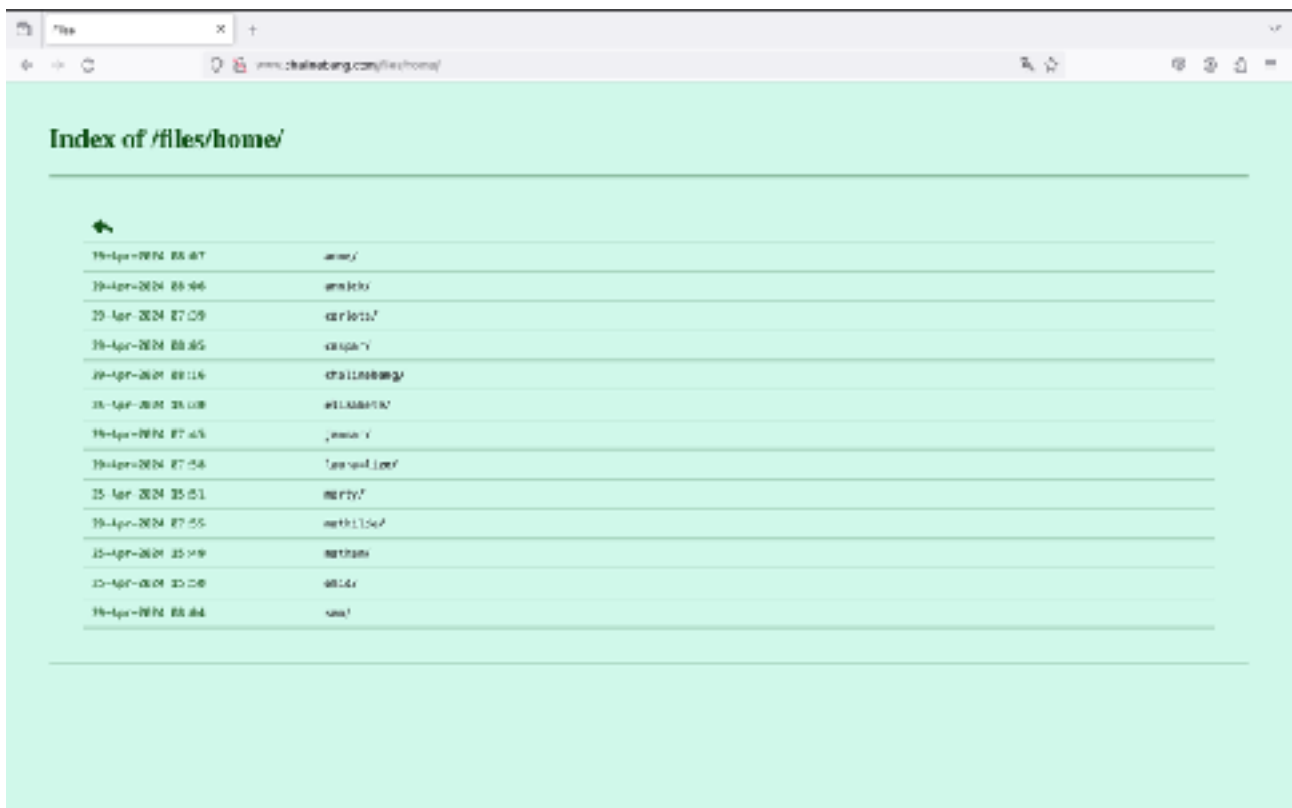# *DIGITAL GARDEN*

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Transformation Design
Autonomous practice Hacking
Supervisor: Christina Cochior and Cleo Foole

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There is a hidden layer to server as a function and the meaning that it contains
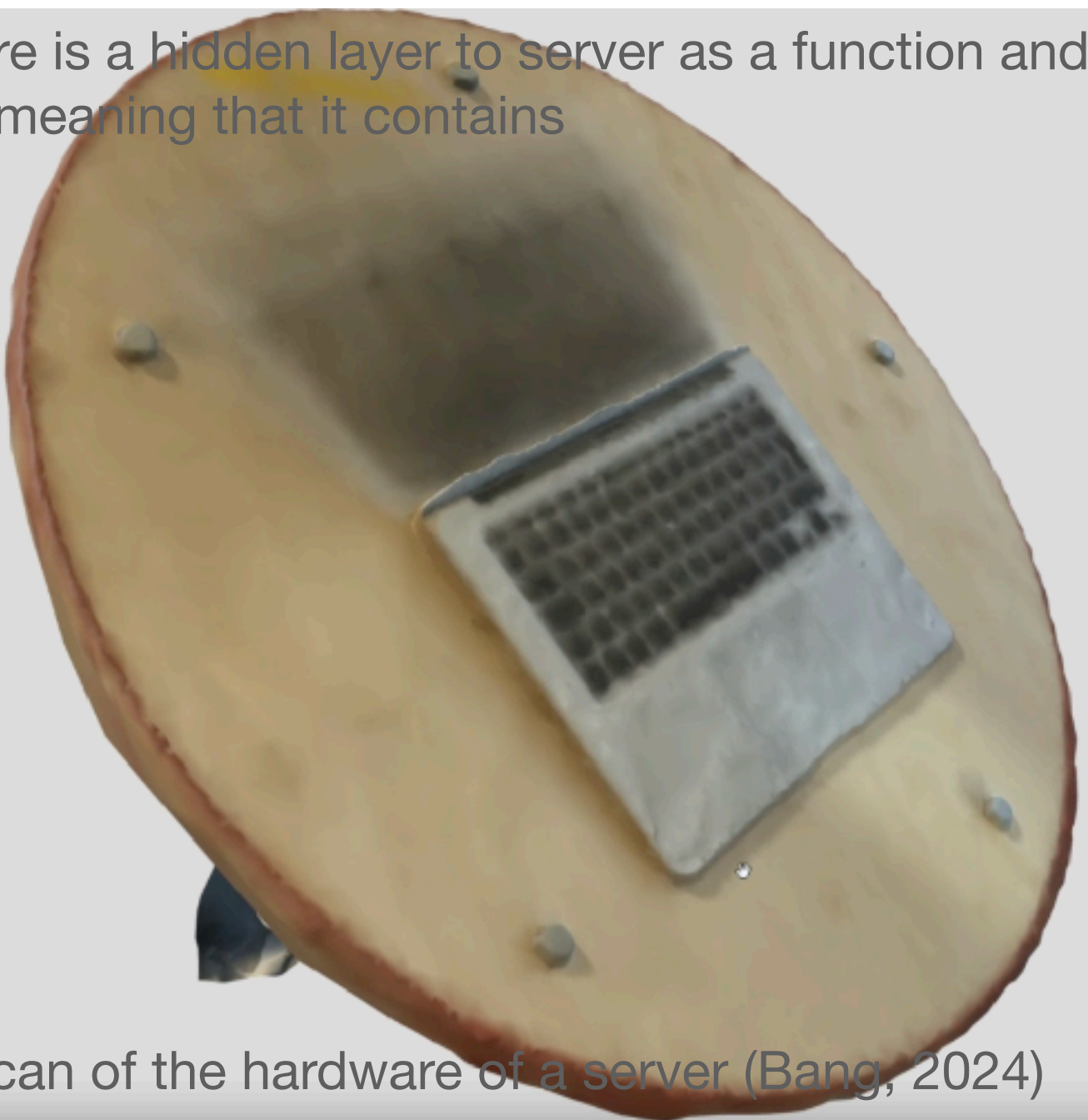
3D scan of the hardware of a server (Bang, 2024)

1.1 Background/ introduction

In the face of the climate emergency and conflict-induced mass migrations, my focus has honed in on information economics, aiming to contribute to reducing their impact on our global society. Through my work I want to offer a public resource of alternative pathways that change the way people understand contemporary technology.

