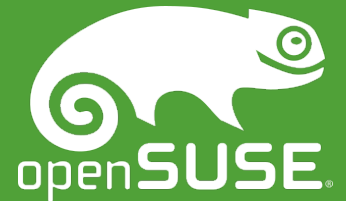


USB Cloud Storage Gateway

Intelligent Storage for Stupid Things

David Disseldorp

ddiss@suse.de



Agenda

- Project Introduction
- Ceph
- USB Storage
- Demo!
- Azure Blob Storage
- Linux I/O Target in Userspace

Hack Week 13

- What to hack on?
 - ARM board gathering dust
 - Learn something new
 - Storage is my day job
-  I know...

Project Idea



Ceph
USB Storage
Gateway



Goals

- Access cloud storage from anything
 - Stereos, TVs, Phones, etc.
- Boot from cloud backed disk images
 - Ceph
 - Azure
- Simple device configuration

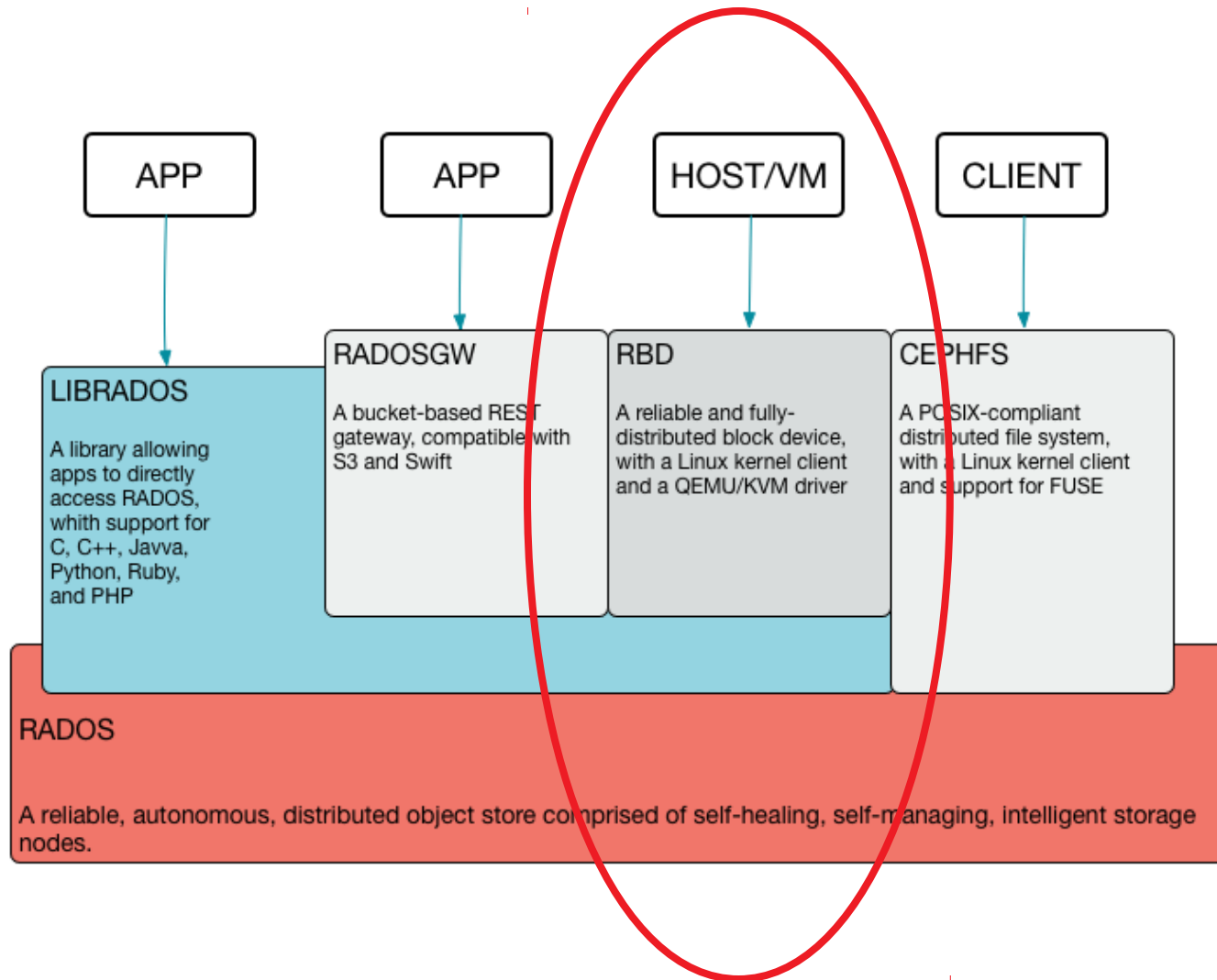


Ceph

- Aggregate, manage and share storage resources
- Highly available
 - No single point of failure
- Self managing and self healing
- Scalable



Ceph

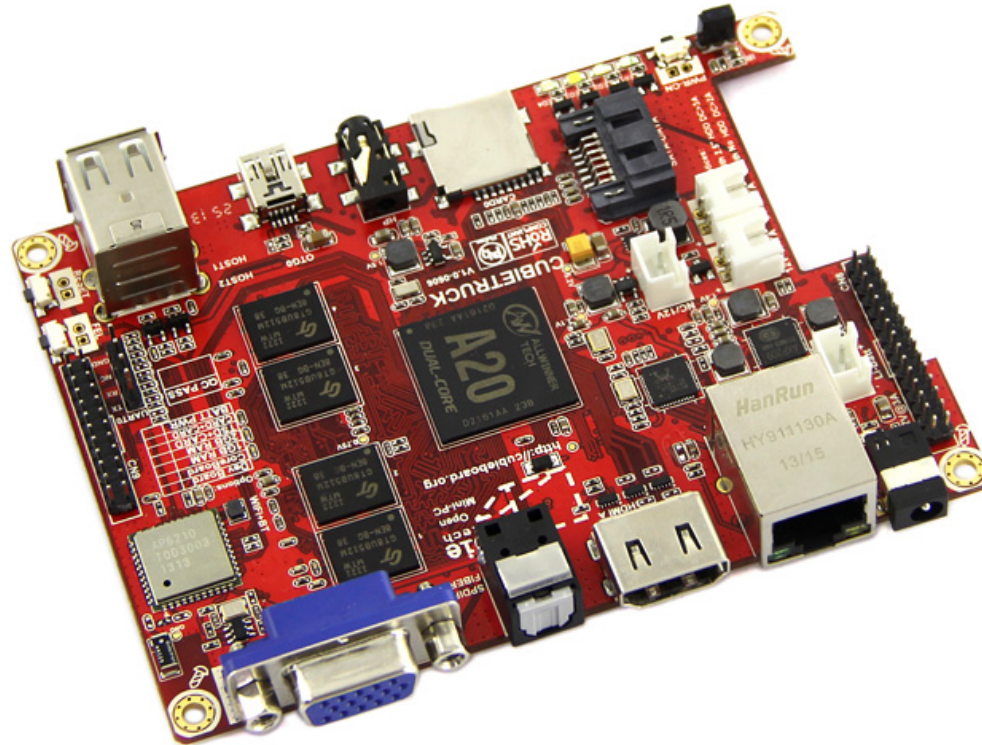


Ceph RADOS Block Device

- Block device backed by RADOS objects
- Thin provisioned
- Resizeable
- Supports snapshots and clones
- Linux kernel and user-space clients



