the same time, we can recognise that awareness of our own way of thinking does matter because it establishes a certain degree of inner realization that a critical reflection on our own thinking helps us to improve, grow and learn from what we have done. More importantly, a reflection comes with the opportunity to reposition the research within the appropriate context of an academic field.

This academic field (Complex Projects) investigates the future challenges of Amsterdam for the year 2100. My individual graduation research is positioned within this chair and aims to investigate future possibilities for the design of data centres.

The choice to investigate the future of data centres is not based on personal preferences. Instead, the choice to design a data centre is based on the need and behaviour of our new digitised society. Designing a data centre is thus understood as an architectural response to house our new digital culture.

A digitised society

We keep spending more of our time looking at computer screens. The average person spends six hours per day on the internet (Kemp, 2018). This is one third of the time we are awake. But blending IT into our lives comes with questionable conditions regarding the binary logics that we impose on ourselves.

We are only on the eve of a digital age but can already see the implications of our IT applications. It is an accelerating pace of change with enormous impact in our everyday life (Kurzweil, 2005). When we turn away from the analogic and move towards IT technology, our environments become more digitised. Our new lifestyle comes with a shift from analogue to digital. ICloud, Dropbox and Google drive are the recent results of this shift. They are the digitised zones to support our new smartphone and app driven lifestyle.

They are the result of a digitised society that increasingly outsources data to digital environments. This trend in data outsourcing makes remote workplaces possible. Data outsourcing supports companies with their overhead investments… Yes, enormous efficiency steps are being made when we hand over human decisions to the rules and laws of the computer. But what do we give away…?

Many experience stress because they are always online, but the total continuity of our computer driven world is not only at the expense of our sleep, performance and health (DDA, 2018). The "Cloud" is a metaphor that misleads. First because the possession of the cloud's content (data) is structured in an undemocratic way (Lanier, 2013). Second because the infrastructure on which our mouse clicks run spills large amounts of energy (Lepawsky, 2019).

These issues, together with cyber-criminality, phishing mails, DDoS attacks, Trojan horses, computer viruses, clickbait, fake news and other online injustices form a problematic future agenda for our digitised cloud computing world.

The current model of data is often a privatised model and the architecture of data centres displays a similar idea. The privatisation of information has a social and technical nature at the same time. The objectives I have set out, in contrast with the current privatised models, aim to share information in way that is environmentally responsible.

The early stage conceptual input (i.e. radiator shape and cloud volume) aim to make the nature of these goals visible. Merging the two (radiator and cloud) also shows the duality of my objectives. Formulating these objectives took time, in hindsight these goals seem more obvious.

New objectives

Most of our data remains unanalysed somewhere in a database. In 2013 only five percent was actually processed (Teeffelen, 2014). This means we are somehow losing information. If we design smart ways to store, process and analyse our collective information (i.e. data) then we can benefit from our data centres in a new way.

Moreover, if data is processed with the right algorithms, it can help us to get a better understanding of trends. Analysis of data can at the same time shape our ideas about the future. These properties fit well with the current interest of my graduation studio.

Data centres are new building typologies and with more newly built data centres on the horizon, there's still a lot of architectural ground that can be covered and developed. If we design our future data centres in a smart way, then we can transform the current shortcomings of data centre architecture into something more durable.

Responding to the issues of our digitised society is an ambitious design brief / programme. I found myself constantly seeking for the balance between human access and computing power. Yes, it is simple to make things complex, on the other hand, it is complex to keep things simple.

Image 1: The agenda for man and machine

For most of us the digital world is only accessible through digital screens. The design I am proposing allows people in the building and gives the data centre a public function. Not only do I criticize the closed information culture, but I also question the current architecture that seems to supports this. My project therefore wants to open what is now closed. It does this by making information publicly available. The typology of a data centre is thus changed. It is transformed into a learning centre.

I also see it as my task to think about solutions for our energy crisis. The design tries to deal with residual heat in a sustainable way. A data centre can't be self-sustaining because its needs external input (data) to stay active. However, this data centre is self-sustaining in how it deals with energy and residual heath. The design thus becomes a power plant that recycles and stores residual heath for others to use.

Rich ambitions. But there is time until 2100 to develop them. An important note is that not all data is suitable for sharing, because much of our information is privacy sensitive. The relationship between public and private therefore became scales to play with.

For a long time, I have been optimistic about the shareable state of data. I have tried to emphasize the public character. This is in contradiction with our current reality as the majority of data is something private. This somewhat optimistic approach brings the content of the project (public) a little further away from the current (private) architectural reality. But moving away from the current reality was the goal from the beginning. It was my dream to reinvent the future of data centres. But what some dream of keeps others awake.

