SMB in the Cloud

David Disseldorp
Samba Team / SUSE
ddiss@suse.de

Agenda

- Cloud storage
  - Common types
  - Interfaces
  - Applications
- Cloud file servers
  - Microsoft Azure File Service
    - Demonstration
  - Amazon Elastic File System
  - OpenStack Manila

Cloud Storage
Common types

- Objects
  - Blob with data and metadata
  - Flat hierarchy

- Virtual block device
  - Blob attached to a Virtual Machine (VM)
  - VM accesses blob data via an overlaid filesystem

Cloud Storage
Interfaces

- REST
  - Internet accessible world-wide
  - HTTP(S) operations
    - Cloud provider specific library and API
  - Limited

- Block device
  - Accessible from connected VM
  - Offers the flexibility of any normal block device

Traditional Applications
Behaviour

- No cloud awareness
  - Made for POSIX or Windows filesystems
- Run against local or remote data-set
  - Remote data on file server
- Output consumed by user or subsequent application
  - Transfer of data-set

Traditional Applications
Cloud Porting Challenges

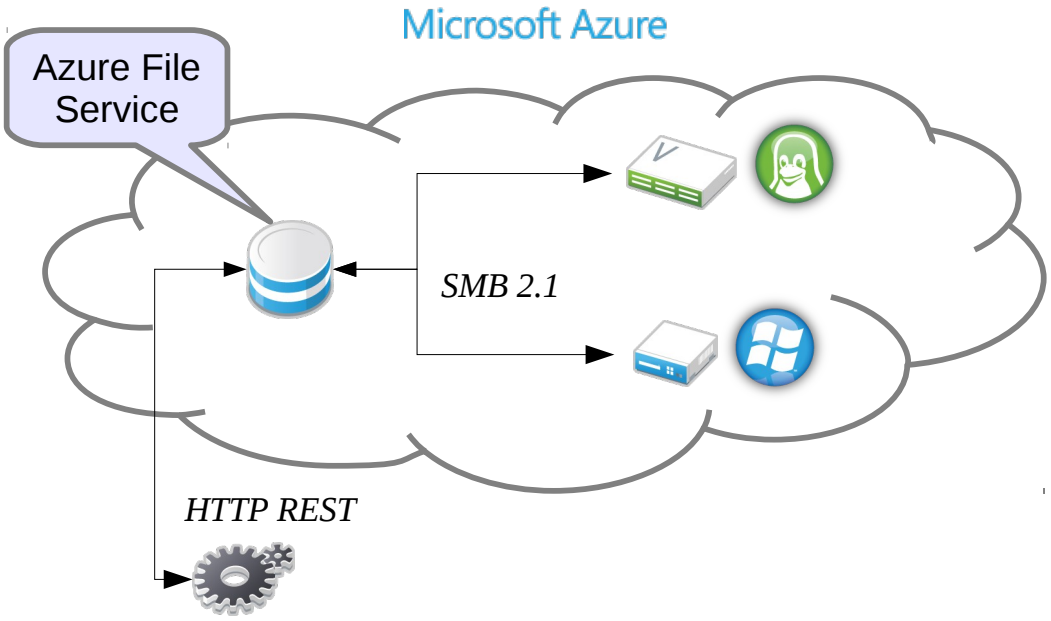
- Object interface not an option
  - Doesn't come close to resembling a filesystem
  - Vendor lock-in
- Block interface not optimal
  - Only accessible from connected VM
    - Multiple data silos
  - Poor storage utilisation
  - Performance and reliability tied to VM

Cloud File Server

- Improved accessibility
  - No silos
  - SMB and NFS clients are abundant
- Better resource utilisation
- Integrated management
  - Alongside existing VM / storage provisioning workflow
- Centralised configuration of distributed applications

Microsoft Azure File Service

Azure File Service
Overview



Azure File Service
Management

- Shares provisioned via REST API
  - *Create Share* and *Delete Share* operations
  - Powershell command line utility
  - Elasto cloud storage client

- Assigned to account and geographic region
  - Only accessible from VMs hosted in the same region

Azure File Service
File Server

- SMB 2.1 is the only supported dialect
  - Restricted to Windows 7 / Server 2008 R2+ Clients
  - Linux 3.5.0+ cifs.ko with CONFIG_CIFS_SMB2

