Running a Devuan Data Center

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TOC

- Who is ungleich?
- Why we do stuff like we do
- The Open Source aspect: How to copy us

# "I shall begin at the beginning"

`history`

- Nico started 1998 at an 1+1 ISP in the small village "Schloß Ricklingen"
- Hacked through various companies
- Landed in pretty Basel in 2005
- Shifted to Zürich area in 2007

`less /var/log/syslog`

- Founded ungleich GmbH 2013
- Moved to Glarus 2014
- First prototype of Data Center Light 2016
- Founded ungleich glarus ltd in 2017

`whoami`: ungleich

- A self-organised, highly distributed team

  solving problems with Open Source

- One non-grey-beard
- And a new generation of hackers
- … eventually redoing the cycle

Why
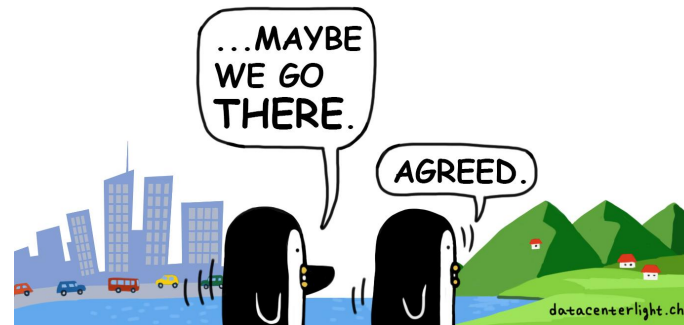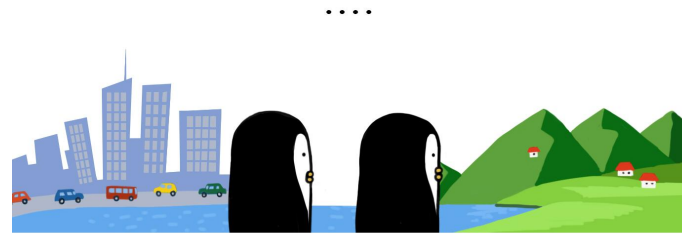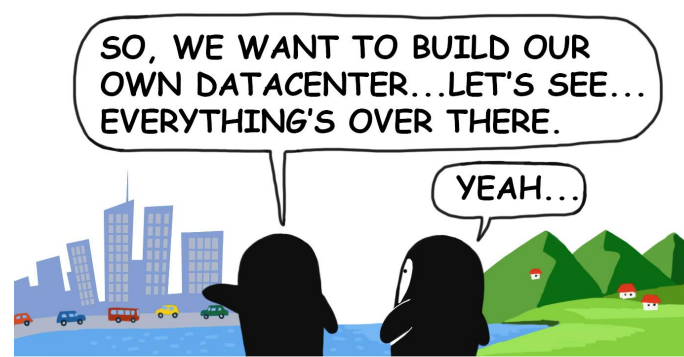
`ls ~/tasks`

- High performance web infrastructure tuning
    - For TV spots - low volume by default, several k request / s when aired
- Design of **virtualisation infrastructures**
    - KVM + ssh + cdist + cinv
    - No web, database server, etc.
- Design / implement / maintain **data centers for customers**
   - Dark fiber, racks, servers

`sort ~/tasks | uniq -c`

- Topics
  - virtualisation
  - servers
  - linux
- The answer to why:
  - Customers run their stuff and asked us to do their hosting