My iCloud stores 2.805 notes, of which 274 are recently deleted. It also stores 140.951 recent images, 10.679 favourite images, 12.992 mails. 662,19 GB of 2TB is currently in use on my iCloud, for which I pay 9,99 euro monthly directly to Apple. I am feeling stuck in the dependence of big tech and a sense of responsibility for the rising monopolies resulting from data extraction and their owning and controlling and the commodification of information and data. Constantly, actively contributing to environmental harm. Feeling entangled with the digital-physical footprint of my *Cloud[1]* and our ecological crisis.


Screenshot of my iCloud storage, (Bang, 2023)

We're entrenched in the issues we're grappling with, perhaps making it difficult to fully comprehend their scope. Our addiction to outsourcing our thoughts and memories to machines, our heavy reliance on technology, and our indifference towards the destruction of nature all reflect a pervasive culture of exponentially growing individualism. This happens in the midst of expanding the scale and scope of capitalistic productive relations

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[1] Cloud - written in capital letters throughout the text to highlight a critical reflection on the abstraction of the term.

through our institutions. For example through my educational institution I am being forced to use Microsoft to communicate and receive crucial information.

Tracking lost, communicating the state of urgency in lost control over our data
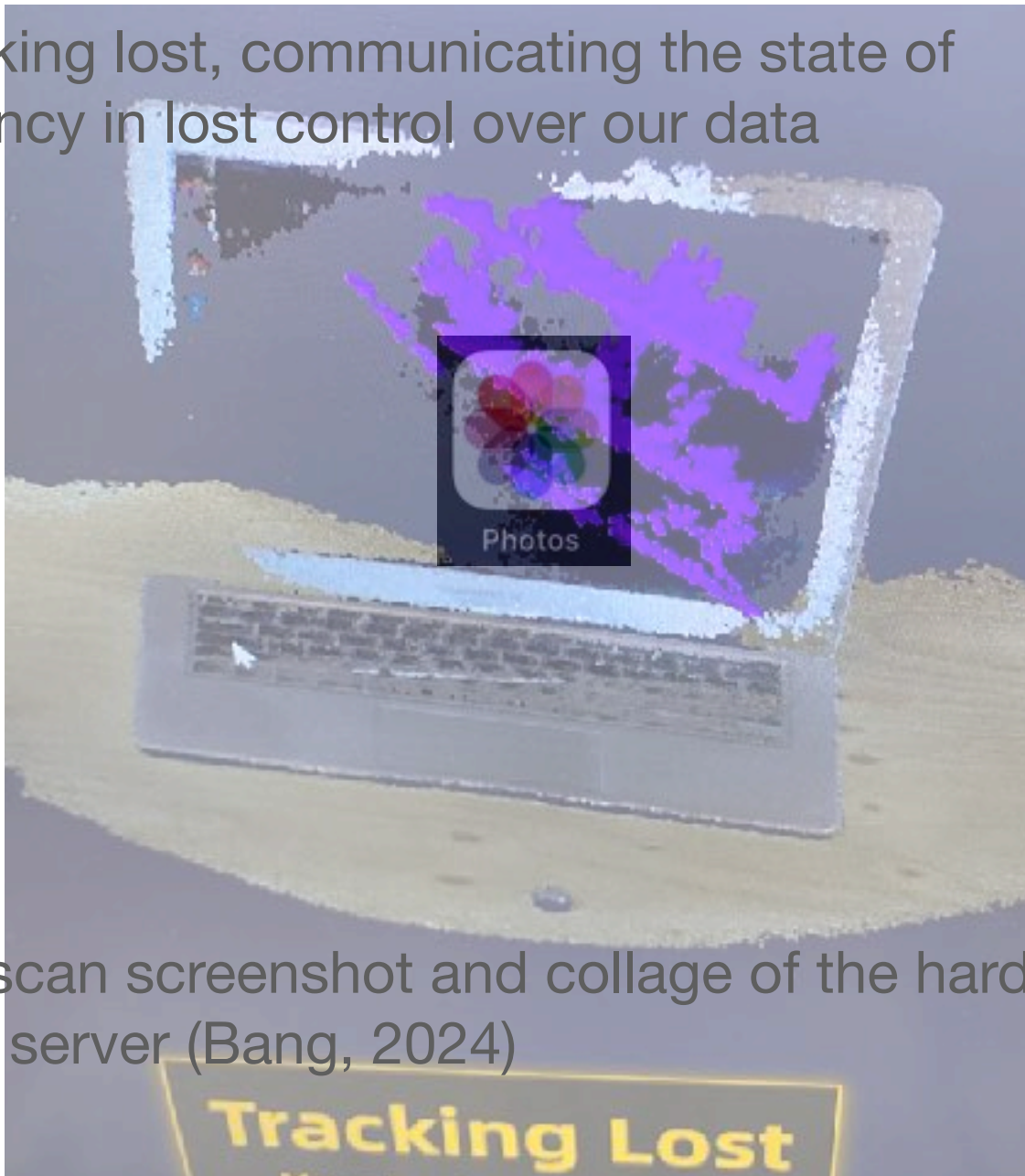
3D scan screenshot and collage of the hardware of a server (Bang, 2024)

By introducing physical photo storage practices, I am rearranging in a sense the physical and emotional connection to it, which refers to wider environmental and political problems. Through the 3D scans of my work and imagery in this document, I am trying to give meaning to these visuals and create narratives around that artefact I am working with. I am thereby using the server as a tool to work with the question: **What is the potential for alternative computational infrastructures to step outside the Cloud Complex?**

1.1 What is the Cloud Complex

The Cloud is not in the air. When I speak about the Cloud Complex I refer to a network of a digital and physical infrastructure. This complex is investigated in the *Trans* Feminist Cloud Counter Action FAQ* (The Institute for Technology In the Public Interest, 2023) as "expansionist, extractivist and financialized modes of Big Tech turn all lively and creative processes processes into profit." that was imported and adapted from the collectively written and edited for the *International Trans*Feminist Digital Depletion Strike* (March 8, 2023). I joined the *TRANSNATIONAL ANTI-COLONIAL TRANS★FEMINIST COUNTER CLOUD ACTION DAY* on Friday 8 March 2024 in Varia Rotterdam, where we called to resist the service Cloud. In the FAQ the Cloud is defined as "a software paradigm that counts on continuously updated software-as-a-service, with scalable computational infrastructure and lots of smartphones, and the political economy of publicly traded Big Tech companies." (The Institute for Technology In the Public Interest, 2023). The Cloud is an entanglement made up from data, infrastructure and economic model.