Hardware



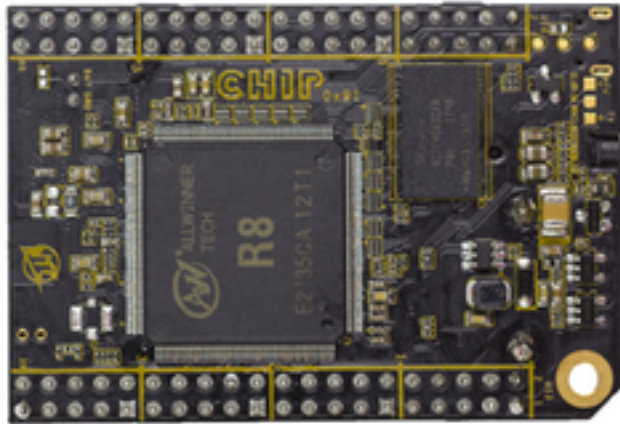
Hardware

- Mainline kernel support
 - sunxi community
- openSUSE Tumbleweed port
- Relatively performant
 - 2x1GHz ARMv7 with 2GB RAM
 - USB2 and “gigabit” Ethernet



Hardware

Alternatives

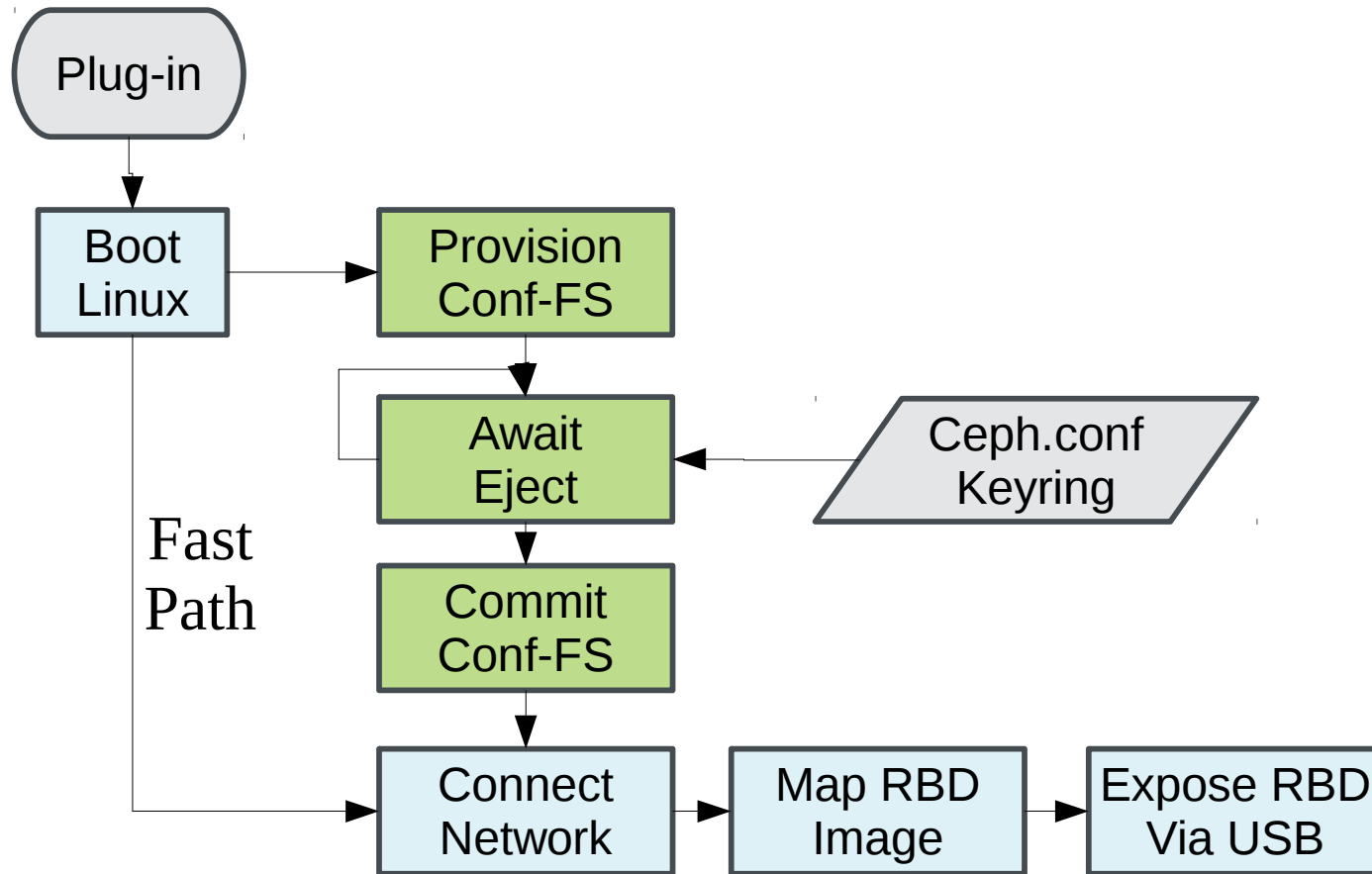


USB Storage

- SCSI transport
 - Bulk-Only transport (BOT)
 - USB Attached SCSI (UAS)
 - Faster: high-speed and super-speed specs
- Kernel support
 - f_mass_storage.ko
 - f_tcm.ko
 - Support for BOT **and** UAS



USB Gateway





Demo

Azure Blob Storage

- Public cloud storage
 - RESTful protocol
 - Pay for what you use
- Page Blobs and Block Blobs
 - Page Blobs ideal for disk images
 - Sparse object
 - Accepts 512-byte aligned I/Os at arbitrary offsets
- Premium accounts with QoS constraints



•Linux I/O Target (LIO)

- In-kernel SCSI target
 - Pluggable transport and storage engine layers
 - Transports: FC, iSCSI, loopback, USB, etc.
 - Storage engines: file, block device, tcm-user (TCMU)
- TCMU
 - LIO storage engine in user-space
 - SCSI pass-through

