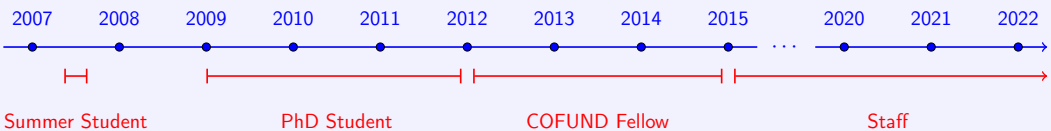
Experience from a former Gentner Student

Jakob Blomer (CERN, EP-SFT)

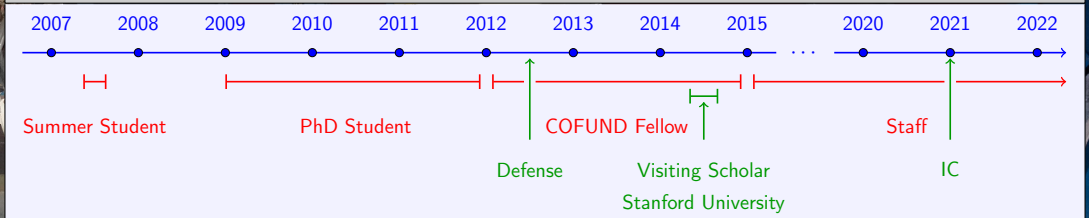
22nd Gentner Day

26 October 2022

Computer Scientist in the Physics Department



Computer Scientist in the Physics Department



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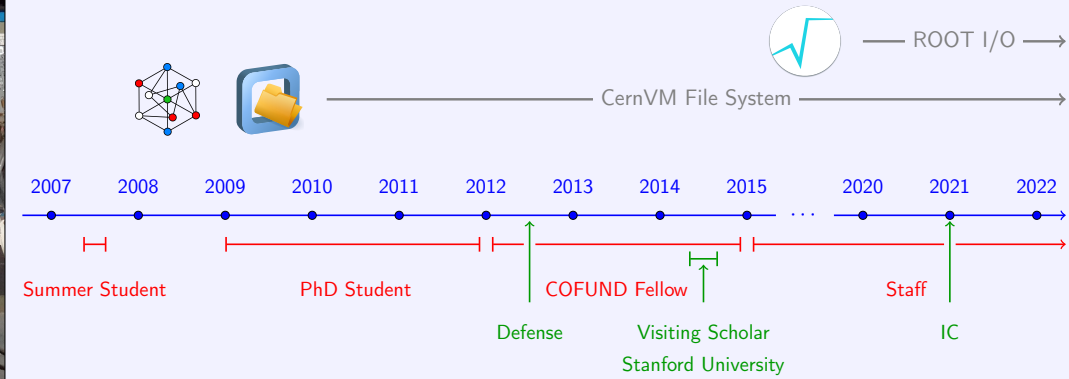