Files, data and metadata that depends on Amazon, Apple, Facebook, Google and Microsoft (GAFAM) hosting structure. The Cloud service fuels the economic concentration of this group of the big five major computing companies (GAFAM). The Cloud Complex is therefore links between the elements of monopolies, infrastructures, devices and services, that has a primarily strategic function. Storage and backup, availability and accessibility are a customer-friendly offer that hides its materiality under the name of the Cloud. Through fibre-optic cable, submarine and land based cable connections, these networks distribute the network that is the Internet, transporting the Internet's data. The Cloud transforms the supply of software into a service that is provided on centralised servers and not on local computers. These are stored on server-racks in mostly multiple extraterritorial data centres. This centralisation of managed network servers that deliver software-as-a-service and platforms-as-a-service works as a economic model to aid growth. Cloud is the economic structure of capitalistic growth.

This state of affairs has already been elaborated on 20 years ago by Ursula K. Le Guin in *A Rant About "Technology"* (Le Guin, 2005), where she defines; "Technology is the active human interface with the material world. [...] supported by massive exploitation both of natural and human resources." I agree with that analysis by highlighting the escalation and urgency of that condition, heading towards ecological collapse. Technological infrastructures reveal the active relation between humans and the rest of nature.

The Cloud extends the reach of capitalism, which follows the paths of imperial, colonial infrastructures in several ways. The Cloud's Complex infrastructure, dominated by multinational corporations in wealthy Western countries, mirrors historical structures. Its reliance on resource extraction from marginalised communities repeating colonial practices. Labor exploitation in low-wage conditions reflects colonial labor practices. Moreover, the Cloud widens global inequalities by favouring wealthy regions, evocative of colonial resource distribution. The profitability of the Cloud Complex relies on extracting energy, minerals, data, and racialised labor. This is elaborated as a "colonial impulse" in the context of expanding the reach of ubiquitous or pervasive computing (ubicomp), as described by Syed Mustafa Ali in "A brief introduction to decolonial computing" (Ali, 2016).

The Cloud functions as a tool that extends and intensifies the colonial logic of extraction, dispossession, and depletion, impacting not only the digital realm but also the physical world. This expansion of a Euro/Western-centric, monocultural view perpetuates fossil fuel-driven planetary damage and contributes to the climate crisis. The scale of Cloud computing has reached alarming levels, with unforeseen ecological consequences arising from the significant water and energy consumption by data centres. It is contradicting the notion of a floating entity that many people associate with the vague term while cause to violently cut people off from the land and the means of life.

The widespread use of Cloud infrastructure raises questions about social and environmental responsibility for those who are not served by it, including their suffering and the destruction of their habitat. This definition underlines the importance of

questioning the ubiquity and normalisation of Cloud services, which are dominated by techno-capitalist hegemony. Data is the pollution of the information age. It reinforces the critical question of who truly desires to be standardised into a structural system that benefits them at the expense of others. Its great acceleration has massive impact on earth and its long term effects remain unknown, while its keeps producing a juxtaposition of over abundance and scarcity. If data is the new oil, than computing is ecocide and the collection and distribution of data contributing to biodiversity loss in several ways - thus all technical decisions are political.

2 What is a server

Selfhosted website, pads in the collective Varia infrastructure

In search for alternative data storage practices I got introduced to the server. A server works as a function but can be much more **as further being elaborated in this part.**

A server, is essentially a computer that makes files available over the internet or through a local network. It can be connected to the Internet, but not only; you can also have a local server that operates independently of the internet. Servers provide various services or resources to other computers, known as clients, over a network, facilitating communication and data exchange between devices. These services can range from hosting websites to storing files or managing network resources. In the context of alternative approaches, servers can also be collectively maintained by works like the server Rosa, connected through *A Traversal Network of Feminist Servers* (Varia, 2023), a collaborative project around intersectional, feminist, ecological servers.

Varia is a Rotterdam based initiative, that develops a critical understanding of everyday technologies by using tools for physical and digital infrastructures in a collective way. There are self-hosted services installed on the Varia server in the space and they host and organise events like Digital Discomfort Working Group or 8M Counter Cloud Gathering (Varia, 2024). In the sphere of digital infrastructure, alternative approaches to server management emphasize collective maintenance and feminist critiques. Initiatives like Varia and Rosa adopt a collective approach to server management, emphasise trust and reciprocity among participants. These initiatives embody feminist principles by challenging traditional power dynamics and promoting collaborative decision-making. By acknowledging the importance of collective effort and critical understanding, these alternative approaches offer a critique of dominant norms in digital infrastructure. Feminist servers explore various approaches to the dynamics of serving, considering factors such as inclusivity, empowerment, and ethical considerations. Feminist technology practices are very valuable in the context of sustainable tech. *Systerserver* (Systerserver, 2024) for example is a platform that provides server infrastructure and tools for feminist administration, particularly in creating safe and inclusive online spaces for women and marginalised communities. It aims to facilitate communication, collaboration, and activism within these groups while prioritising privacy and security.

…exist in the wishful space-time between the no longer and the not yet.

This is the first *wish* from *A Wishlist for trans*feminist servers* (Digital Discomfort, 2022). The list illustrates how computational language and the practice can be done otherwise. It is a feminist critique of digital infrastructure and their enacted power relations, a critique of infrastructures, that lends itself to the critique of norms. The wish explores the concept of *now*, existing in a state the potential of anticipation, situated between the past and the future, significant in relation to alternative futures and ongoing learning.