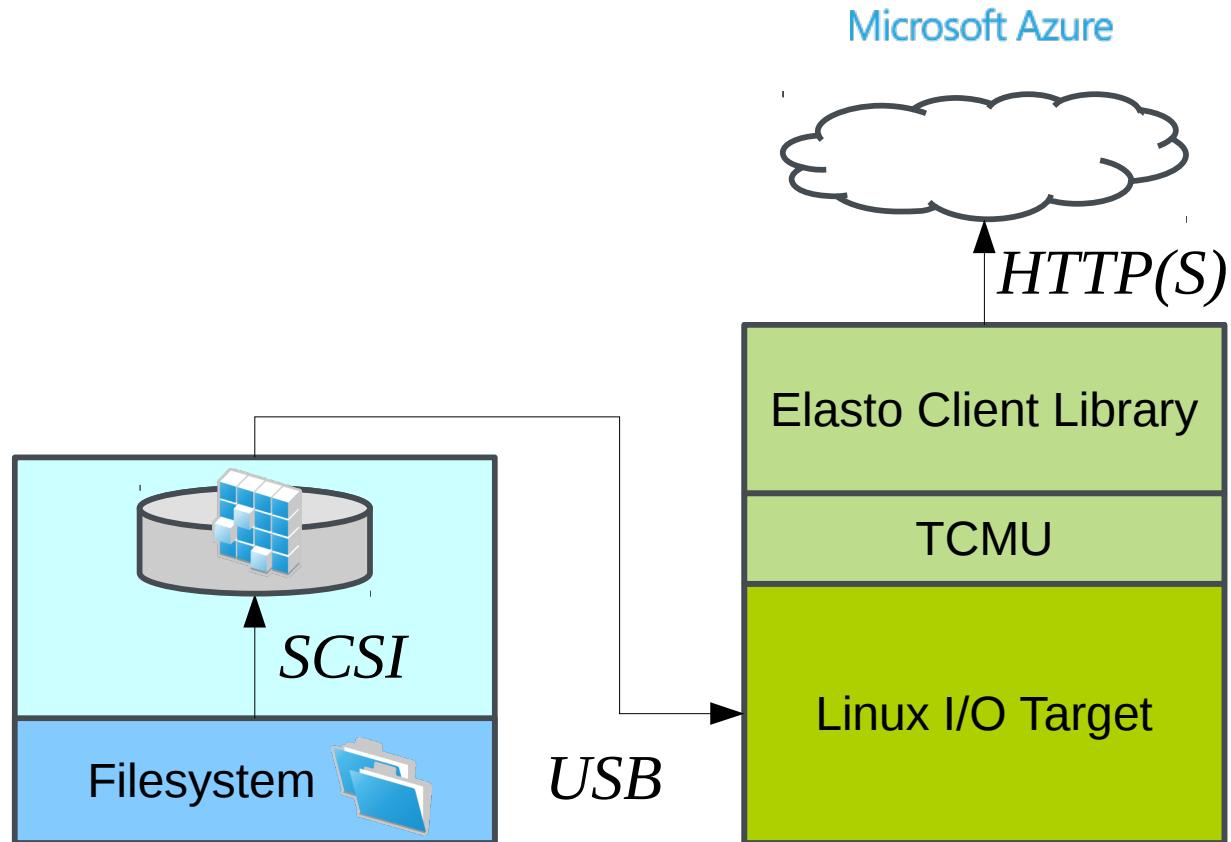


•Linux I/O Target with Azure

- Elasto Cloud project
 - Azure Page Blob client written in C
 - Also supports Azure File Service and Amazon S3 protocols
- TCMU Elasto handler
 - Maps SCSI I/O to Azure Page Blob REST requests
 - Page Blobs accessible as regular block devices
 - Exposable via supported LIO transports



•Linux I/O Target with Azure





Future Challenges

- Performance
 - USB3+ and GbE/802.11ac
- Power
 - Battery to reduce reliance on USB supply