`find / -name "*datacenter*"`

- Initially based in .de on top of a big provider
- Many architecture limitations
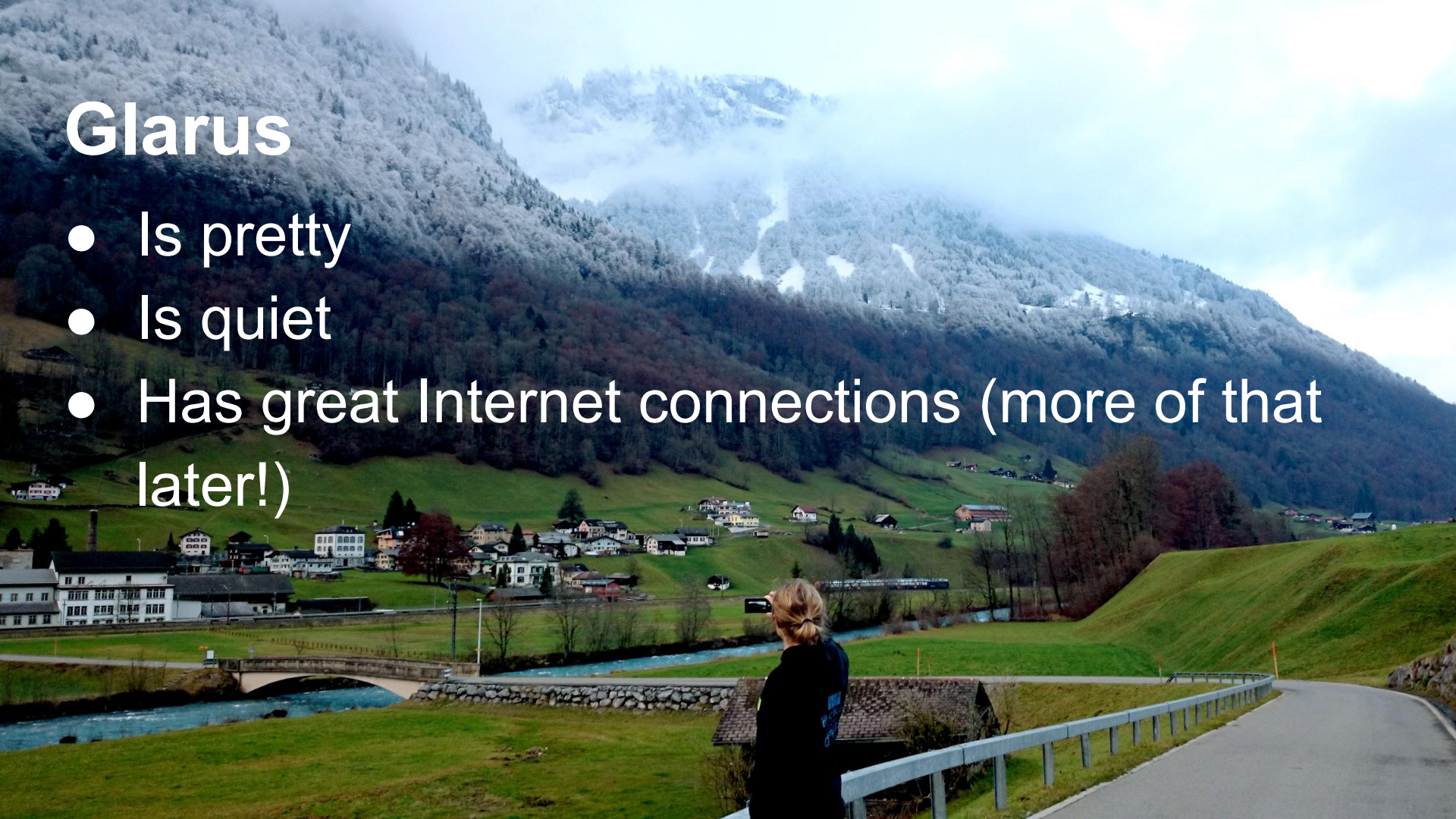- Customer requiring Swiss based location

Glarus - wild wild mid-east

- An old and pretty Canton
- The most industrialised Canton
- Used to host a lot of spinning and weaving factories
- … now empty factory halls
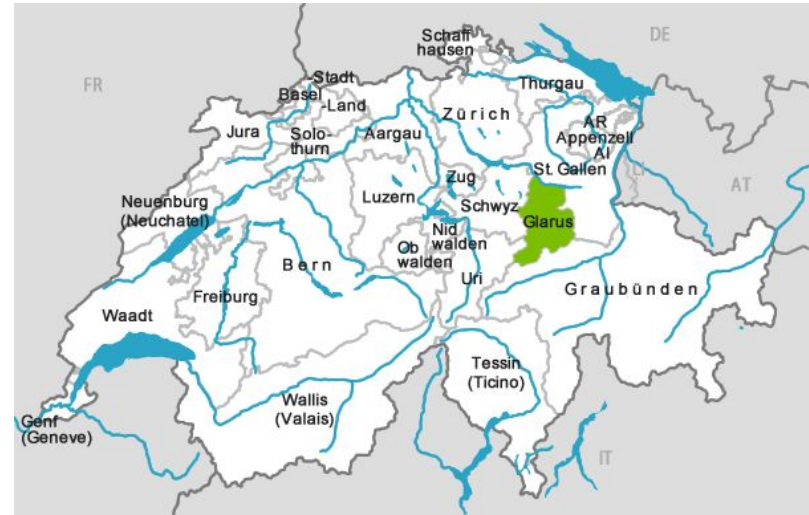
Glarus