Varia server (Bang, 2024)

Space-time as an in-between, that can be used for speculative design, characterised by hopeful anticipation for what is to come while acknowledging the passage of time, urgency to act and the experiences that have shaped the past. I see the *no longer* as a

opportunity to give space to acknowledging the history of infrastructures. I view the *not-yet* as an opportunity to explore and commit to ongoing learning through caring. It invites to give words to my own wish - the wish for creating and inhabiting **alternative.**

2.1 Methods

My project is inspired by ***permacomputing***, a radically more sustainable approach to computation. Permacomputing design principles have been modeled after those of permaculture (https://permacomputing.net/Principles/), which urges the need to maximise the lifespans of hardware and inspired me to build a server on my *old* computer. Hereby I am sharing the steps I took in the terminal (meditator between operating system of the machine and user) for building a server on a MacBookAir 2010 hardware.

```
:~$ (sudo?) ip a
inet 192.168.1.207/24 thats the IP address of my machine
```

software to handle the request - nginx

```
sudo (super user do)
cd (change directory)
```

Added index. php to the list if you are using PHP
index index.html index.htm index.nginx-debian.htm
for setting up web server

Through building the server I am understanding how the internet is constructed

Screenshot of Photogrammetry of the server in my living room (Bang, 2024)

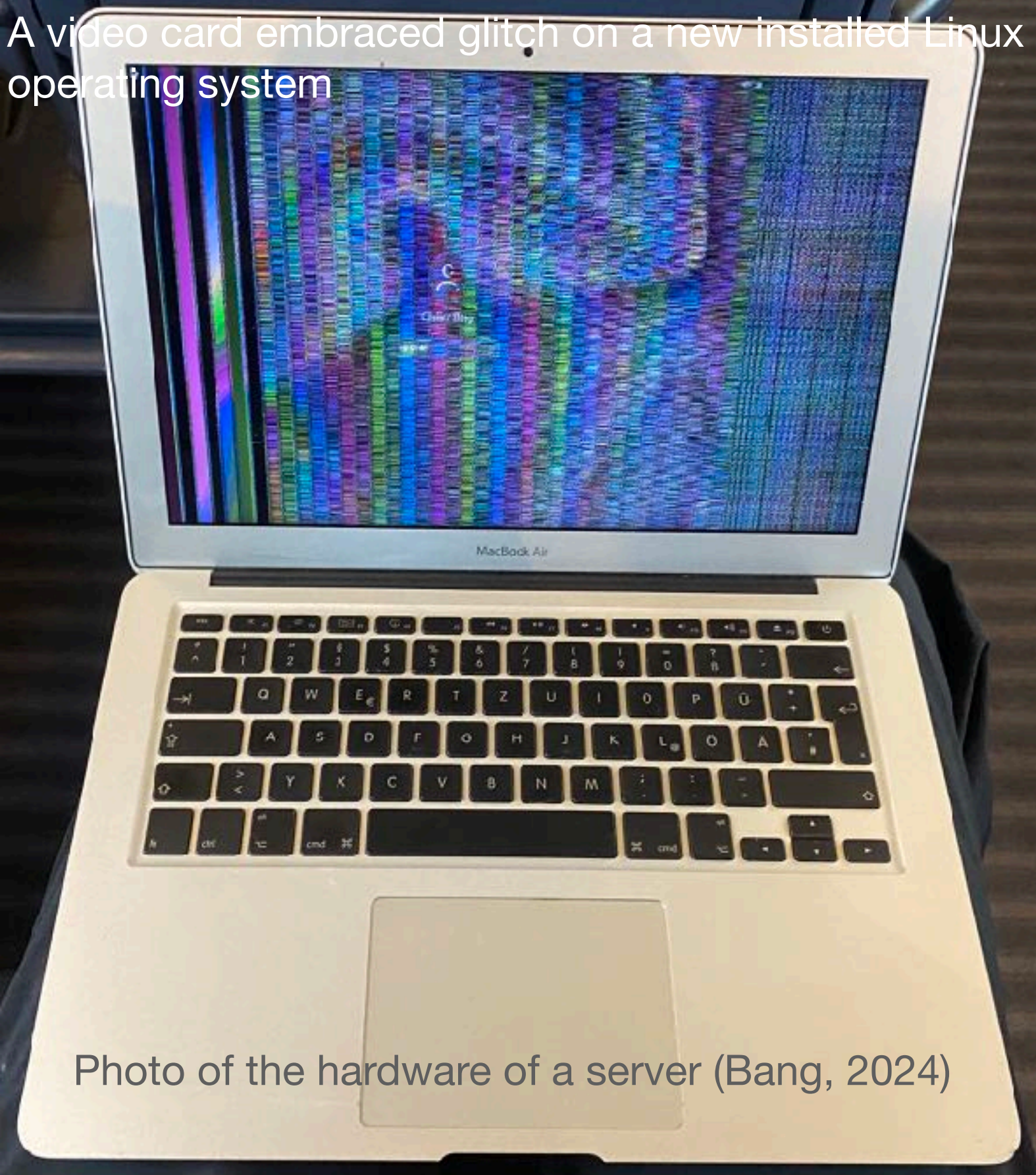A video card embraced glitch on a new installed Linux operating system

Photo of the hardware of a server (Bang, 2024)

sudo cp indexsite.html /var /www./html

Duck dns -static ip

Through ssh chaline@192.168.1.207 I can log in to the server from another computer (secure shell)

Port forwarding in ziggo connect box

Static ip address - sudo nano /etc/netplan/*.yaml

01-netcfg.yaml

YAML

```
network:
  version: 2
  renderer: NetworkManager
  ethernets:
    wlp1s0b1:
      dhcp4: no
      addresses: [192.168.178.14/24]
      gateway: 192.168.178.1
      nameservers:
        addresses: [8.8.8.8, 8.8.4.4]
```

