OpenStack Manila
Shared File Services for the Cloud

January 29, 2015

SNIA™
Cloud Storage Initiative

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Today's Presenters

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Cloud Storage Initiative

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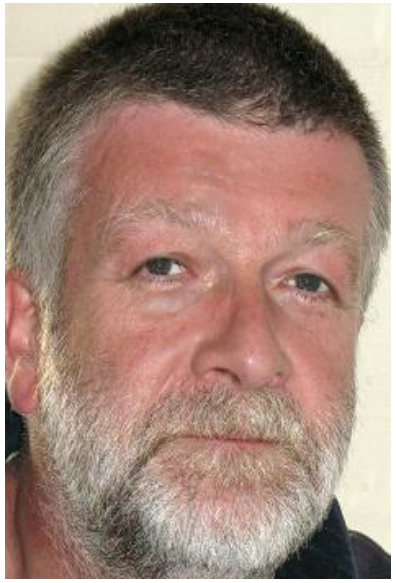

Agenda

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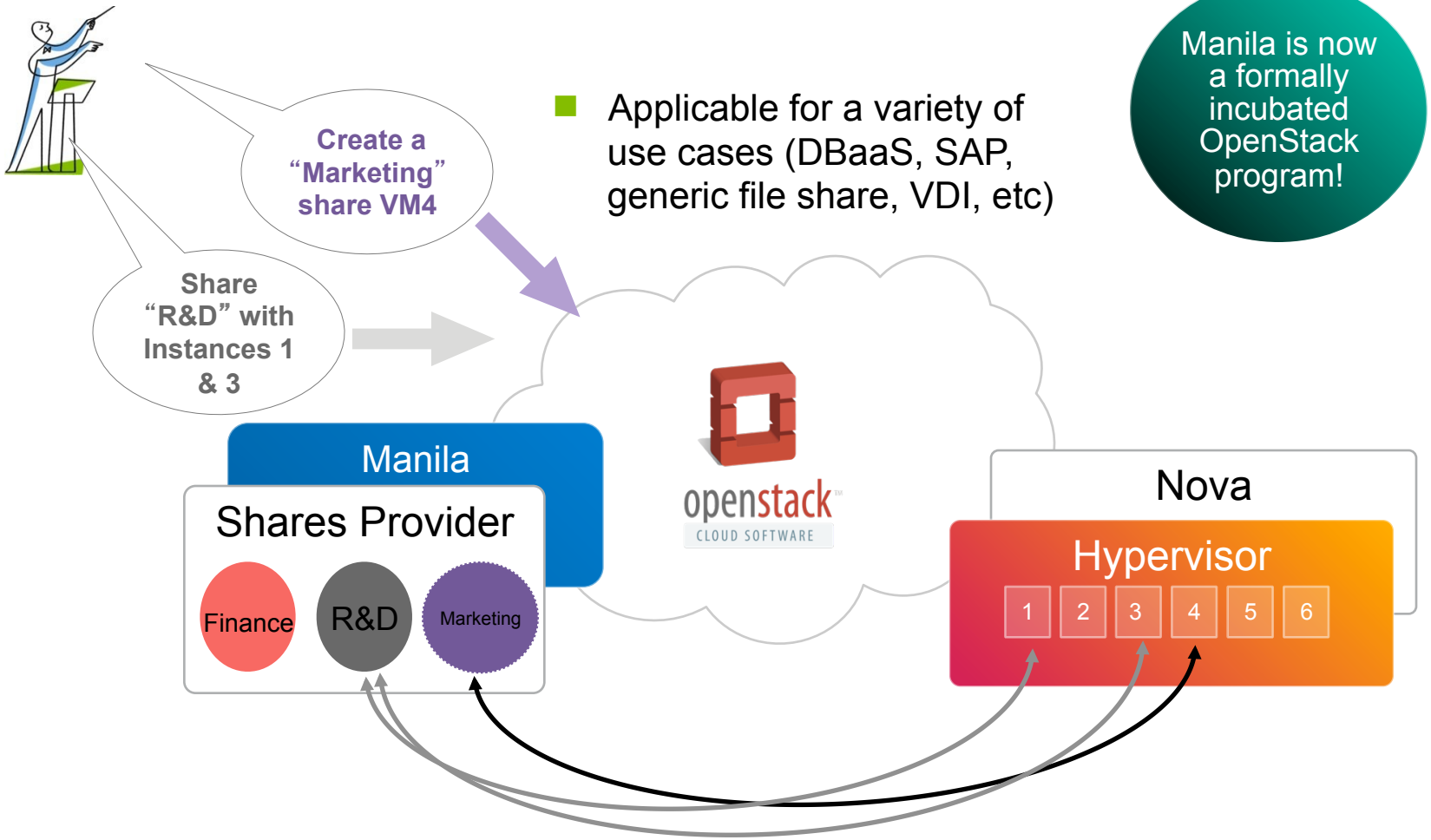
- Project Overview
- Key Concepts
- API Overview
- Architecture Overview
- Drivers and Integration
- Automation
- Roadmap and Futures