- Is pretty
- Is quiet
- Has great Internet connections (more of that later!)

cd ~/data_center; make all

- Doing it once is hard
    - But doing many times is fun
    - From customer needs to doing it for ourselves

- You will need
    - 1 building
    - 1 Internet connection (2 is better though)
    - Some power
    - A bit of hardware
    - Lots of cables
    - Some years of experience

ENOUCH WITH COMPROMISES.
WE WILL BUILD OUR
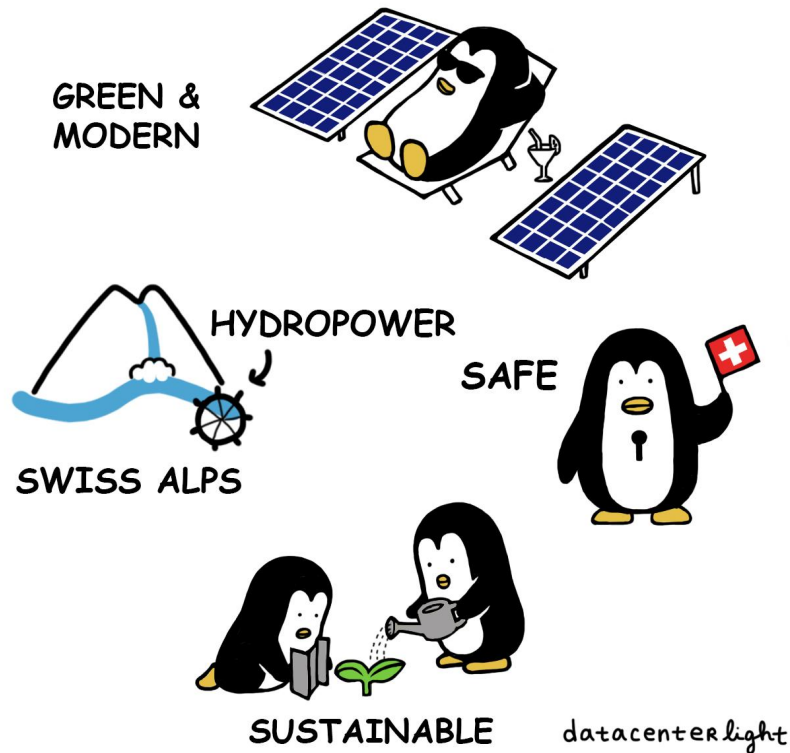OWN DATACENTER!

datacenterlight.ch

3 things you need

- Space
- Connectivity
- Power
- …
- + some knowledge
- + some finances
- + a lot of trust
- + endurance

What is green?

Green is...

- Using resources responsible
- Using renewable energy sources
- Reusing existing resources
- Avoid wasting resources

Green #1: Reuse!

- Data Center Light uses existing buildings
- Old houses
- Old factory halls
  - **Very thick walls!**
- Outcome
  - Avoid waste a lot of embodied energy

Green #2: Be natural cool

- Data Center Light does not actively cool
- Servers need much more space
  - Regular data center: 40 servers on 1 m²
  - Data Center Light: 1 server on 4 m²
- Temperature
  - Hardware range is about 10-35C
  - Reality is around 15-30C
- About 160x space inefficient!!!
  - But we can use old factory halls
  - Virtually infinite space available
- Outcome
  - No additional active cooling installation
  - No active cooling

Green #3: Reuse!