Configuration
From http to https - secure

Bought a domain name *chalinebang.com*
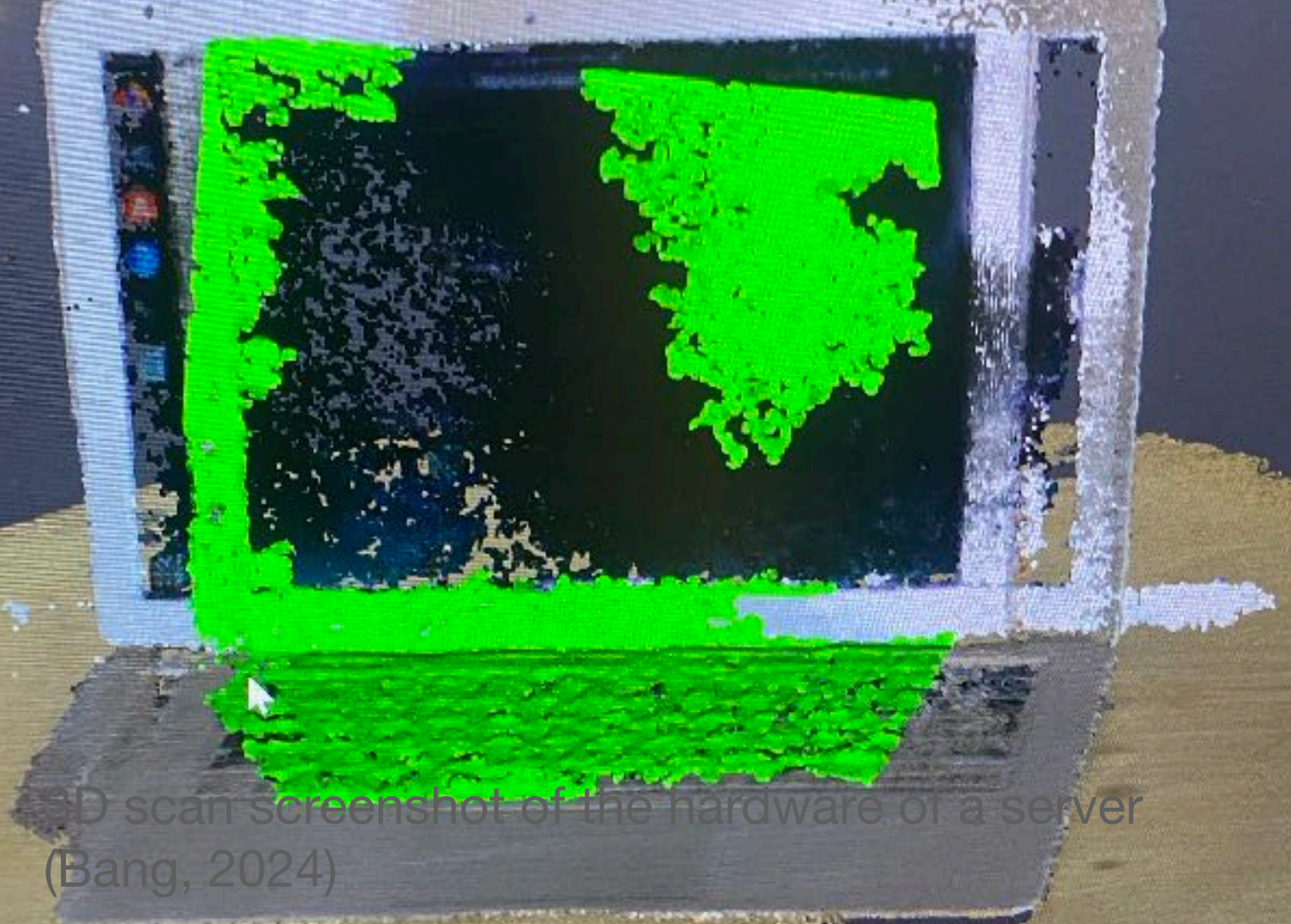
2.2 Input by experts

I decided to interview experts to inform and reflect (during) my making process. In this chapter, I dive/dig into insights provided by experts regarding the challenges and

What afterlife can this hardware host?

3D scan screenshot of the hardware of a server
(Bang, 2024)

What meaning can this server carry?

3D scan screenshot of the hardware of a server
(Bang, 2024)

implications of data management, particularly within the context of energy efficiency, environmental impact, and community engagement.

Benjamin Czaja, a High Performance Computing advisor focuses in particular on energy efficiency. He repeated that "things are becoming more energy efficient, but they are also using more energy." Merely improving efficiency to save energy is not a solution, as it often gives way to intensified data harvesting and expansion. Technological innovation continues to operate within a socio-historical framework shaped by capitalist competition and exploitation. Fundamentally the issue lies in our continued dependence on Cloud infrastructure that is driven by a capitalistic mindset fixated on growth. Ben argued in his world this wouldn't change, but I thought there are not multiple worlds, not mine or yours - there only is **one world.** So, it is important to open up technical decisions and interdisciplinary collaboration is crucial to make more inclusive decisions and thus decentralised.

Software artist, writer, and PhD researcher Marloes de Valk has been following the development of data centres, their intertwined political landscape, and the inherent environmental impact they cause. In her lecture *A Tale of Two Data Centres* (Valk, 2024), she investigates, the intrinsic connection between the already existing infrastructures for food production, used by Google to cooling data centres state of affairs. In a conversation with Marloes, she is emphasises on the importance of prompting people to reconsider the purpose of computing and the internet. She suggests taking a hands-on approach and engaging with the local community with my design directly. Rather than relying on the Cloud for excessive storage, radically rethinking what computing is for. *Different practices* could disrupt the continuous stream of data that drives this economy. It enforces my commitment to question how we show more deliberate to where we go with technology. How can we envision collective practices that prioritise sustainable and local data sharing, moving beyond our reliance on Cloud-based networks?

To further explore this I talked to Davide Bevilacqua, the managing director at servus.at, an association that works with demystification of technology, both through cultural and technical processes. They are a profit free data centre, hosting data from around 1200 people in Linz, Austria. He states to motivate for the usage of their infrastructure instead of other Cloud systems for a public benefit. Being part of the servus community means, they aim to make projects together in addition to offering the infrastructure. They offer a secure communication infrastructure, but no guarantee for safeguard for data backups in means of full security. Sometimes the infrastructure is not working for a day or two but their members have an understanding for that. Last year they asked everyone to archive their data, due to almost reaching the 2Tb total storage space of servus server, by doing so also rethinking to what you need to be online and compromise in order to maintain the infrastructure. This let me reflect on my Cloud storage service of 2TB space and ultimately questioning the absurdity of it in relation to a running communication infrastructure for 1200 people.

Hacker, mother, activist, feminist and community builder Vesna Manojlovic, played a key role in rethinking my work. In a talk with her, I asked how she would imagine the Internet within planetary boundaries in relation to data storage. Her preference would not be individualistic, but collectivist, in small groups of people or neighbourhoods. Keeping it small and local and emphasising more collective responsibility and connections between the technical and non technical people is key she said. She envisioned sustainable digital infrastructures collectivist, decentralised and outside of the capitalist system. This was a turning point in my process and let me refigure the purpose of the server from an

The server is physically located in my living room, in what practice will it be situated?

Screenshot of photogrammetry of the server in my living room (Bang, 2024)

alternative photo storage for myself to a collective space. So I took from that, rethinking more sustainable practices is foremost about connecting, opening up spaces and redistributing resources towards collectives.

3 http://217.103.251.8

In this section I elaborate and reflect on design choices and processes within my work. I created a body to explore an alternative digital infrastructure, thereby I am addressing not only a step from an individual to a collective storage space but also its potential as being a collective. As an alternative to the Cloud Complex it is hosted on the server in my living room.