- REST file and directory access
  - Public internet gateway
  - Cross protocol locking for concurrent access
    - SMB2 Create FILE_SHARE_WRITE dictates whether REST Put Range is accepted
  - Case insensitive

Azure File Service
SMB Server

- Restricted feature set, no support for:
  - Security descriptors (ACLs)
  - Alternate data streams
  - Sparse files
  - Server-side copy
  - Named pipes (no srvsvc)

- NTLMv2 authentication only
  - *Account* and s*torage access key* credentials
  - No integration with Azure Active Directory (Kerberos)

Azure File Service
Security

Azure File Service
Performance

- 1000 (8k) IOPS per-share
  - Twice that of virtual block device
- 60 MB/s per-share

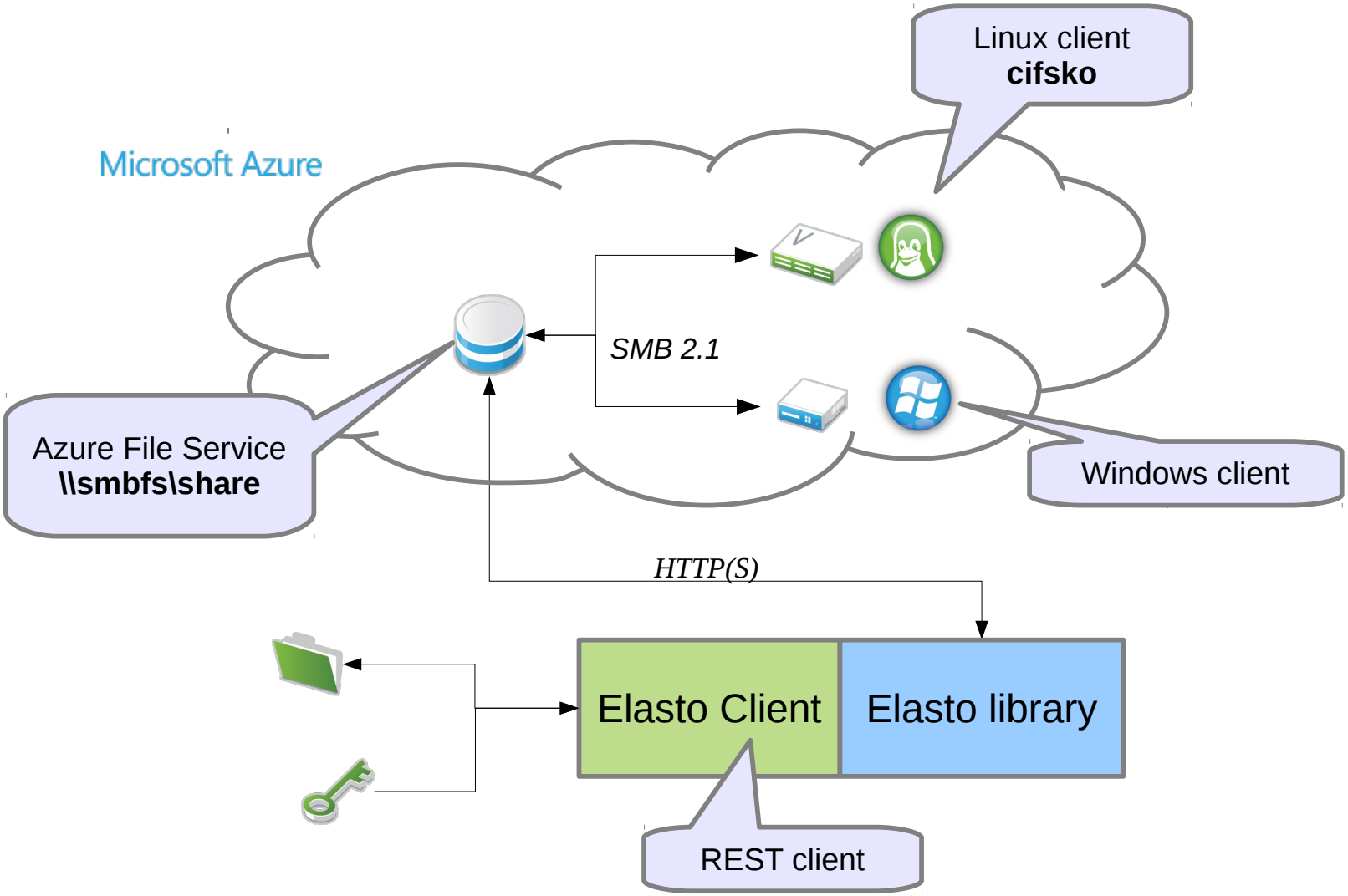
- Cross-protocol leasing
  - SMB clients can take read / write / handle leases
    - No need to flush IO to server
  - REST IO to leased file results in client lease break