Shared File Services

of all storage sold is for file-based use cases

per IDC, 2012

Manila: Project Overview

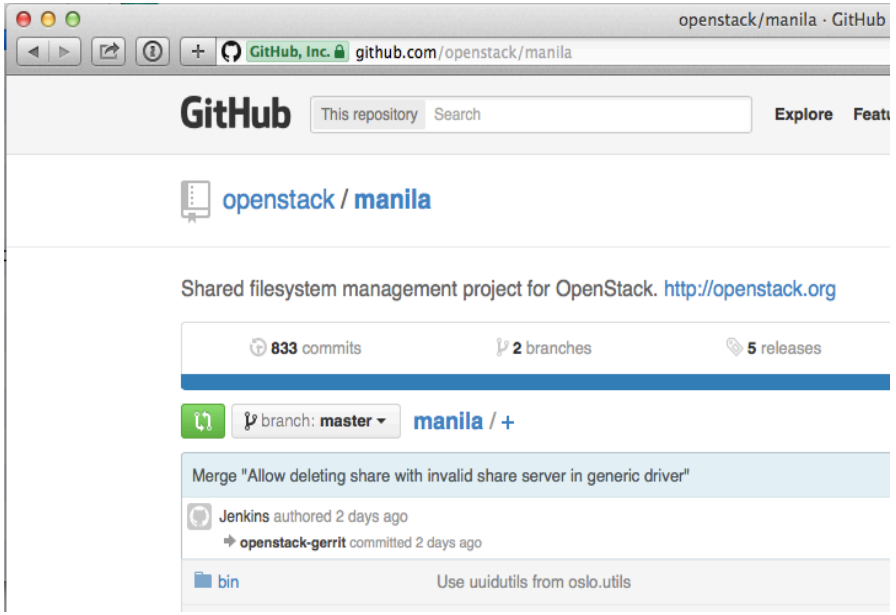


- Applicable for a variety of use cases (DBaaS, SAP, generic file share, VDI, etc)

Manila is now a formally incubated OpenStack program!

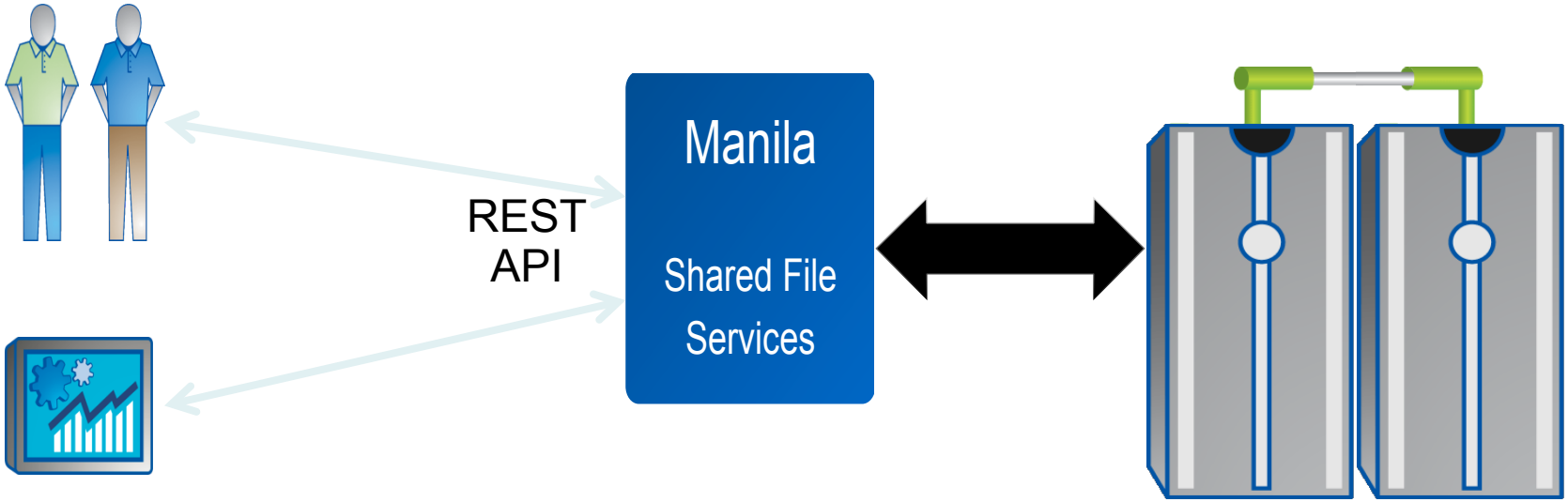
Manila: Project Overview

- What's the customer use case for Manila?
  - 65% of disk capacity slated for file storage (IDC 2012)
  - Self-service management & provisioning of shared file systems is hard
  - Customers invent this themselves via scripting, automation, etc.
- Who is contributing to Manila?
  - EMC, IBM, Mirantis, NetApp, Red Hat, SUSE
- Where can I get Manila?
  - https://github.com/openstack/manila
  - https://wiki.openstack.org/wiki/Manila
  - `http://netapp.github.io/openstack/2014/08/15/manila-devstack/`
  - `#openstack-manila` on IRC (Freenode)



Manila: Overview of Key Concepts

- Replace homegrown or legacy systems
- Improve IT responsiveness by providing self-service share management
- Integrate Manila with existing automation frameworks through REST API or CLI



Manila: Overview of Key Concepts

- Share (an instance of a shared file system)
  - User specifies size, access protocol, “share type”
  - Can be accessed concurrently by multiple instances

