Remotely accessing files in a distributed LDAP+Samba-based infrastructure

"Cloud" in a new manner

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There is NO CLOUD, just other people’s computers
Remotely accessing files in a distributed LDAP+Samba-based infrastructure

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ABSTRACT

Context. An in-production infrastructure of 64 schools running Debian-based networks with OpenLDAP and Kerberos. Samba is even provided for Windows compatibility. This O.S. is called “FUSS” and is developed by the Autonomous Province of Bolzano.
What’s FUSS?

FUSS stands for Free Upgrade for a digitally Sustainable School
What’s FUSS?

- Launched in 2005
- Covers 72 schools with 64 servers and 4000 PCs and Laptops
- Both server and client distro
- Selection of didactic software
Schools are far
Goal

Make users files available remotely
How a school network works?

Clients \rightarrow Kerberos \rightarrow DC (FUSS) \rightarrow OpenLDAP
What’s FUSS Remote Access?

- Solution to access your data outside the school network
- Online collaboration suite (LOOL)
- Private cloud
Why this solution?

- Data under control (GDPR)
- Distributed storage
- Same credentials as the school network (SSO)
Infrastructure

FUSS private infrastructure

- smallstep
- Internal ACME/PKI
- Private DNS

FUSS public infrastructure

- LibreOffice Online
- Balanced proxy

Single school LAN

- DC (FUSS)
- Remote Access delegate server

access.fuss.bz.it

LibreOffice Online

Balanced proxy
Building LibreOffice online

Automating stable compilation
The following script may be used to automatically fetch the latest (supposed) stable version and compile it. You can run it in something like a nightly build. In any case, using ccache is highly suggested to enhance a lot the build times after the first.

```
cd /opt
[e online ] || git clone --depth=1 https://git.libreoffice.org/online
cd online
git pull origin master
cd docker
git ls-remote https://git.libreoffice.org/core | cut -f2 | grep -e ^refs/heads/libreoffice | tail -1 | rev | cut -d '//' -f1 | rev > core-branch
git ls-remote https://git.libreoffice.org/online | cut -f2 | grep -e ^refs/heads/libreoffice | tail -1 | rev | cut -d '//' -f1 | rev > online-branch
LIBREOFFICE_BRANCH=$<cat core-branch> LIBREOFFICE_ONLINE_BRANCH=$<cat online-branch> DOCKER_HUB_TAG=$<cat online-branch>-$(date +%Y-%m-%d) NO_DOCKER_PUSH=yes ONLINE_EXTRA_BUILD_OPTIONS=--enable-anonymization --with-max-connections=100000 --with-max-documents=100000 /l10n/docker-nightly.sh
```
Pillars: the ACME protocol

“The Automatic Certificate Management Environment (ACME) protocol is a communications protocol for automating interactions between certificate authorities and their users' web servers, allowing the automated deployment of public key infrastructure at very low cost. It was designed by the Internet Security Research Group (ISRG) for their Let's Encrypt service.”

(from Wikipedia)
Pillars: certbot

Is the software who implements the ACME protocol
Pillars: the ACME protocol

- The agent says to the server which domains he wants to verify (e.g. domain.tld);
- The server returns a token and a path in which he expects this token to be available;
- The agent moves the token in place and the server challenges via HTTP expecting to find the token he gave to the agent;
- If successful, the server signs a CSR uploaded by the agent. The private key is generated on the host and remains on the host.
Pillars: Smallstep

- Toolkit for internal PKI management
- SSH Single-sign-on
- Implementation of ACME server
Proxmox Virtual Environment

Compute, network, and storage in a single solution

Proxmox VE is an open-source server management platform for your enterprise virtualization. It tightly integrates KVM hypervisor and LXC, software-defined storage, and networking functionality on a single platform. With the integrated web-based user interface you can easily manage VMs and containers, highly available clusters, or the integrated disaster recovery tools with ease.

Enterprise-class features and a 100% software-based focus make Proxmox VE the perfect choice to virtualize your IT infrastructure, optimize existing resources and increase efficiencies with minimal expense. You can easily virtualize even the most demanding Linux and Windows application workloads, and dynamically scale computing and storage as your needs grow ensuring that your data center adjusts for future growth.

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Access path

User → WAN → Proxy server → Schools WAN → His files on the school’s server
Deploy strategy

1. Creation of the delegate server

- DC (FUSS)
- Empty Debian 10 VM
- Virtualization environment
- Debian 10 template
Deploy strategy
2. Delegate server setup

- FUSS private infrastructure
- FUSS RA controller
- Internal ACME/PKI
- smallstep

- Single school LAN
- VM Debian 10 + Docker
- DC (FUSS)
Deploy strategy
3. Orchestration of the central infrastructure

FUSS Private infrastructure
- Private DNS
- FUSS RA controller

FUSS RA controller

FUSS public infrastructure
- Public DNS
- Balanced proxy

Let's Encrypt

school.access.fuss.bz.it

Ansible
Give me the code!

- https://gitlab.fuss.bz.it/fuss-team/fuss-nc
Want to know more?

Feel free to get in touch with me:
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