3.1 Self-hosting

Self-hosting requires constant technical attention, requiring regular reboots to keep it running smoothly. There were times when I asked my housemate to check on it while I was away, as it would occasionally break in my absence. This connection goes beyond the digital, as I am physically tied to it, needing to be present for maintenance. Its fragility urged me to form a relationship with it, one that requires ongoing care.
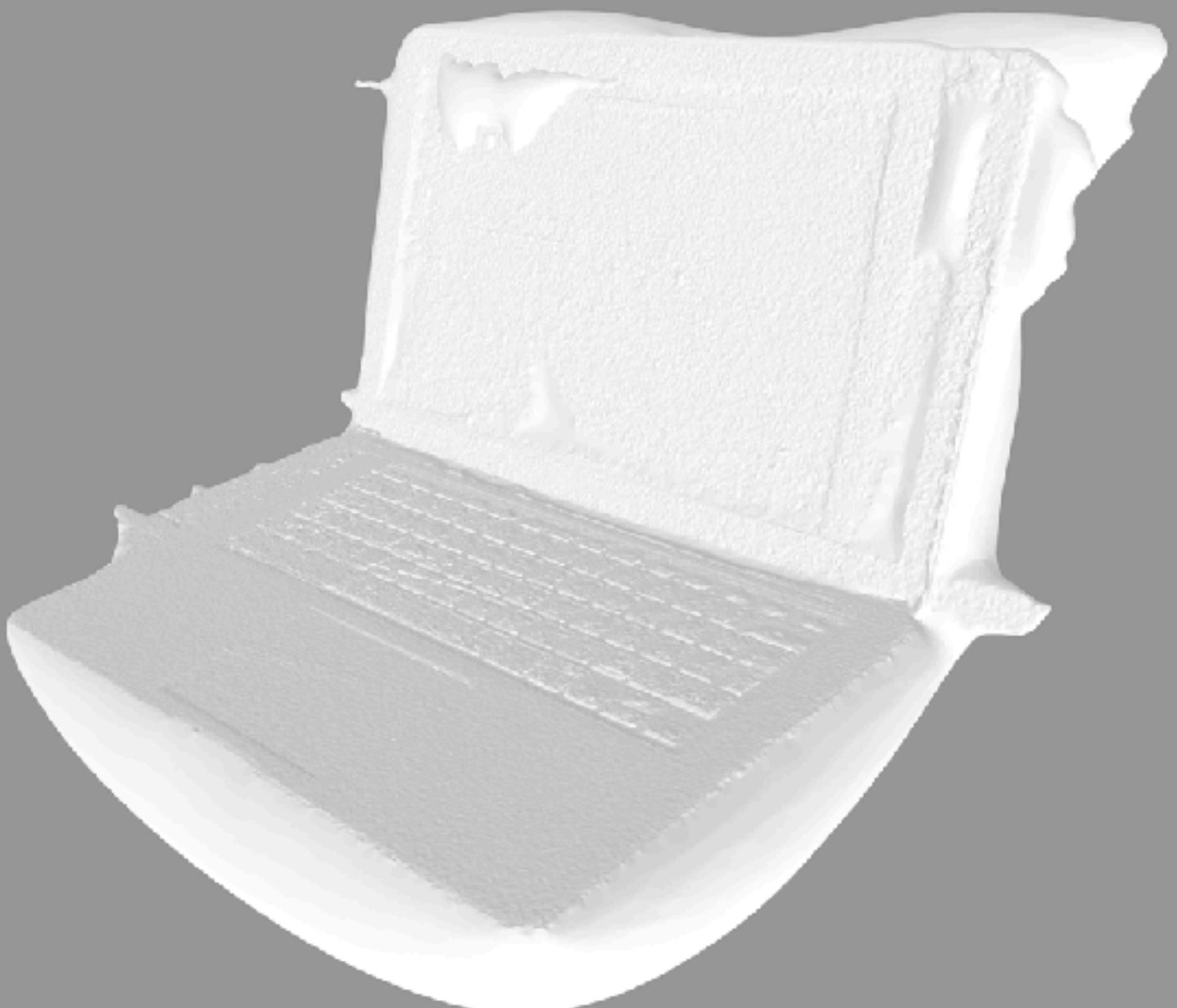
So my perspective on hosting has generated a different value of the space in mind. The practice of building the server charged the created space with a sense of preciousness and importance as a valuable resource. By working with actual spatiality of the photos

and files I gained a feeling of agency, notions of moral responsibility and political accountability of my data. Probably, because I am more aware of their negative effects, I started to care for the footprint of my data storage.

For me, this means practicing self hosting to remediate the default and utilise tools differently, by shifting from capitalistic hoarding driven by fear to embracing reduced and shared spaces. As integral parts of larger institutions, we must actively explore ways to decrease our dependence on cloud-based applications. We have to advocate for restructuring digital infrastructures within our organisations to better align with our interests, all while envisioning and embodying alternative methods.

This perspective calls for a distinct approach to data, space, privilege, and responsibility, particularly in the context of climate change. To reclaim ownership of our data storage technology, countering monopolistic control systems that harvest and manipulate our information for their own ends. To resist the standardisation of contemporary techno-capitalism and its massive impact on our physical and digital environments, I reconstruct my digital garden as a metaphor for the virtual space that's created.

3.2 Digital community garden

Screenshot of photogrammetry of the server in my living room (Bang, 2024)

Giving body and purpose to the server

Reflecting on my conversation with Ben I know that, If everyone would host their data individually on a server, this would ultimately not be more sustainable. Referring back to my insights given the exchange with Vesna Manojlovic, it becomes clear that there are limitations of technological *solutions* in addressing complex environmental issues. So it is clear that we need better sustainable, social aware computational practices, by figuring and imagining less extractives practices.

(considered infrastructure)

//In a world of limits, resource scarcity, limits-aware computing must define socio-technical computing systems.
LIMITS 2024 (Limits, 2024) is an organisation that host workshops on computing within limits and encourages community-building and sharing of infrastructure."As an interdisciplinary group of researchers, practitioners, and scholars, we seek to reshape the computing research agenda, grounded by an awareness that contemporary computing research is intertwined with ecological limits in general, and climate- and climate justice-related limits in particular." Limits trying to work with the limits - not growth

Me relate!!!!!!!!!!!!!!!!!

3D scan Screenshot of the hardware of a server (Bang, 2024)

Inspired by this, I addressed a form of working with limitations instead of against them; through the consideration of it being a shared storage.

If we aim to establish an alternative, it must exist in a tangible, physical location. It felt like there was no other way than giving the server a purpose and function of a shared space, in a sense a shared resource, that has potential to be **more**. So this server can work as a tool to not only transform individual data pollution but foremost to engage differently in these technological practices socially. This urged me to share the created storage space on the server with my peers and pushed me to initiate the crit(ical) server.

3.3 Crit(ical) *server* (mode of relating)
is the host in the sftp configuration of my server (host is also the old term for server).

I feel a lack of crit space during my study at the Willem de Kooning Academy and I am interested and like to engage with my peers process, so we can support, test and give feedback on each others work. A crit space in art education is where students present their work for critique by peers and instructors, aiming to receive constructive feedback to refine their artwork and develop their artistic skills. It's a key aspect of art education, encouraging dialogue and collaboration among students. The crit(ical) server stores the works of the group, that facilitates the crit space, so it's space is amongst other people, intending to engage with the material critically.