- Share access rules (ACL)
  - Defines which clients can access the share
  - Specified by IP in CIDR notation

- Share network
  - Defines the Neutron network & subnet through which instances access the share
  - A share can be associated with only one share network

Manila: Overview of Key Concepts

- Security service
  - Finer-grained client access rules for Authn/z (e.g. LDAP, Active Directory, Kerberos)
  - Share can be associated to multiple security services

- Snapshots
  - Read-only copy of share contents
  - New share can be created from a snapshot

- Backend
  - Provider of shares; a share resides on a single backend

- Driver
  - Vendor or technology-specific implementation of backend API

Manila: API Overview - Shares

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Operation	CLI command	REST API
Create share	manila create	POST /shares
Delete share	manila delete <id>	DELETE /shares/{id}
List shares	manila list	GET /shares
Show share details	manila show <id>	GET /shares/{id}
Rename share	manila rename	PUT /shares/{id}
Edit share metadata	manila metadata	PUT /shares/{id}/metadata
Show share metadata	manila metadata-show	POST /shares/{id}/metadata

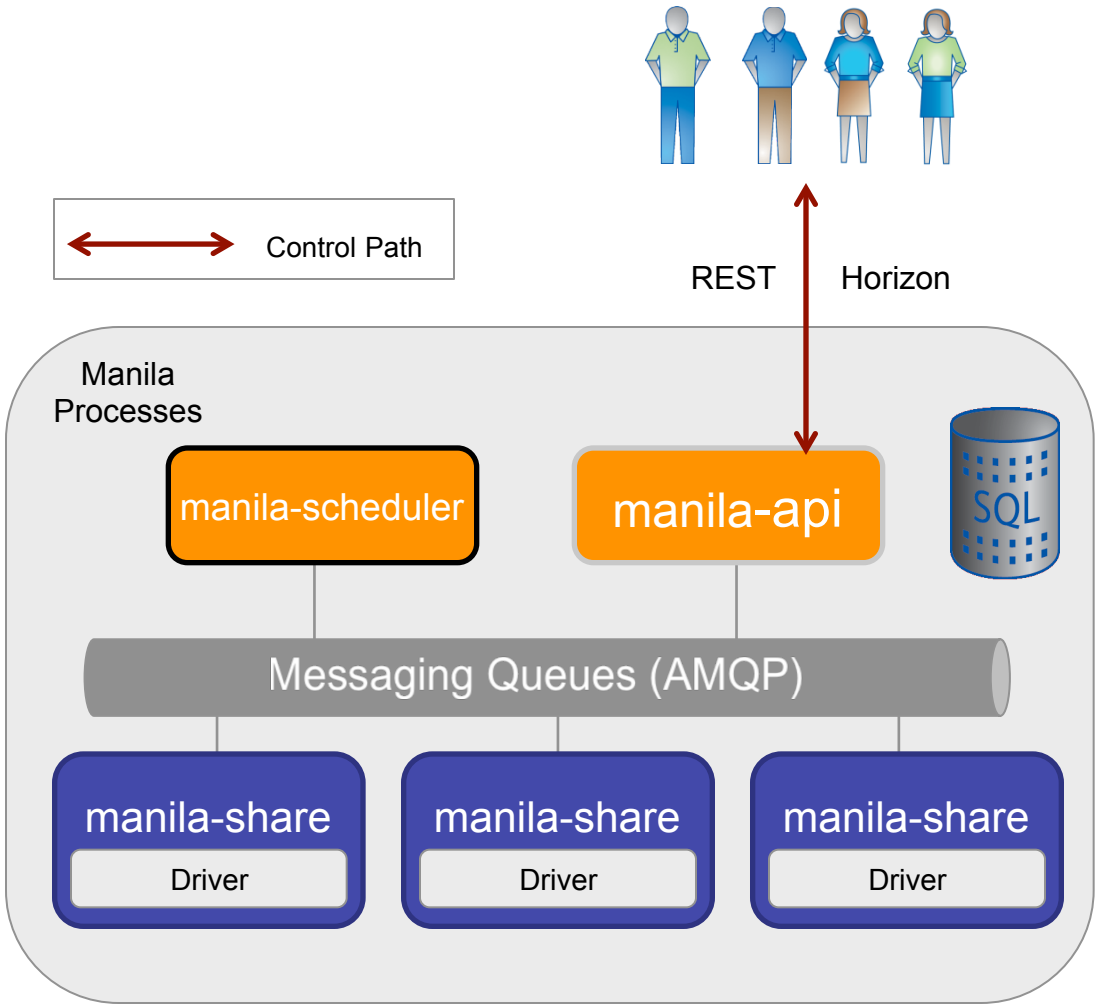
Manila: API Overview – Share Access & Networks

Operation	CLI command	REST API
Allow share access	manila access-allow	POST /shares/{id}/action
Deny share access	manila access-deny	POST /shares/{id}/action
List share access	manila access-list	POST /shares/{id}/action

Operation	CLI command	REST API
Create share network	manila share-network-create	POST /share-networks
Delete share network	manila share-network-delete	DELETE /share-networks/{id}
List share networks	manila share-network-list	GET /share-networks
Activate share network	manila share-network-activate	POST /share-networks/{id}/action