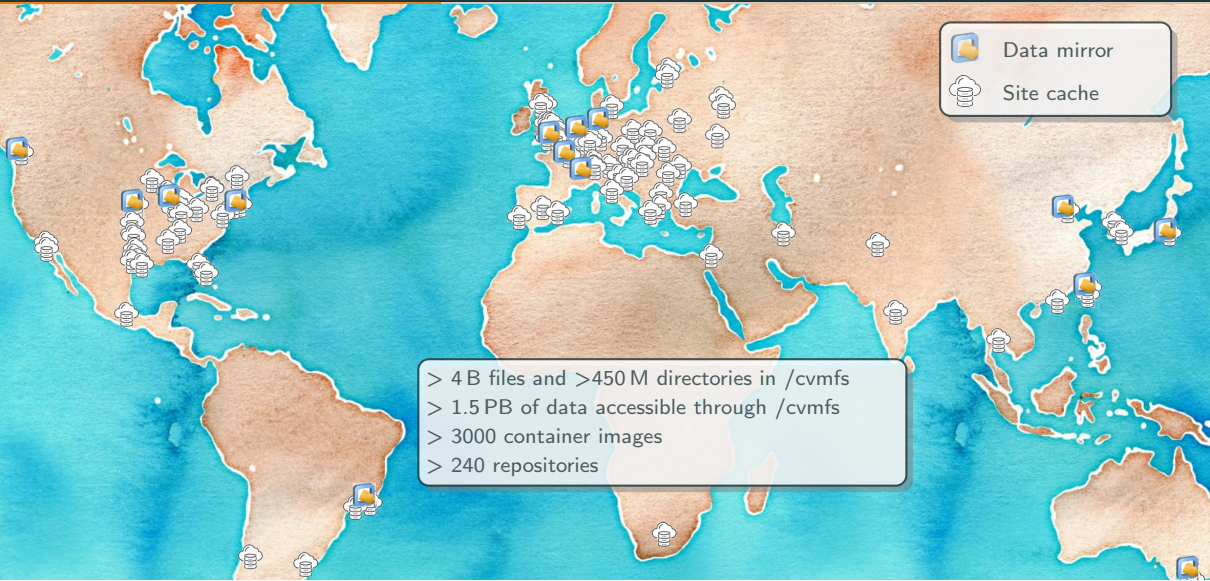
CernVM File System

Global-scale file system to access scientific software

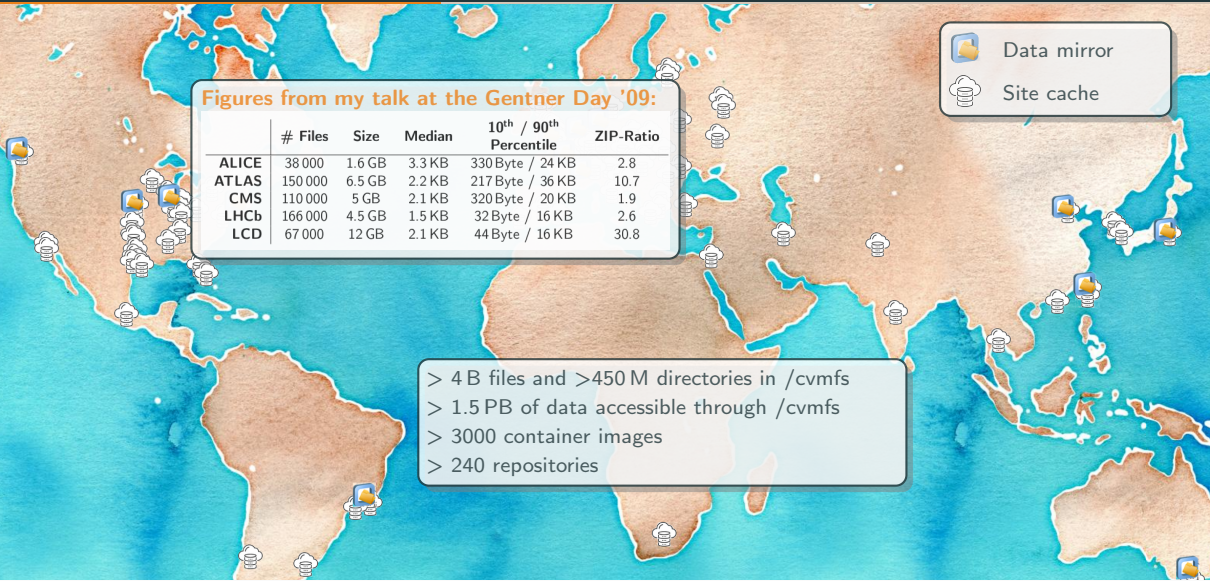
```
[lxplus ~]$ ls /cvmfs/cms.cern.ch
redhat  debian  ubuntu  macos  ...
```

Replacing application distribution by pre-built bundles (container, package, . . .)

