StratusLab Cloud Distribution Installation

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StratusLab

What is it?

- Complete IaaS cloud distribution
- Open source (Apache 2 license)
- Works well for production private and public IaaS clouds

Focus: Darn Simple Cloud

- Simple to install on commodity hardware
- Simple to use, from any client machine
- Scales down as well as up!

Infrastructure as a Service (IaaS)

+ Customized environment
+ Dynamic (scalable) provisioning
+ Easy access

– Variety of APIs and interfaces
– Image creation is tedious
– Single machine granularity

Where did it start?

Informal collaboration to investigate running grid services on Amazon EC2 (2007)

Identified need for open source cloud distribution.

StratusLab Project (6/2010 to 5/2012) co-funded by EC with 6 partners from 5 countries

Production dist. with academic & commercial deployments.

Website: http://stratuslab.eu
Twitter: @StratusLab
Support: support@stratuslab.eu
Source: http://github.com/StratusLab

Open collaboration to continue the development and support of the StratusLab software

Releases

Release Policy

- Quarterly timed releases (13.02, 13.05, …)
- Roadmap (6-month) describing the StratusLab evolution

Release History

- V2.1 (16/10): Streamlined release; improved IO perf. with virtio drivers
- V2.1.1 (29/11): Bug fixes; storage upload; better Windows support
- V13.02 (31/1): Support for CloudInit contextualization and bug fixes
- V13.05 (18/6): Initial steps towards new architecture
- V13.09 (30/9): Initial preparations for CIMI and new architecture
- V13.12 (19/12): Bug fix release
- V14.03 (08/3): Bug fix release
- V14.06 RC (15/6): Proxied deployment architecture; prep. for CIMI