Manila: Overview of Architecture

- Manila is not in the data path!
- `manila-api`
  - Exposes REST API through WSGI application
- `manila-scheduler`
  - Makes provisioning decisions for share requests
- `manila-share`
  - Manager process + one process per backend
  - Responsible for communicating with storage subsystems

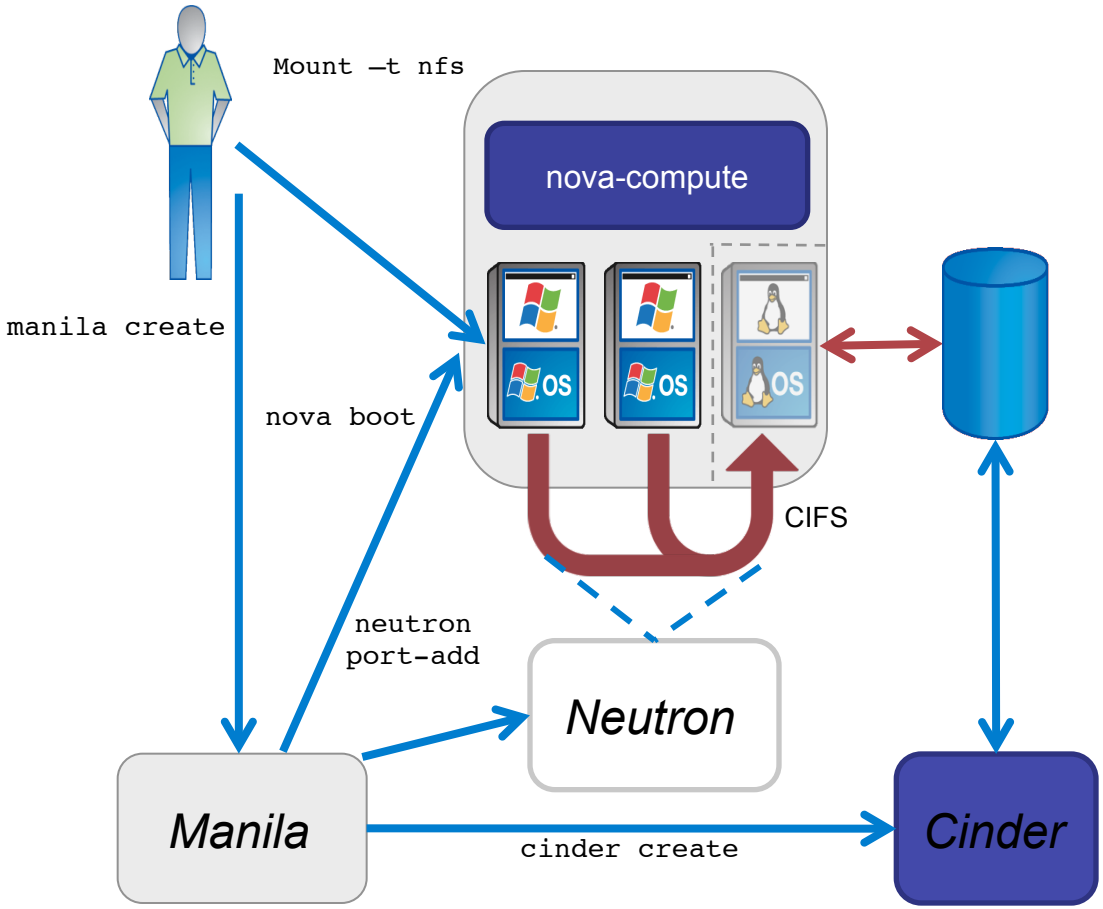


Manila: Vendor Drivers

- Reference Implementation
  - Nova VM (from Glance image) hosts NFS, CIFS servers
  - Cinder volume (of requested size) per share provides storage capacity
- NetApp clustered Data ONTAP
- Red Hat GlusterFS
- EMC VNX and Isilon
- IBM GPFS (Kilo)
- NFS-Ganesha(Kilo)
- *Oracle ZFS(Kilo)*
- Huawei (Kilo)
- *More to come…*