Azure File Service
Pricing

- Premium charged
  - $0.08 per GB
  - More expensive than object ($0.024) and block ($0.05)

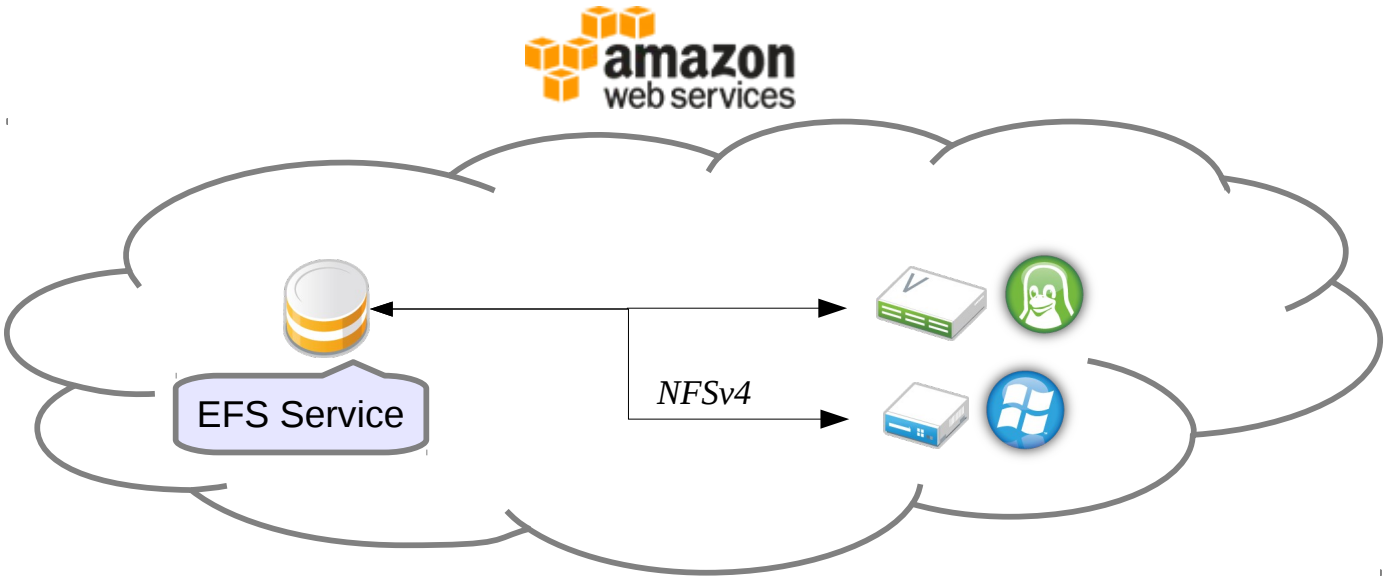
- Object storage commoditised
  - Competition with Amazon S3 and Google