- Data Center Light uses used hardware
- Same concept as used cars
  - Price savings of about 200% - 6000% !
- But replace crucial parts
  - New SSDs/HDD
- Operate without guarantee
  - Have enough spare parts
- Objective
  - Use what is available, don't unnecessary build

Green #4: Renewable energy

- Data Center Light uses home made energy
- On site hydro power plant (about 90-98% of the energy)
- On site solar panels (between 2-10% of the energy)
- Objective
  - Be fully powered by renewable energy
  - Support local industry

What about connectivity?
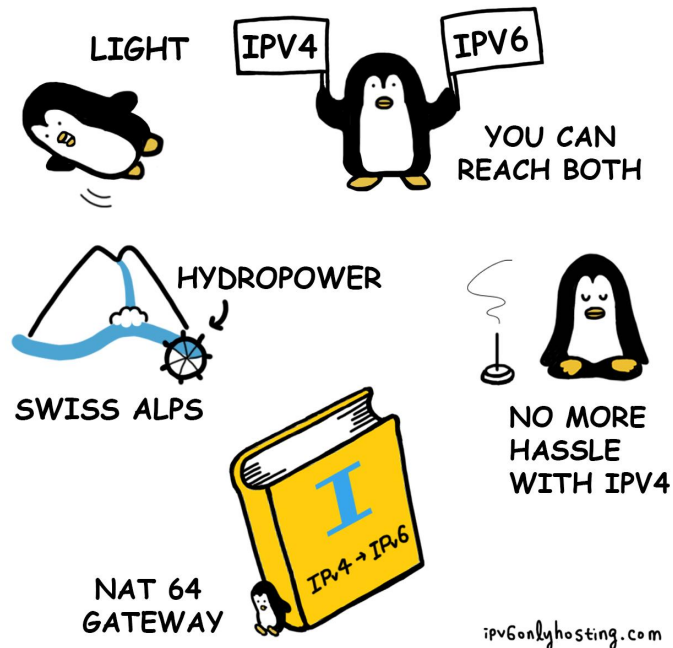
[Dark] Fiber for fun!

- Data Center Light uses about 100km of fiber
- Between the different locations
- Towards Zurich
- Inside the data centers
- Single mode fiber can carry 9.6TBit/s
    - That is 9600 Gbit/s
    - That is about 9600x the regular speed
- Supported by the local electricity companies

IP addresses

- Starting late (2017) we only received 1024 IPv4 addresses…
  - … however we also received a /29 IPv6 network
  - Which means we have access to 633825300114114700748351602688 IPv6 addresses
- Data Center Light is an IPv6 first data center
  - Every component has an IPv6 address
  - Customer VMs are available IPv6 only and Dual stack (IPv6+IPv4)
- Upgraded to 2048 IPv4 addresses and 2x /29 networks in 2019
  - We hope to sustain without additional IPv4 addresses

IPv6

- IPv6 is much more than "virtually infinite IP addresses"
- IPv6 is freedom
  - Let's you connect ANY device to the Internet
- IPv6 saves time & money
  - Makes planning networks much easier
  - Single stack where possible
  - You need a network? Take a /64.
  - You need a new location? Take a /48.
  - You need a new data center? Take a /32.

LIGHT

IPV4 IPV6

YOU CAN REACH BOTH

HYDROPOWER

SWISS ALPS

NAT 64 GATEWAY

IPv4 → IPv6

NO MORE HASSLE WITH IPV4

ipv6onlyhosting.com

IPv6++

- Offering IPv6 only VMs
  - Allows application devopment and testing
  - Allows saving money (remember the IPv4 limit?)
- Offering IPv6 VPNs
  - Getting IPv6 anywhere
  - Active networks in Spain, Korea, France, China
- Most important: IPv4 is not sustainable
  - You will need to switch
  - The earlier, the less pressure it will be for you

… and how does ANY of this relate to Devuan?