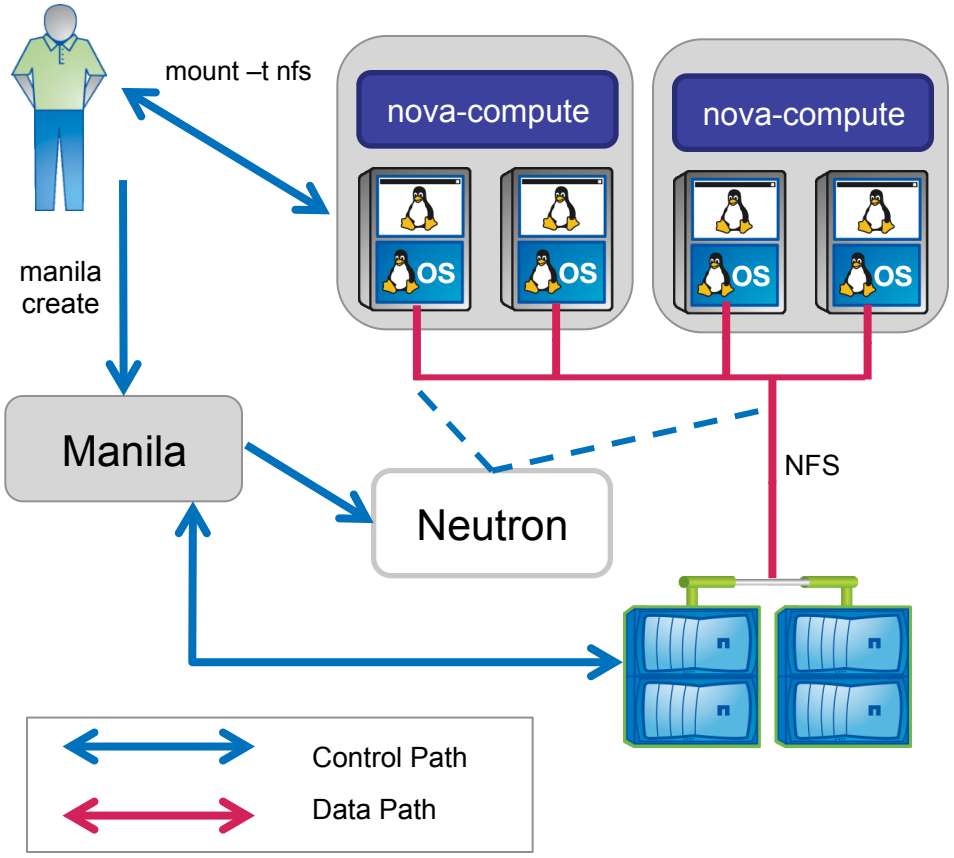
Manila: Generic Share Driver

- Creates a Nova instance (not owned by requesting tenant) to offer NFS/CIFS shares backed by Cinder volumes
- New instance is created for each “share network”
- Connected into existing Neutron network & subnet
- Instance flavor, source Glance image, & SSH keypair are configurable in manila.conf
- Manila creates shares in instance using Linux commands over SSH



Manila: NetApp clustered Data ONTAP

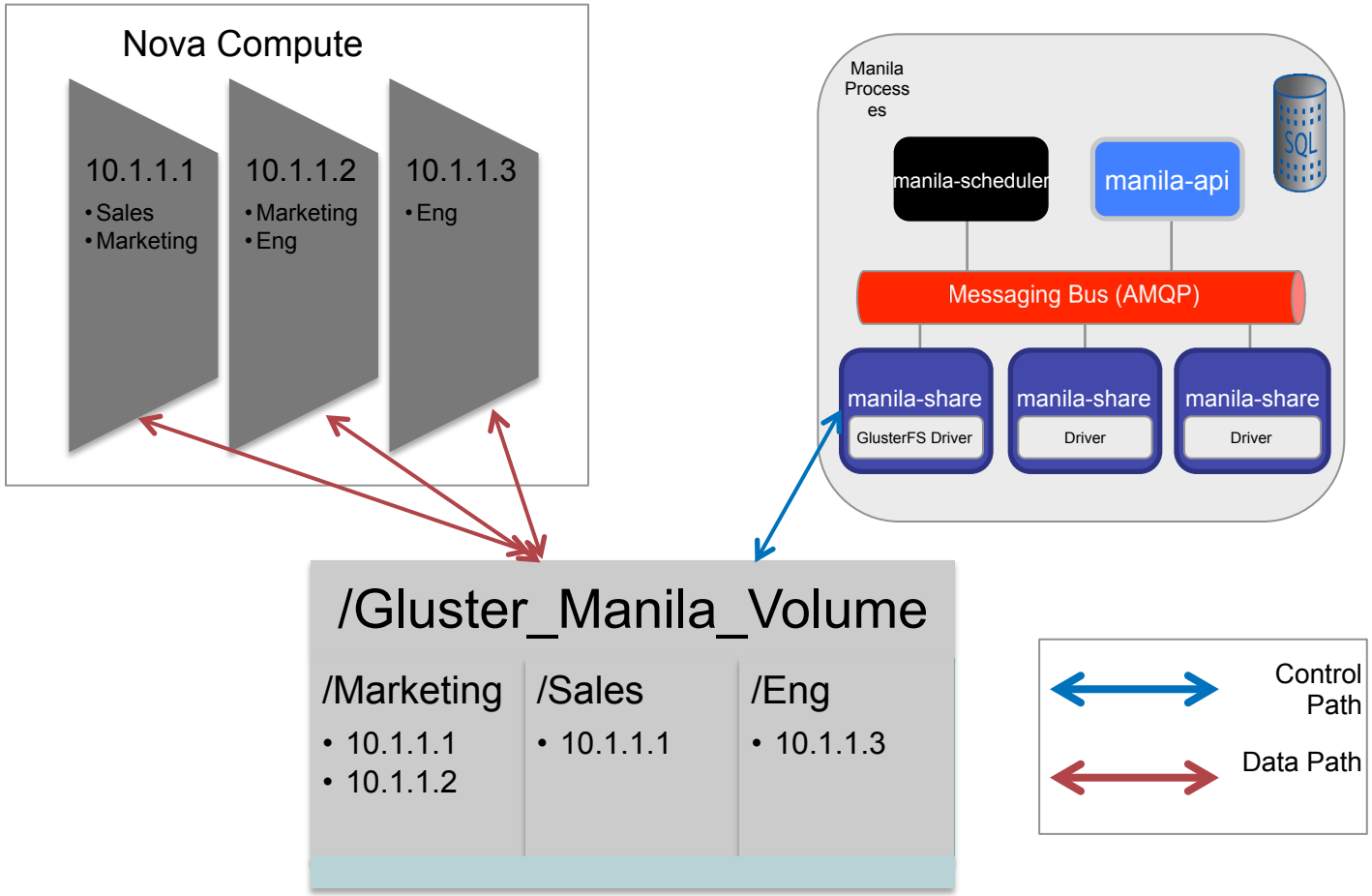
- Driver points at an existing clustered Data ONTAP deployment
- A new storage virtual machine (SVM) is created for each share network
- Create a new Data LIF with the VLAN tag set to same VLAN tag of the Neutron network
- Access permissions are set at the controller for guests