I decided to propose the format of the crit and thereby the servers works as an infrastructure dedicated to exchange and share works, with a few of my peers. It is set up for a combination of friends, permacomputing evenings peers (a working group that comes together every week) and peers that are interested to collaborate forming a group of 12 students from WDKA. Accessed via http://www.chalinebang.com/files/home/ on the internet, the infrastructure can be accessed by participants through the sftp protocol on this IP address 217.103.251.8 and through the software File-Zilla. In ftp/sftp (file transfer protocol configuration) the works can be uploaded with a username and password (configured user identification) by the participants. So the digital files for the crit are actually stored on the server through this process. What is the social working !How exactly does it happen Mention structure of critical space ///////////////////
Referring to sustainability (permacomputing), it is crucial to focus on organic growth and maintenance to sustain the server alive. The participants/gardeners can see a shared interface and everyone visits and view each other's folders. It becomes clear that bonds of trust and reciprocal efforts are needed to maintain a server space collectively in order to contribute to its sustainability. A non-hierarchical structure, (as is the case with this project), holds value due to its democratic decisions. Links grow through community and spatial dynamics that intersect in a hybrid realm. The servers space blends digital and physical dimensions, serving as a tool to weave together diverse practices of connecting. At its core, the community network revolves around my peers and their connectivity and collaboration in any form.
We practice a Approach to decision making in discussion , majority- non hierarchical , vote - consensus decision making Conversation based approach to Deci making
to decision making and organising offline get-togethers in addition to online communication. So the shared space is in the process of recognising and negotiating as
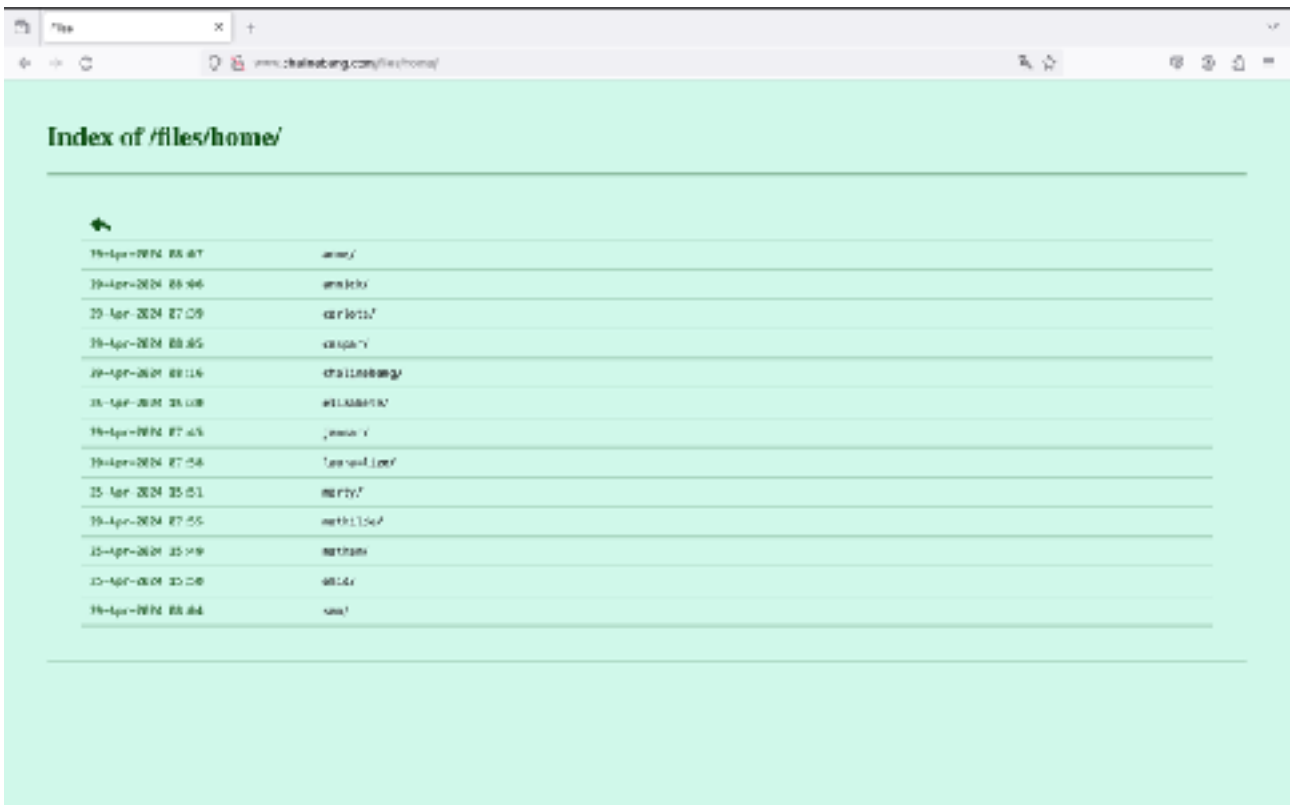
we become an offline community. It is not only a platform to publish your work but rather a space to find buddies, participate instead of consume also outside the net. The crit meetings work as a whiteboard for modes of working together and making our works stronger. In the first meet-up we introduced ourselves, what we are working on, what we need feedback on and a wish for the space, needs and adjustments like adding Individual pads. These work to individually state what we are uploading and particular questions we have on the work. Participants shared needing to be prompted through each other and to have deadlines to upload. We also discussed positive outcomes and aspects of collaborating on projects, sharing open calls and planned offline meetings. Everyone agreed on having meetings on physical location as very useful, where we meet, test work, share and strengthen relationships in your group.
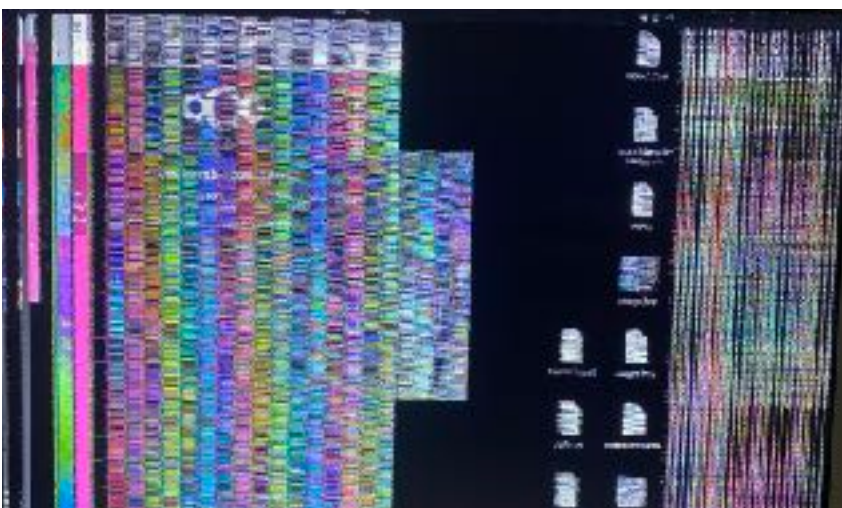
To care for it we decided to practice uploading work, visuals, or writings on the server, and responding to these reciprocal. We are doing that through being in touch on the infrastructure online, it is in a sense a practical experiment of being a little artist collective support system.