Demonstration



Amazon Elastic File System

Amazon Elastic File System
Overview

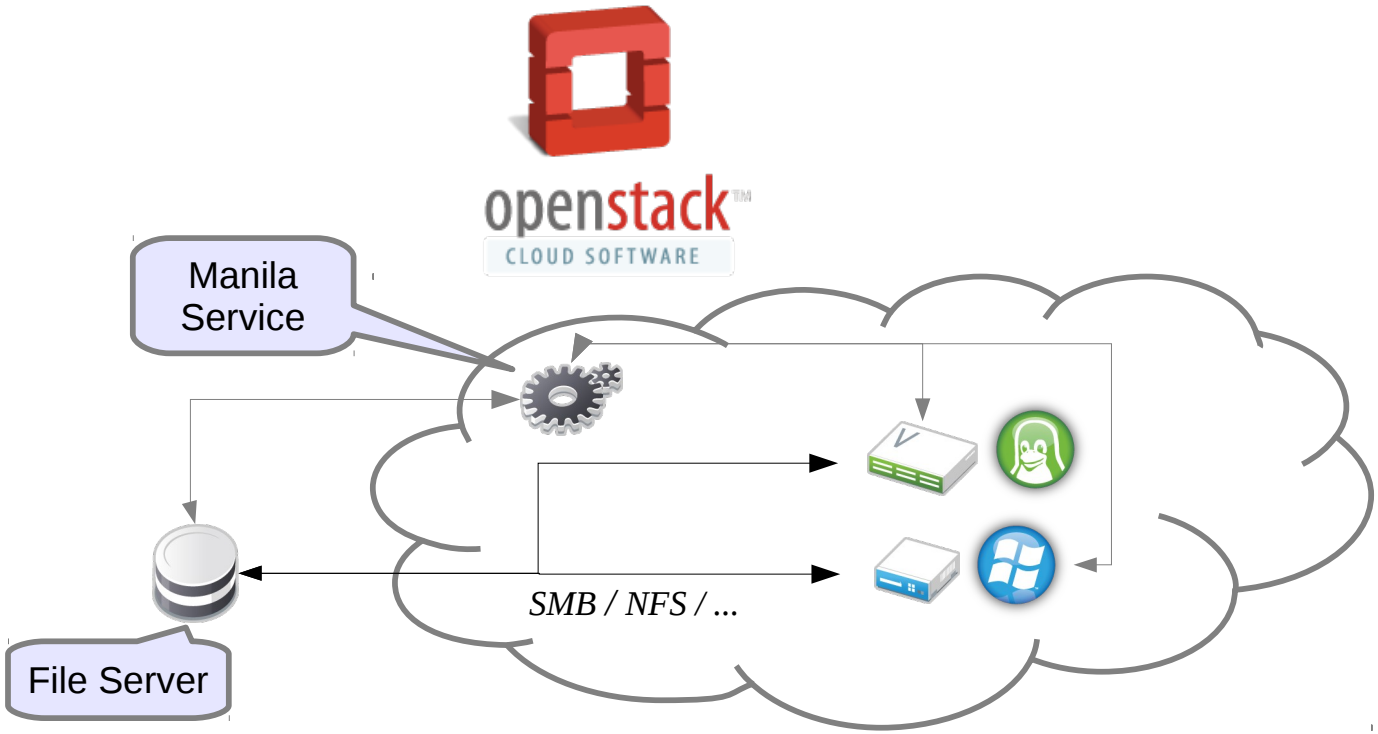


Amazon Elastic File System
Overview

- NFSv4 file server only
- SSD based
  - $0.30 / GB
- File system assigned to region
  - Accessible from EC2 instances within region
- Management and provisioning of file shares
  - Network, instance and user level access restrictions

OpenStack Manila

OpenStack Manila
Overview



OpenStack Manila
Overview

- File server project for OpenStack

- Management and provisioning of file shares
  - Independent of underlying file server and data-path
  - Back end file server specific drivers
    - NetApp, EMC and IBM
    - GlusterFS
    - Generic open source file server

OpenStack Manila
Management

- REST management API
  - Share creation and deletion
  - Share snapshots
  - Used by Horizon dashboard and command line utility
  - Authenticated via OpenStack Keystone