Support

Policy

- Best-effort support with strong focus on the latest release

Information

- Web site documentation
- Recorded tutorials

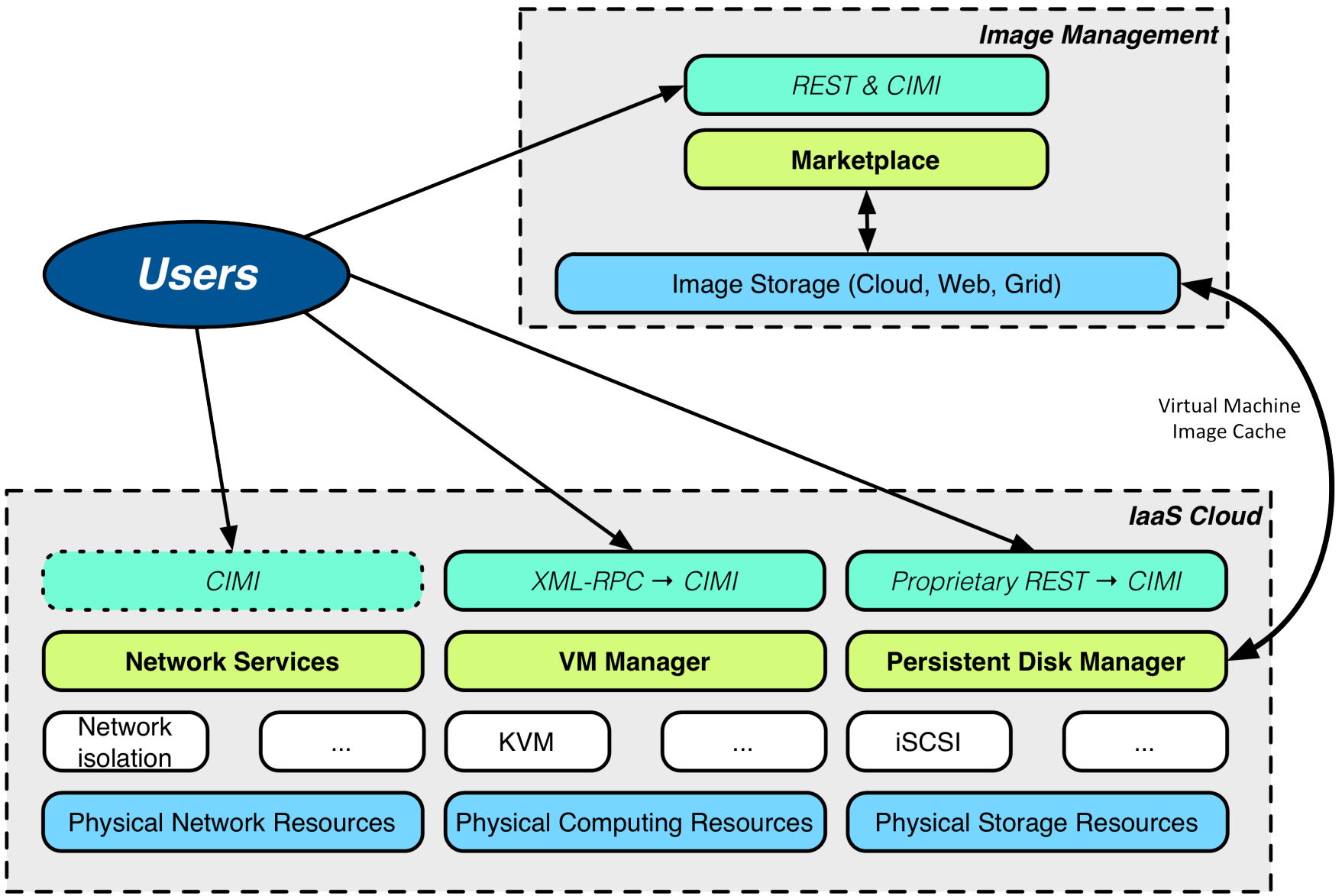
Mailing List

- support@stratuslab.eu

Meetings

- Live tutorials (usually 2-3 per year)
- Workshops (2+ per year)

StratusLab Services



StratusLab

Services

- Compute: Virtual machine management (currently uses OpenNebula)
- Storage: Volume-based storage service
- Network: Simple configuration for public, local, and private VM access
- Image mgt.: Complete system for trusted sharing of VM images

Tools

- Python CLI and APIs (Libcloud) to facilitate use of cloud
- CLI to facilitate the installation of services

Service Details

Compute

Features

- Fast provisioning of VMs, with low latency start-up

Contextualization

- HEPiX & OpenNebula CDROM contextualization by default
- CloudInit (disk based) also supported

Implementation

- API: XML-RPC interface of OpenNebula
- OpenNebula (C++, Ruby) with customized hooks
- Hooks primarily for caching, snapshots, and storage access
- StratusLab proxy (one-proxy) for authentication

Storage

Features

- Volume abstraction for storage service
- Provide users with persistent storage for data
- Serves also as cache of images for VM instances
- (No file-based or object-based storage service)

Implementation

- API: Proprietary REST interface with CRUD actions
- Java-based service using MySQL database for state information
- Can use iSCSI, shared file system, or CEPH for physical storage
- Can use LVM volumes, simple files, or block devices for disk content

Network

Features

- Support 3 specific use cases: public service (public), MPI applications (local), and BOINC-like worker (private)
- Dynamic configuration of network switches not needed
- Uses usual services for VM network configuration

Implementation

- No API: manual, static configuration of network
- Rec. configuration: VLAN for cloud services separate VLAN for VMs
- All classes of IP addresses are optional, can create other classes
- Uses DHCP for VM network configuration
- Users responsible for protecting their machines