3.4 Together

Together we strengthen the step outside the cloud complex and the potential of alternative infrastructures by being collectively in the space.

The crit(ical) *s*erver is a small local server. So given these (spatial) limitations and its purpose, influenced how people are engaging and operating the space. By having rethought what a digital infrastructure is for, it became clear to imagine a design that supports a need and encourages stronger community bonds and sense of collective space. Evaluated computing within the (psychological) limits, it has potential aiming to raise group consciousness, shared responsibility and safety of common space. So, the **crit(ical) server** embodies an **alternative computational infrastructure** that serves a more critical engagement with the data we use, through the mode of reflection, selection and awareness. Opposed to store 140.951 images, which are never looked at again, this server space not only works as a storage but foremost as a crit model. It triggered the curiosity to do and explore considered communication outside the individualistic constrains of big tech data dumps.

Another point of reflection is the meant of selection, that we not always have in relation to our mainstream digital Cloud infrastructures. Through the act of selecting for the format of the crit, I didn't need to set up limitations because, already the format and the infrastructure, is influencing how people relate to the scale of it. So the infrastructure is influencing how participants relate to what they can or cannot store on the server. The format of these meetings is already inducing a more thoughtful relationship with digital data. As a consequence it works as a potential to refigure and reassess for what services we need digital infrastructure for and to think more collectively.

Everyone expressed excitement about the off grid community server that is also a real life community extended to graduation in the future. If we continue, we are aiming to not only have one person carrying the maintenance, but everyone finds their own place and it's actually beneficial for everyone, in a sense fruitful space. The crit(ical) server exists to encourage stronger and more resilient art practices. Its goal and purpose lies in connections within the community, empowering my peers to create and sustain social
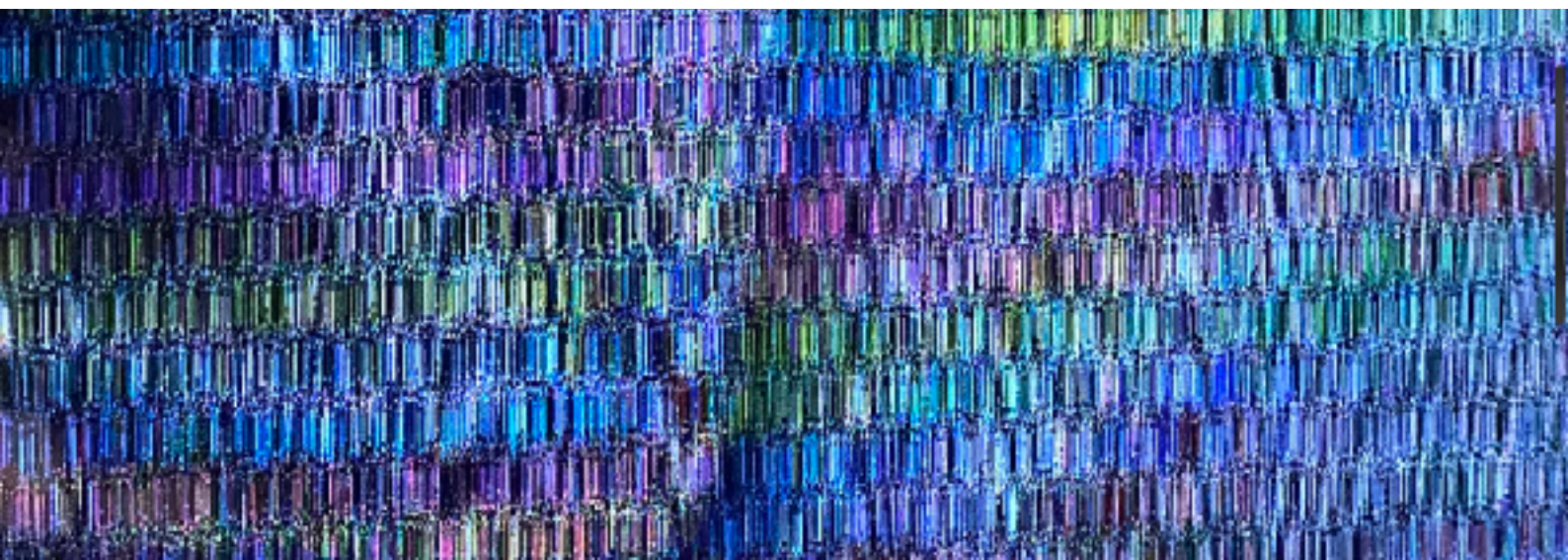
bonds while nurturing connectivity, through a peer-to-peer collective. The space is designed to facilitate sustainable data exploration and information sharing within communities. In doing so, I address the challenges and opportunities inherent in design during a climate crisis by translating design theories into steps that prioritise community values. It's about Sharing or collectivising ownership, things we can collectively manage, about providing good, healthy and affordable products and services by showing solidarity and being part of it. This approach can serve as a tool to empower community efforts and guide more collective decision-making for processes.

Seedling server germinated in its community

4 Reflection

Alternative computational infrastructures hold immense potential for liberation and political transformation. They are not just technological systems but also norms themselves, capable of shaping spaces and embodying community values. Collective efforts can contribute slowly unentangle, disassemble, tensions and contribute to restoration and regeneration. The agency of self-hosting and server infrastructure emphasises the potential for more sustainable and decentralised computation.

Screen the hardware of a server (Bang, 2024)

Prioritising open-source software and locally hosted servers in internal communication fosters diversity on the internet and promotes privacy. By reclaiming ownership of digital spaces, such as through self-hosting, we can challenge the dominance of big tech monopolies and work towards a more organic internet. We need to press the emergency brakes and start nurturing radically different ecologies and social relations within this world. Like squatting a house, a server can be the entry to claiming back the proprietary layout of the internet.

Servers play a crucial role in shaping the web and its processes, mediating the storage and transmission of data. They serve as tools for repairing, and adjusting systems of meaning making, highlighting the importance of physical space in digital ecosystems. My project of self-hosting and establishing a shared server space is a response to the overabundance of digital media storage and the lack of critical engagement with it. By selecting and curating digital content, I aim to explore the limitations and constraints of working with a smaller server, challenging the notion of unlimited digital storage. By critically examining the design of digital infrastructure and rethinking the purpose of computing, we can foster more sustainable and ethical practices. This project reflects a commitment to decentralisation, community empowerment, and reimagining the digital landscape.

//// one overall comment - flow of information

////////////////flow into each other
Not just pieces but clear

Come together
Treaties come together , clear connection

Why bringing up what bringing up

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