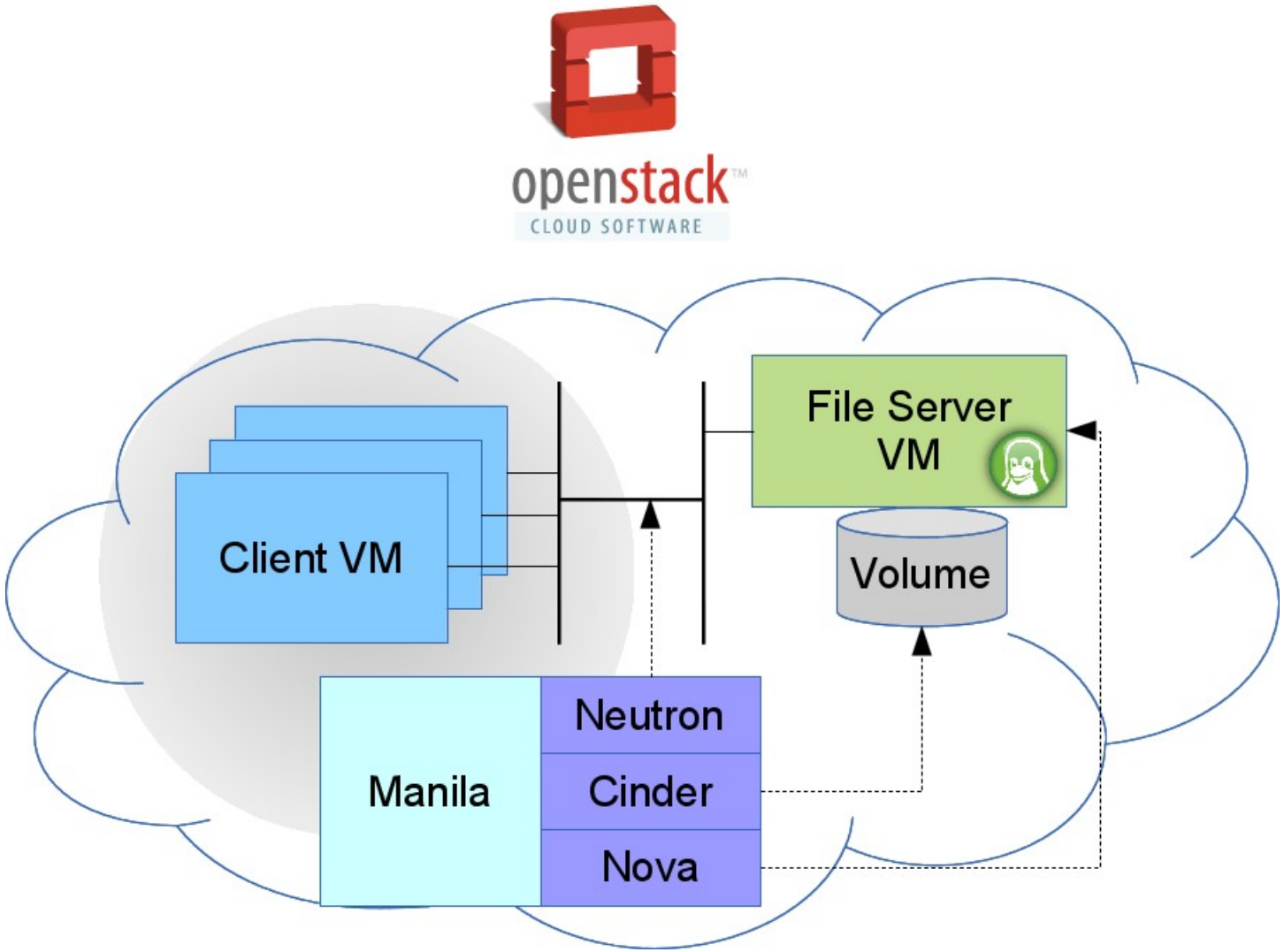
- File shares assigned to private network
  - IP based access restrictions

OpenStack Manila
Generic File Server Driver

- Linux file server VM
  - Deployed and booted on first share creation
  - Connected to private tenant network
  - Samba SMB server and kernel NFS server

- Shares backed by Cinder volumes
  - Ceph RADOS block device
  - Share snapshot creation and deletion supported

OpenStack Manila
Generic File Server Driver



Future

- Samba as file server service
  - OpenStack Manila
    - High availability
    - Use CephFS as backing storage for Samba shares
  - Offered by other public cloud storage providers?

- Samba as cloud storage gateway
  - See Jeremy's slides
  - SMB to REST protocol mapping
  - Elasto cloud library

Future

- Automated share mounts from client VM

- Integration with authentication and identity services

Conclusion

- Cloud file sharing services in infancy
  - Azure File Service and Amazon EFS are both in preview
- Potential to improve portability
  - Easily migrate traditional applications into the cloud
- Improved manageability and resource utilisation
  - Integrated work-flow

Questions?

Thank you.

References

- http://blogs.msdn.com/b/windowsazurestorage/archive/2014/05/12/introducing-microsoft-azure-file-service.aspx
- https://www.openstack.org/summit/openstack-summit-atlanta-2014/session-videos/presentation/manila-an-openstack-file-share-service
- https://wiki.openstack.org/wiki/Neutron/APIv2-specification
- https://github.com/stackforge/manila
- http://aws.amazon.com/blogs/aws/amazon-s3-bigger-and-busier-than-ever/
- http://aws.amazon.com/efs/details/

Corporate Headquarters
Maxfeldstrasse 5
90409 Nuremberg
Germany

+49 911 740 53 0 (Worldwide)
www.suse.com

Join us on:
www.opensuse.org