CernVM-FS Deployment Today (Worldwide LHC Computing Grid)



CernVM-FS Deployment Today (Worldwide LHC Computing Grid)



Figures from my talk at the Gentner Day '09:

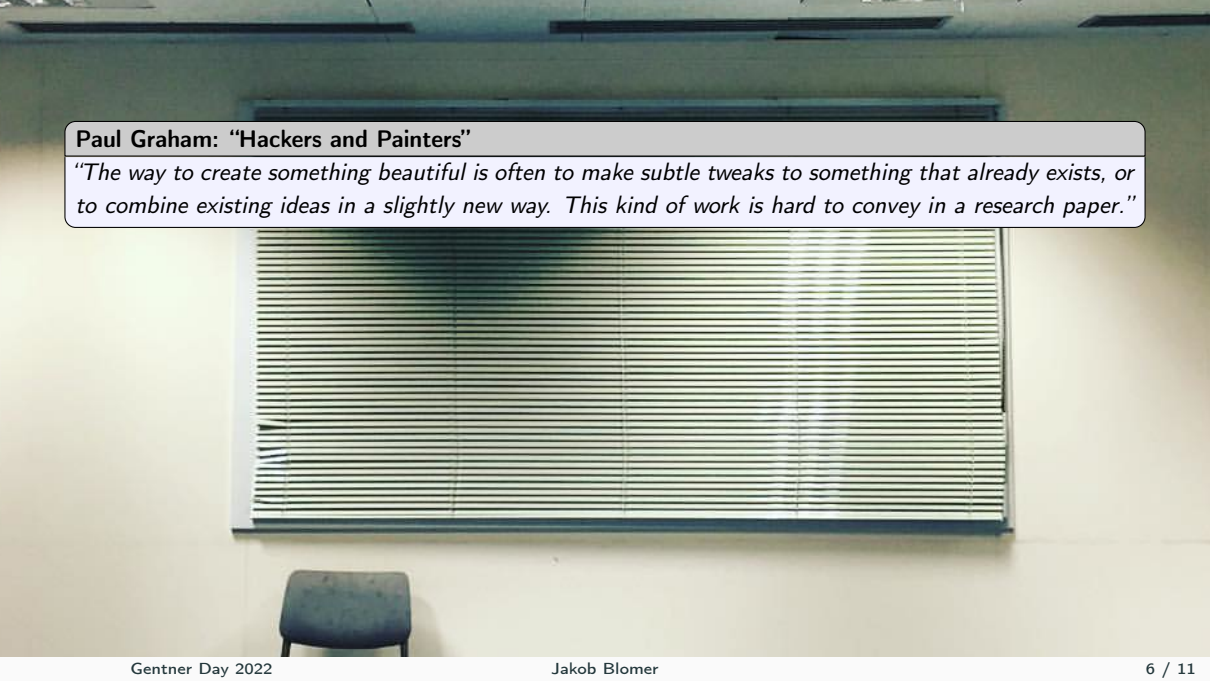
	# Files	Size	Median	10^{th} / 90^{th} Percentile	ZIP-Ratio
ALICE	38 000	1.6 GB	3.3 KB	330 Byte / 24 KB	2.8
ATLAS	150 000	6.5 GB	2.2 KB	217 Byte / 36 KB	10.7
CMS	110 000	5 GB	2.1 KB	320 Byte / 20 KB	1.9
LHCb	166 000	4.5 GB	1.5 KB	32 Byte / 16 KB	2.6
LCD	67 000	12 GB	2.1 KB	44 Byte / 16 KB	30.8

- > 4 B files and >450 M directories in /cvmfs
- > 1.5 PB of data accessible through /cvmfs
- > 3000 container images
- > 240 repositories

TECHNISCHE UNIVERSITÄT MÜNCHEN
Lehrstuhl für Netzarchitekturen und Netzdienste
Decentralized Data Storage and Processing
in the Context of the LHC Experiments at CERN

Paul Graham: "Hackers and Painters"

"The way to create something beautiful is often to make subtle tweaks to something that already exists, or to combine existing ideas in a slightly new way. This kind of work is hard to convey in a research paper."



