Technical Features					
Feature Group	**Feature**	**Eucalyptus**	**OpenStack**	**VCL**	**CloudStack**
General Features	Version under revision	3.4.1	Havana, version 8 (2013.2.x)	2.3.2	4.2.0
	Highly Available Architecture Design	✔	✔	✖	✔
	Development language	Java, C, Python, Perl	Python	Perl	Java
	Supported DBMS	PostGreSQL	Drizzle, Firebird, Microsoft SQL Server, MySQL, Oracle, PostgreSQL, SQLite, Sybase	Mysql	MySQL
	Supported protocols and backends	Local users, IAM	LDAP, Kerberos, Local Users	Local Users, LDAP, Shibboleth	LDAP, local users
Computational Features	Supported Hypervisors	ESXi, KVM	KVM, QEMU, Xen, ESXi/VC, Hyper-V, PowerVM, Docker	KVM, ESXi	VMware, KVM, XenServer y Xen Cloud Platform (XCP)
	Scheduling methods	EuQoS	By filters and weights, random (filtered), customized	By availability of the hypervisor	?
	Live migration support	✔	✔	✖	✔
	Baremetal provisioning support	✔	✔	✔	✔
	High Performance Computing Support	✔	✔	✔	✔
Networking Features	IP v4 management	✔	✔	✔	✔
	IP v6 management	✖	?	✖	✖
	MAC management	✔	✔	✔	✔
	Software-defined networking (SDN) support	✔	✔	✖	✔
	Projects Traffic Isolation method	VLAN	VLAN, GRE, VLAN+GRE	VLAN	VLAN
	Firewall	✔	✔	✖	✔
	Routing	✔	✔	✖	✔
	NAT	✔	✔	✔	✔
	Remote Desktop access protocols	VNC	VNC (noVNC), SPICE	✖	VNC
VM Images Features	Supported disk formats	Raw, VMDK, VDI, QCOW2, ISO	Raw, VHD, VMDK, VDI, ISO, QCOW2, AKI, ARI, AMI	Raw, VMDK, VDI, QCOW2, ISO	QCOW2, VHD, VMDK
	Supported container formats	emi	Bare, ovf, aki, ari, ami	?	?
	Supported backends	Posix Filesystem	Local disk and NFS, Swift, S3, RBD	Local disk and NFS	NFS, Swift, S3
	Image caching	✔	✔	✔	✖
	Create Image from VM snapshot	✖	✔	✖	✔

Technical Features(2)					
Feature Group	**Feature**	**Eucalyptus**	**OpenStack**	**VCL**	**CloudStack**
Block Storage Features	Supported backends	NFS, DAS, EBS, iSCSI	NFS, LVM, Ceph, GlusterFS, and specific drivers (VNX, DELL, etc)	✘	iSCSI, NFS
	Create/Delete volume	✔	✔	✘	✔
	Attach/Dettach volume to VM	✔	✔	✘	✔
	Expand volume	✔	✔	✘	✔
	Create snapshot from volume	✔	✔	✘	✔
	Manage snapshots (delete / list)	✔	✔	✘	✔
	Create volume from snapshot	✔	✔	✘	✔
	Clone a volume (volume from volume)	✔	✔	✘	✘
	Create VM Image from volume	✔	✔	✘	✔
	Support for volume migration to another host	✔	✔	✘	✔
NAS Storage Features	Supported backends	✘	✘	✘	✘
Object Storage Features	Preferred backend	EBS, Walrus	Swift	✘	Swift (OpenStack) and Amazon´s S3
	Access method	REST-Ful	REST-ful API & python-swiftclient	✘	Just for VM Images and Volume Snapshots
	Segmentation support (zones, groups)	✘	Zones ⊂ Rings ⊂ Regions	✘	Zones ⊂ Rings ⊂ Regions (applies to Swift)
	Authentication integration support	✔	✔	✘	✘
	Web UI integration	✔	✔	✘	✘

Management Features					
Feature Group	**Feature**	**Eucalyptus**	**OpenStack**	**VCL**	**CloudStack**
General Features	Licensing	GNU	Apache 2.0	Apache 2.0	Apache 2.0
	Web Interface	✔	✔	✔	✔
	Command Line Interface	✔	✔	✔	✔
	REST-ful API	✔	✔	✘	✘ (It is REST-like, not REST-ful
	EC2-Amazon API compatibility	✔	✔	✘	✔
	Virtual Machines management (create, reboot, suspend, resize, delete)	✔	✔	✔	✔
User Accounts Features	Permissions granularity	Groups, Users	Tenant, Users	Groups, Users	Domain, Account, Domain Administrators, Projects
	Basic management of user accounts	✔	✔	✔	✔
	User with multiple projects or groups	✘	✔	✘	✔
Security Features	Least privileged access design	✔	✔	✔	?
	Role Based Access Control (RBA)	✔	✔	✔	✔
	Fine granularity permissions definition method	JSON files	JSON files	✘	On Web UI
	Centralized permission control	✘	✘	✘	On Web UI
	Security groups	✔	✔	✔	✔
Resource Allocation Features	Ability to select the zone/region/ availability zone, etc	✔	✔	✘	✔
	Ability to allocate/deallocate external IP's to VM's	✔	✔	✘	✔
	Virtual Machines en bloc provisioning	✔	✔	✔	?
	VM's provisioning based on schedule	✘	✘	✔	✘
Orchestration Features	Complex architectures definition support	✔	✔	✘	✘
	Autoscaling support	✘	✔	✘	✔
	Web UI integration	✘	✔	✘	✘
	Architecture definition formats	Ansible	HOT (Heat Orchestration Template), CloudFormation (AWS)	✘	✘

Management Features (2)					
Feature Group	**Feature**	**Eucalyptus**	**OpenStack**	**VCL**	**CloudStack**
Infrastructure Segregation Features	Logic division	Availability Zones	Availability Zones y Host Aggregates	Hypervisors grouping	Zones, Pods & Clusters
	Physical division	Regions	Cells & Regions	Controller Nodes	Regions
Quota Definition Features	Number of VCPU's	✔	✔	✔	✔ (per account & per project)
	Available RAM memory	✔	✔	✔	✔
	Number of virtual machines to deploy	✔	✔	✖	✔
	Volume quantity	✔	✔	✖	?
	Available storage for volumes	✔	✔	✖	✔
	Number of snapshots to take	✔	✔	✖	✔
	Number of floating IP's	✔	✔	✖	?
	Number of key pairs	✔	✔	✖	✔
	Number of security rules	✔	✔	✖	?
Monitoring Features	Web UI integration	✖	✔	✖	✔
	Centralized module	✖	✔	✖	✔
	Alarms definition support	✖	✔	✖	?
	Computational resources monitoring	✖	✔	✖	✔
	Networking resources monitoring	✖	✔	✖	✔
	Images monitoring	✖	✔	✔	✖
	Object Storage monitoring	✖	✔	✖	✖
	Volumes monitoring	✖	✔	✖	✔
	Energy monitoring	✖	✔	✖	✖
	Visualizations included	✖	✔	✖	✔
	Extendible (new metrics)	✖	✔	✖	✖
Documentation Features	End user guide	✔	✔	✔	?
	Administrator guide	✔	✔	✔	✔
	Installation guide	✔	✔	✔	✔
Support Features	Support wiki	✔	✔	✔	✔
	Support forum	✔	✔	✔	✖
	Available certifications	✔	✔	✖	✖
	Commercial support	✔	✔	✖	✔
	Software update cycle	✔	6 months approx.	Not frequently updated	6 months