Manila: Red Hat GlusterFS

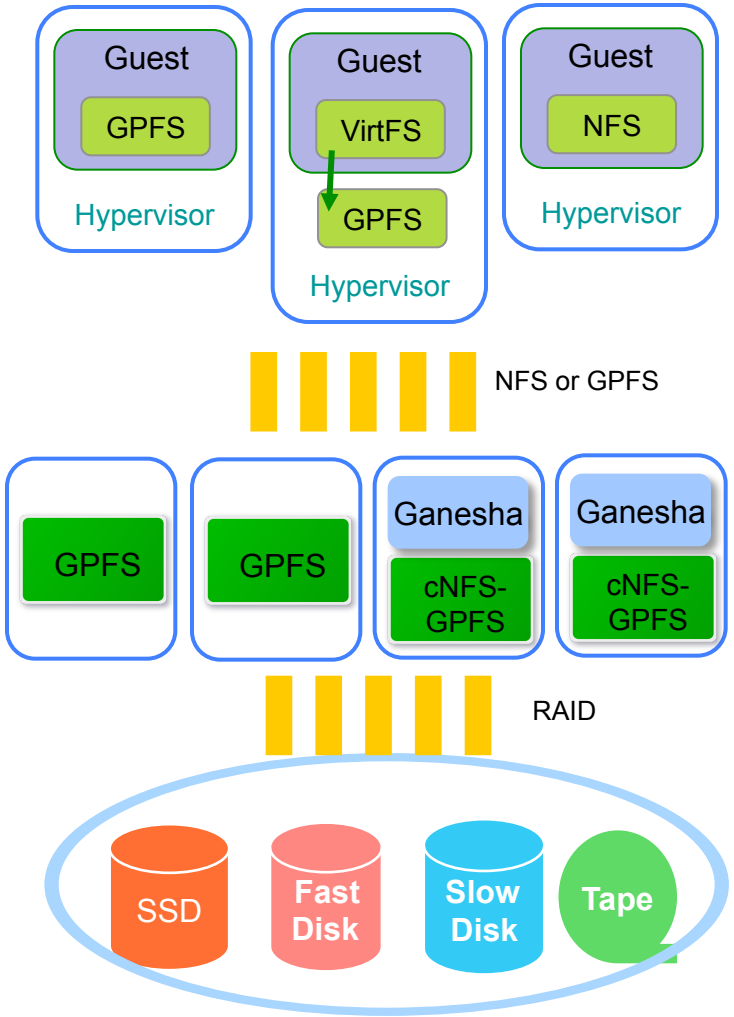
manila create
manila access-allow

- Use Gluster to provide a Distributed Scale Out File System backend for Manila File Shares
- Current: Single Tenant GlusterFS driver using Gluster-NFS
- Future: Be able to use NFS Ganesha(Kilo)



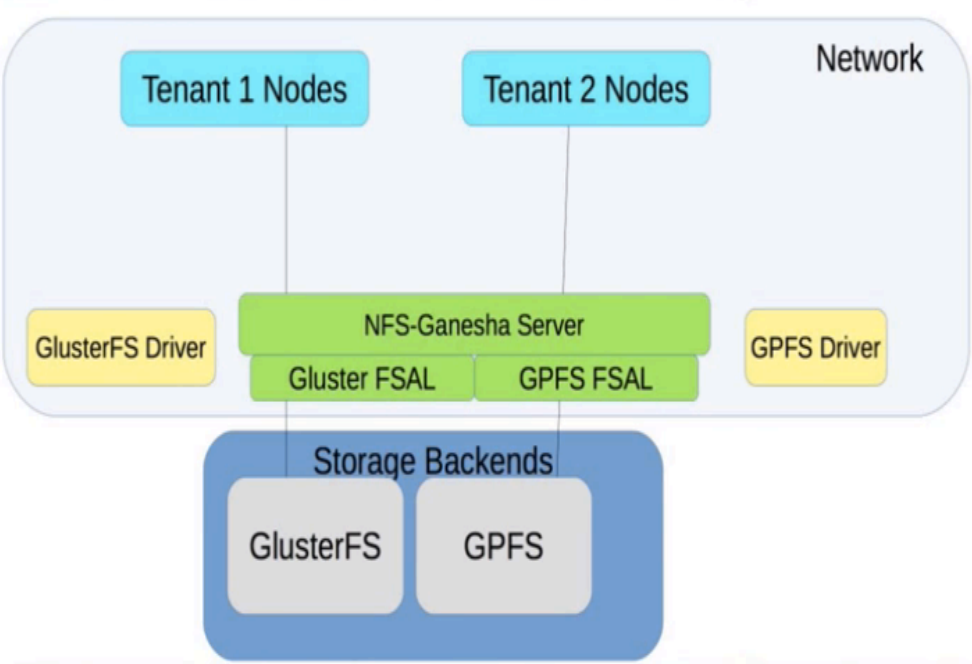
Manila: IBM GPFS

- Goal is for GPFS to provide a single data plane for all data center applications.
  - Manila extends the data plane into the VM
- Support both cNFS and GPFS
  - pNFS in roadmap
- Leverage Standard GPFS Enterprise features
  - Scale Out, High Performance, Highly Available, Encryption, Backup, DR, Declustered RAID
  - Tiered Storage Pools