Warning:

sensitive content following

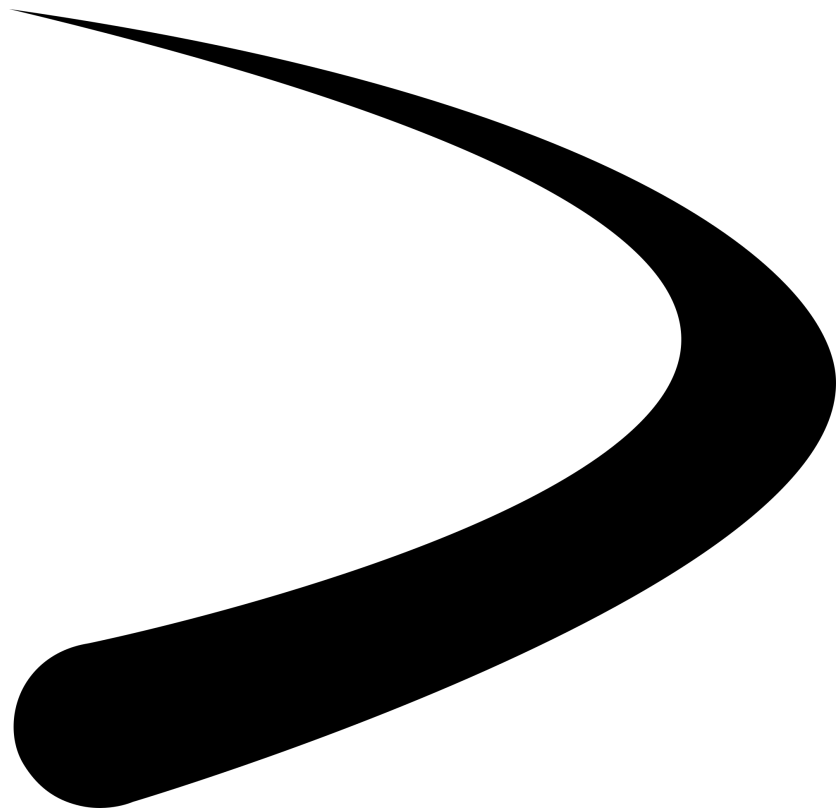# Which operating system to use?

Ubuntu?

Archlinux?

FreeBSD?
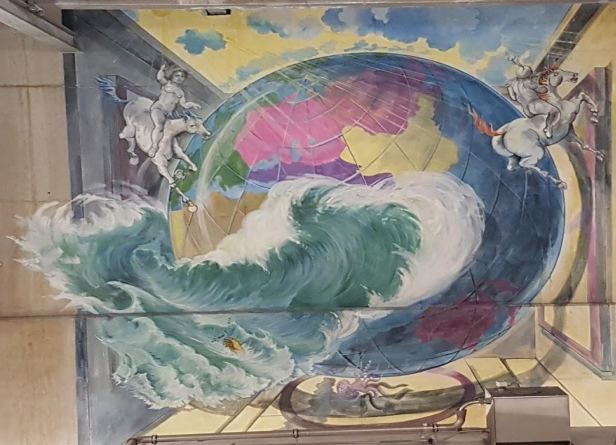
Debian?

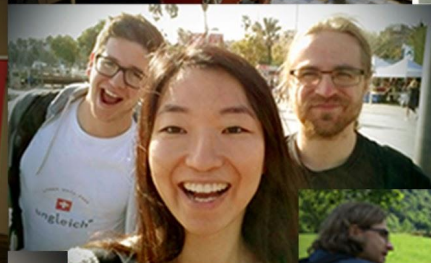# So how does it actually look like?

Digital Glarus

Digital Chalet Schwanden

Renewable Energy

Summary

- Glarus
  - Because it is pretty and has space ⇒ Freedom!
- IPv6
  - Because it is pretty and has space ⇒ Freedom!
- Devuan
  - Because it is pretty and has space ⇒ Freedom!

More of IT?

More of Digital Glarus

- Informal project to support digitalisation in Glarus
  - Make Glarus available to people outside of Glarus
- Create interesting space for digital nomads
- Support business development
  - Swiss-Crowdfunder.com: a joint venture of 200ok & ungleich
- Hosting international students
- Building up COWorking spaces
  - 2015 Digital Chalet Schwanden
  - 2018 Spinnerei Linthal

Visit us!

- Hack4Glarus - the hackathon of Glarus
  - 2019-05-31 … 2019-06-02
  - www.hack4glarus.ch
- In Linthal
  - Bahnhofstrasse 1, 8783 Linthal, almost the end of the world
- In Schwanden
  - In der Au 7, 8762 Schwanden, in the middle of Glarus Süd
- Virtual
  - https://chat.ungleich.ch