- f_tcm
 - Works in VM (loopback) but fails on board
 - Needs super-speed support?
- Caching
- Transparent encryption



Questions?

Code:

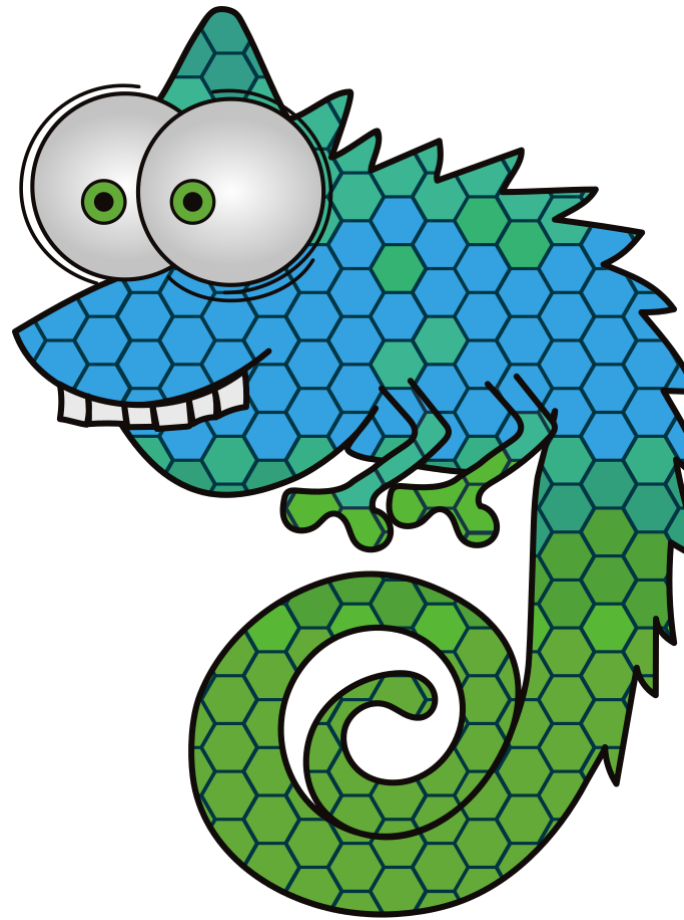
<https://github.com/ddiss/rbd-usb.git>

<http://www.elastocloud.org>

<https://en.opensuse.org/Portal:ARM>
<https://linux-sunxi.org>

Thank you.





Have a Lot of Fun, and Join Us At:

www.opensuse.org

<https://creativecommons.org/licenses/by-sa/4.0/>

rbrown@opensuse.org

<http://opensuse.github.io/branding-guidelines/>