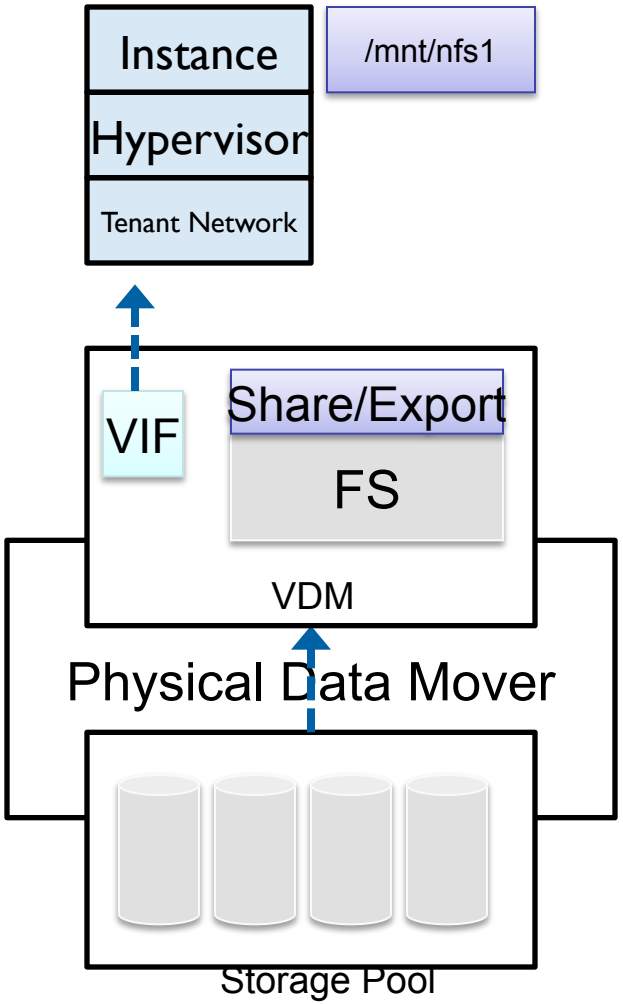
Manila: NFS-Ganesha Driver

- The NFS-Ganesha is a User Space NFS Server
- It is an Open Source project with active community of both Company and Independent sponsored developers
- Provides a modular architecture providing File System Abstraction Layer(FSAL) for Storage Backends
- Ganesha driver will be a gateway mediated model between Manila and Storage Pools
- Current work in progress for Manila
  - GlusterFS
  - GPFS



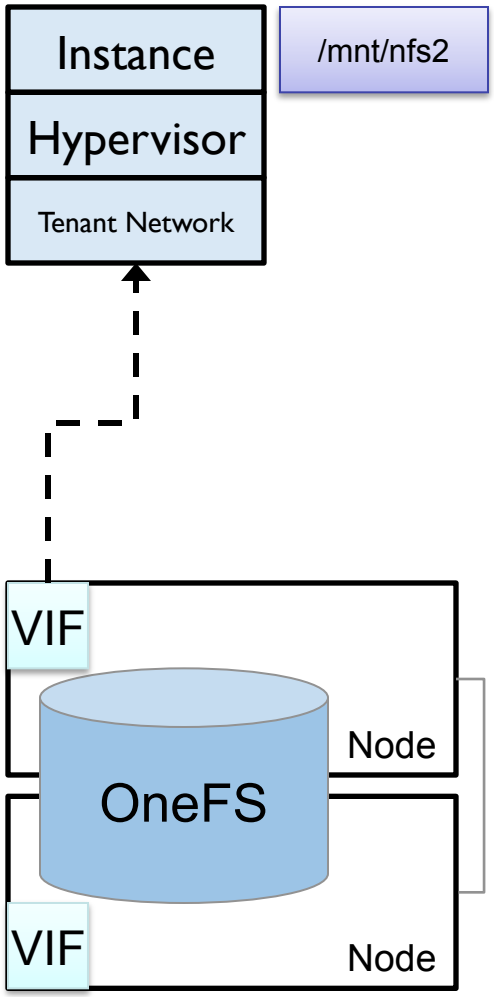
Manila: EMC VNX

- Today:
  - Common driver with Plugin capability
  - Prototype supports majority of Manila API
  - Currently requires that interface already exist on tenant network
- WIP Items:
  - Implement multi-tenancy by automating management of Virtual Data Movers (VDM) and VIF (via network setup/teardown)
  - Add logic for selecting other physical data movers