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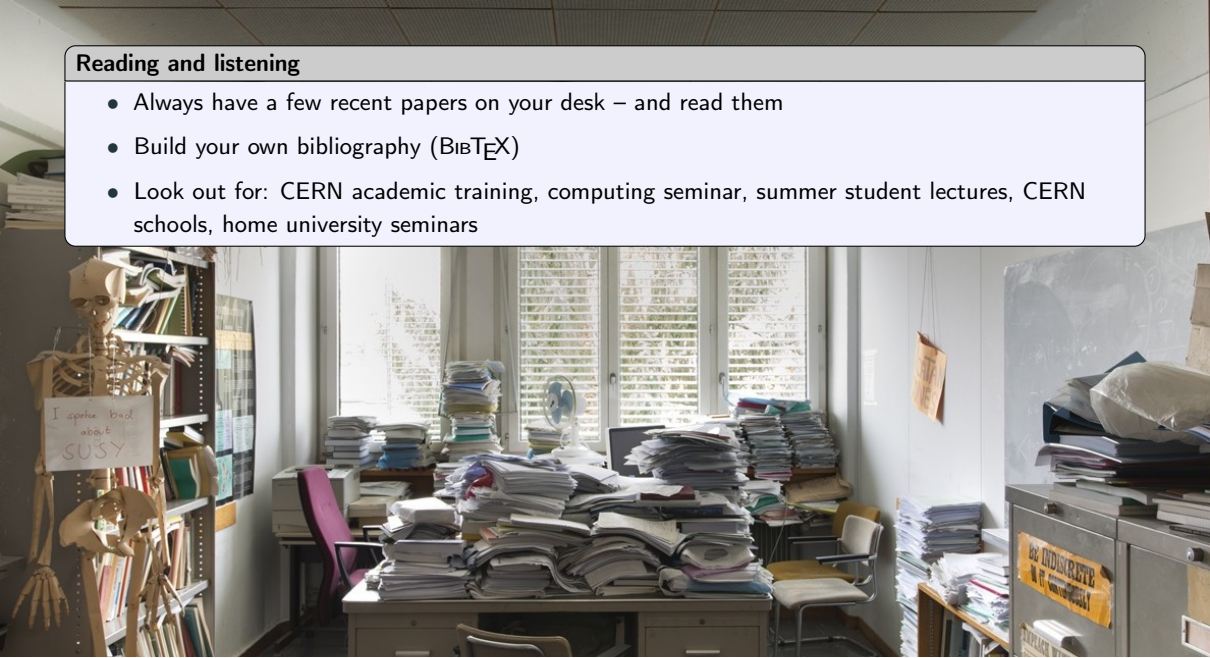
Research: looking behind the scenes