Of course, the design outcome tries to be as relevant as possible. A fair amount of objectivity is therefore required. At the same time, I see it as the architect's task to formulate an opinion and generate ideas that are based upon that opinion. But my opinion and profound thinking sometimes differed.

Fluctuations

Fluctuations in weight and importance of different agenda points and objectives added arbitrariness to my design process. New insights are gained as time goes by. By the same token, as time goes by early decisions can be questioned. The majority of study projects has a timespan of 10 - 20 weeks. The graduation project takes longer. A result of the graduation project's longevity is the increased time to question the decisions we make. Yes, a graduation project enjoys the ''luxury'' of time. But the longevity in my case troubled straightforward thinking.

Adequate design solutions are not merely troubled as the increase of time allows for different mind-sets. The increase of time also opens up space for looking at the project from varying perspectives. Sometimes the approach was of a more technical nature, later problems were argued with a more social nature. One does not necessarily exclude the other. But mixing different agenda points added complexity to both the design process and subsequently the design outcome.

Different scales

I experienced uncertainty and had moments of hesitation. But I learned, that in order, to address the posed problems it helps to approach the problems from different scales. 1:1000 and 1:5 scale drawings are equally in their value as the end, in many cases, justifies the means.
	Characteristic for the Complex project studio are the different sizes and scales (image 2) that are used to encounter varying sorts of problems. This added complexity to the project. These different scales, at the same time, helped to developed the project.

The differences in sizes and scales adds value to the scientific relevance of this architectural research. Because it addresses more problems at once. Therewith it consequently informs more people, stakeholders and areas. The variety of thinking and designing scales makes the design relevant for more than just the IT field.

But different agenda points sometimes resulted in a confused and inefficient process. Technical matters alternated with social problems and it took time to organize my thoughts and to gain a clear overview of all these things. To keep an overview, it may be helpful not to let go of the concept. The conceptual design phase involved the development where I tried to understand any design issues and find solutions in an early stage of the process.

This early phase of project development involved the creation of copious design alternatives. These where used to create an overview of possibilities which consequently informed my design decisions. In the end, some early conceptual drawings turned out to be fairly accurate in the way they deal with the posed problem. This has learned me that early thoughts, even without in-depth research, can be very valuable.

All things considered, I could improve my work activities if I learn to detect the shortcomings in an early phase. But steering the design in the right direction, and being efficient maybe a matter experience. I can imagine that designing throughout different scales is something that works best if it is done in parallels. Because switching between scales helps to connect ''the dots''. Switching between scales can also be a contribution to the explanation of a project. Because some problems are solved in 1:5 scale whilst other problems require 1:1000 scale. The mind-set per scale can be different but the idea can stay the same.
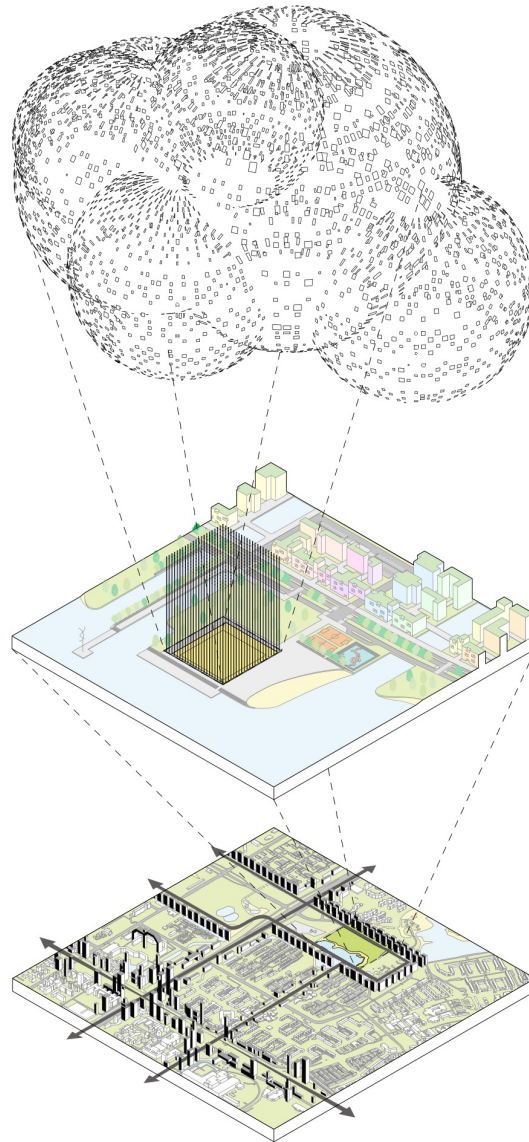
Image 2 It took time to organize my thoughts due to different sizes and scales of the project.