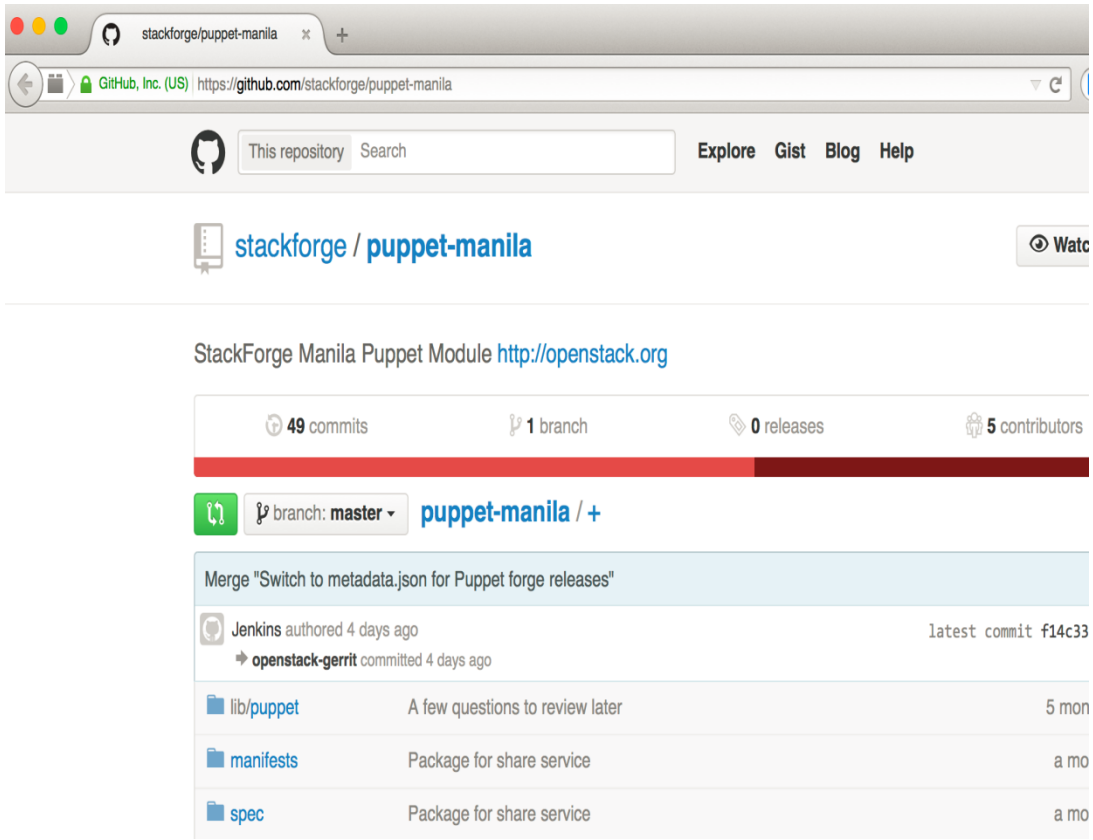
Manila: EMC Isilon

- Today:
  - Creates export/share and allocates quota
  - Supports majority of Manila API
  - Leverages Host ACL for both SMB and NFS
- WIP Items:
  - SmartConnect and Access Zones (for multi-tenancy)
  - Define “update_share_status”



Manila: Automation

- The manila module is a thorough attempt to make Puppet capable of managing the entirety of manila.
- Combination of Puppet manifests and ruby code to delivery configuration and extra functionality through types and providers.



Manila: Status

- **Officially an incubated OpenStack program (August 26th, 2014)!**
- Work towards Project Graduation
- Multiple POC's in progress
- Additional contributors and drivers being developed
- Active Community contributors

Manila: What is new in Juno

- Manila repos are now under “OpenStack” Github organization
- puppet-manila now on stackforge
- Increased developer & admin documentation
- Removal of obsolete/unmaintained drivers
- Added tempest integration and gate tests

Manila: Kilo and beyond

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- Automate mounting shares within instances
- Share Type Support
- Replication
- Manage and Un-manage of Shares
- Backup
- Trove Enablement for Manila Awareness
- Additional Vendor Drivers and Backends
- Driver Extensions

Manila: How to get Started

- Manila Wiki
  - https://wiki.openstack.org/wiki/Manila
- Distributions
  - RDO
    - RPMs are available now; Packstack integration coming soon
  - OpenSUSE
    - RPMs are available now; installer integration coming soon
- IRC on Freenode
  - `#openstack-manila`
    - any time
  - `#openstack-meeting-alt`
    - 15:00 UTC on Thursdays

Other SNIA-CSI Webcasts

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- Check out on-demand Webcasts from this Cloud Developers' Tutorial Series:
- Introducing CDMI 1.1
- OpenStack Cloud Storage
  - http://www.snia.org/forum/csi/knowledge/webcasts
- Upcoming CSI Webcasts:
- LTFS Bulk Transfer Standard – Feb. 10th https://www.brighttalk.com/webcast/663/138935
- Hybrid Clouds: Bridging Private & Public Cloud Infrastructures – March 18 https://www.brighttalk.com/webcast/663/143055

After This Webcast

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- This webcast and a copy of the slides will be posted to the SNIA Cloud Storage Initiative (CSI) website and available on-demand
  - http://www.snia.org/forum/csi/knowledge/webcasts
- A full Q&A from this webcast, including answers to questions we couldn't get to today, will be posted to the SNIA-CSI blog
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Conclusion

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Thank You