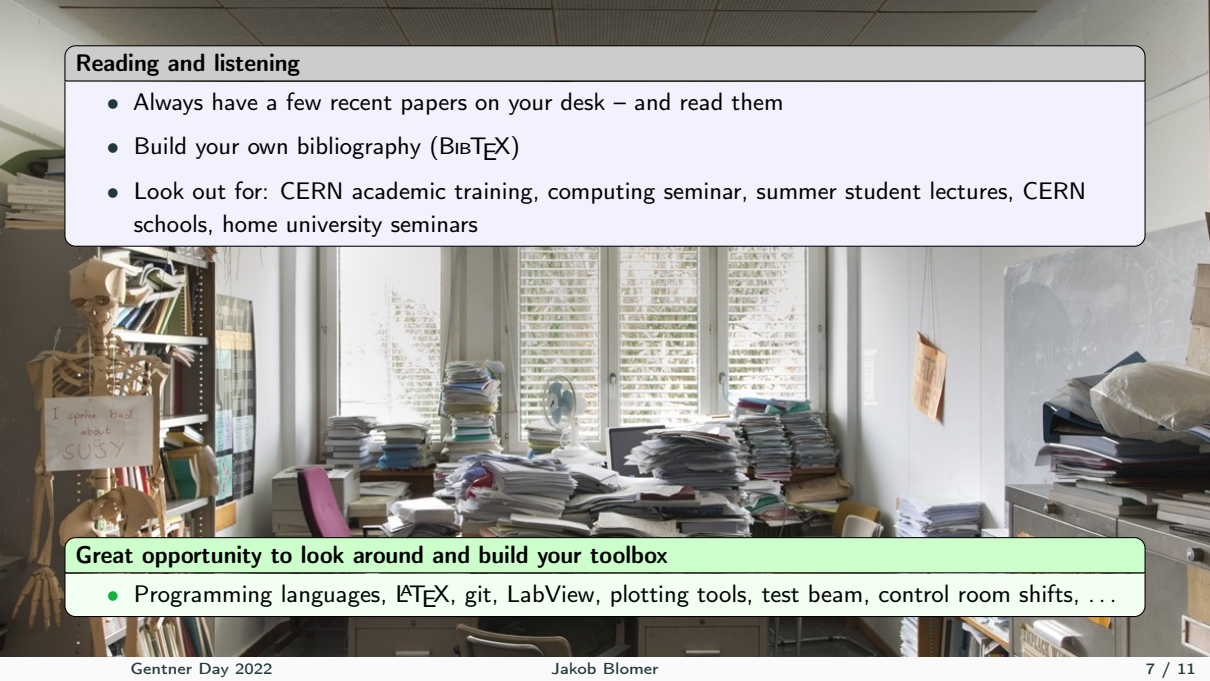
- What is the problem we haven't understood?
- What have others done?
  Why didn't it work?
- Meticulously collect facts and numbers

$\rightarrow$ Comprehensive answer to a (narrow) question

Reading and listening

- Always have a few recent papers on your desk – and read them
- Build your own bibliography (BibTeX)
- Look out for: CERN academic training, computing seminar, summer student lectures, CERN schools, home university seminars





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Great opportunity to look around and build your toolbox

- Programming languages, LaTeX, git, LabView, plotting tools, test beam, control room shifts, ...

Writing and presenting

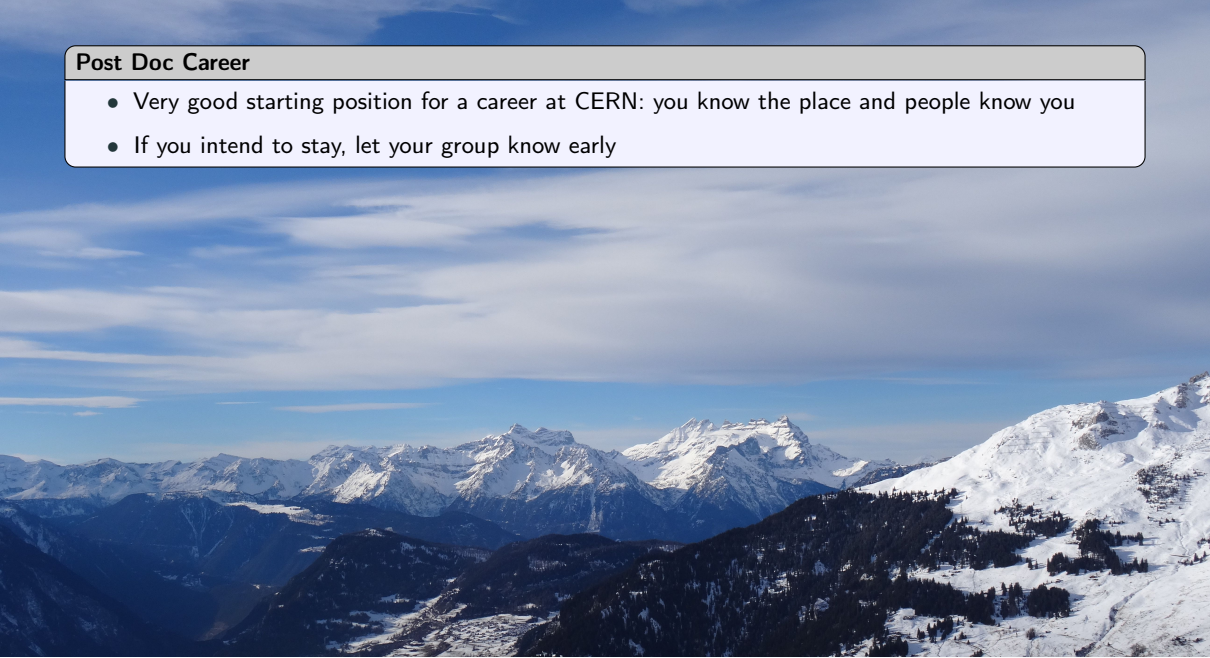
- Useful notes: lab notebook, list of presentations, short write-ups
- Occasionally present outside your day-to-day peers
- Writing takes time, last 6 months usually reserved for thesis

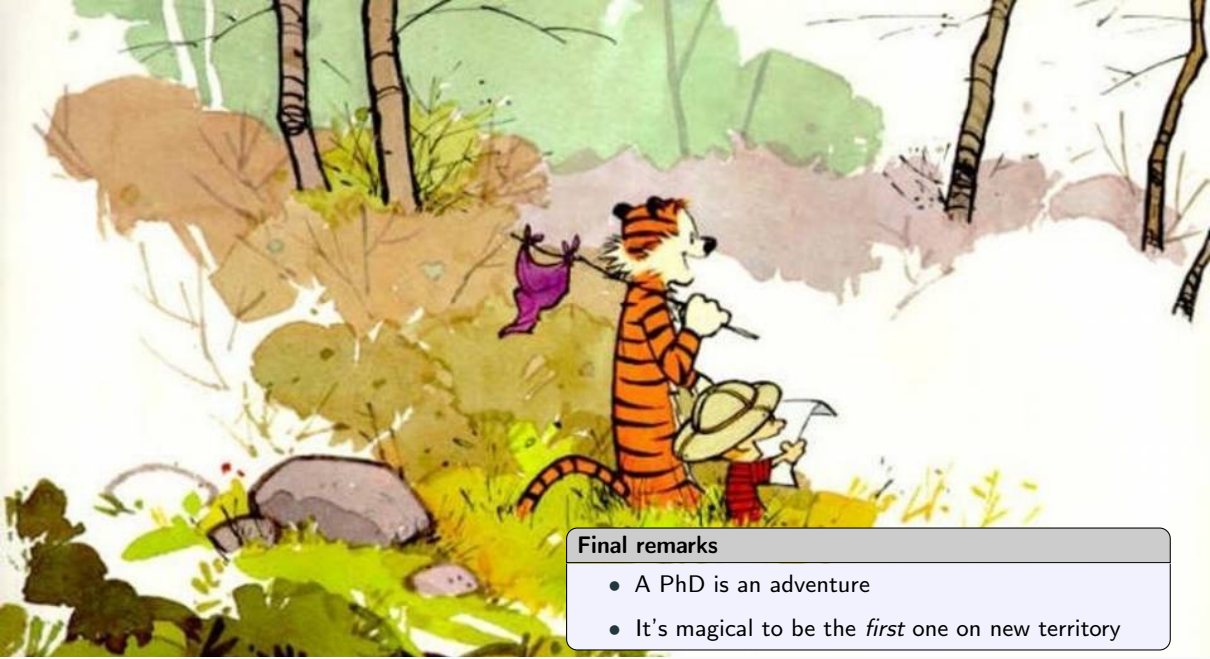
Peer Group

- Missing the typical university group biotope
- Fellow PhD students can fill that void
- Gentner home travel helps to reconnect

Post Doc Career

- Very good starting position for a career at CERN: you know the place and people know you
- If you intend to stay, let your group know early





Final remarks

- A PhD is an adventure
- It's magical to be the *first* one on new territory