Marketplace & Image Handling

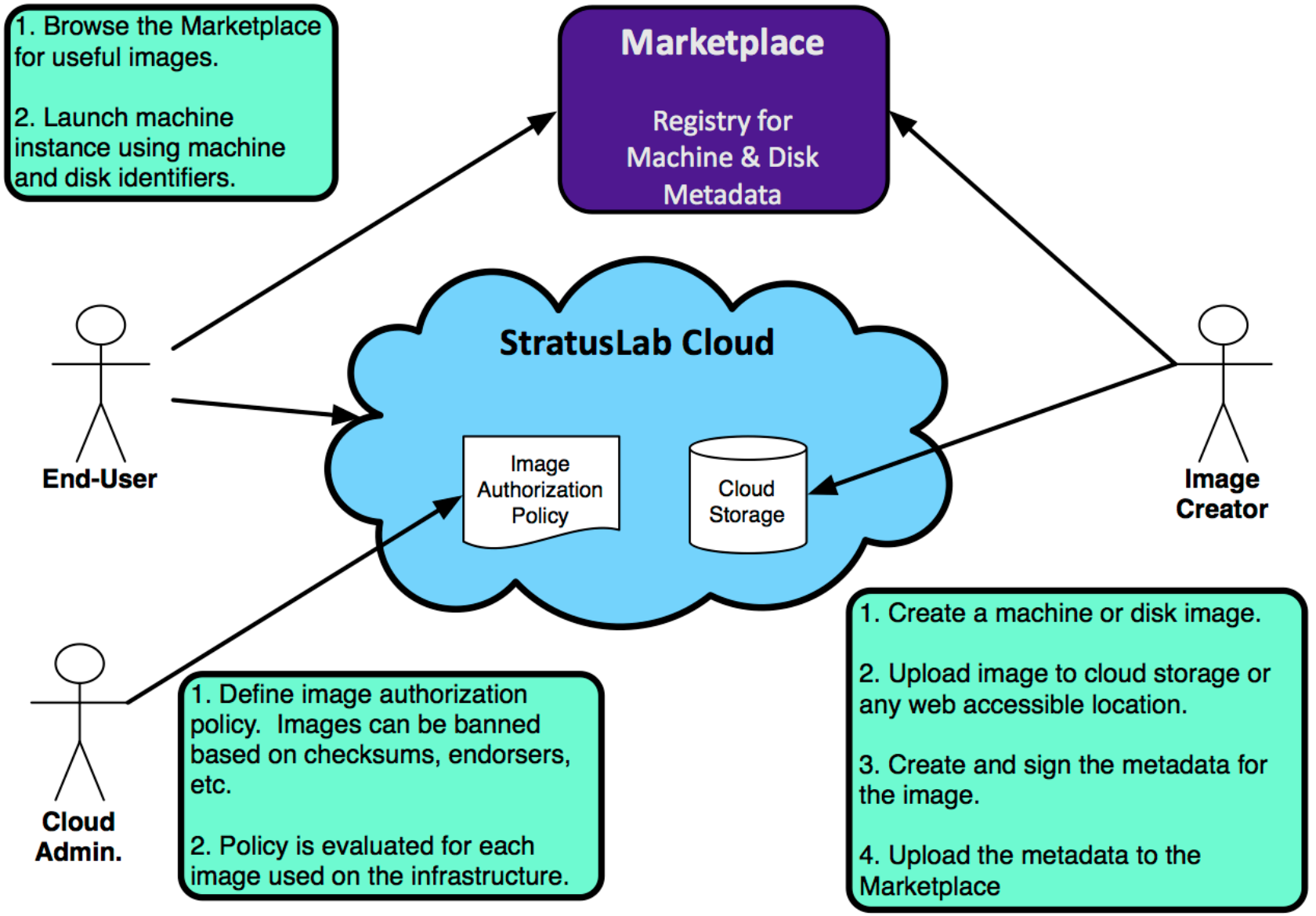
Priorities

- Mechanism for sharing and trusting images
- Possible to distribute fixed, read-only data sets as well
- Split the storage of image metadata and image contents
- Availability of VM images of common operating systems

Implementation

- Marketplace API: Proprietary REST API for create, read, search
- Marketplace acts as image registry and handles only metadata
- Image contents can be located on any public (web) server
- ‘Private’ images can also be held in cloud storage
- CentOS, Ubuntu, ScientificLinux images maintained by StratusLab

Image Handling Workflow



Tools

Command Line Client

- Administrator: simplifies StratusLab installation
- Users: access StratusLab cloud from anywhere

Administration

- Quarantine for stopped virtual machines
- Monitoring of cloud activity and resources

Authentication and Authorization

- Supports username/password, certificates, cert. proxies
- Specification in local file and/or LDAP

Installation Procedure

Commands

Configuration: `stratus-config`

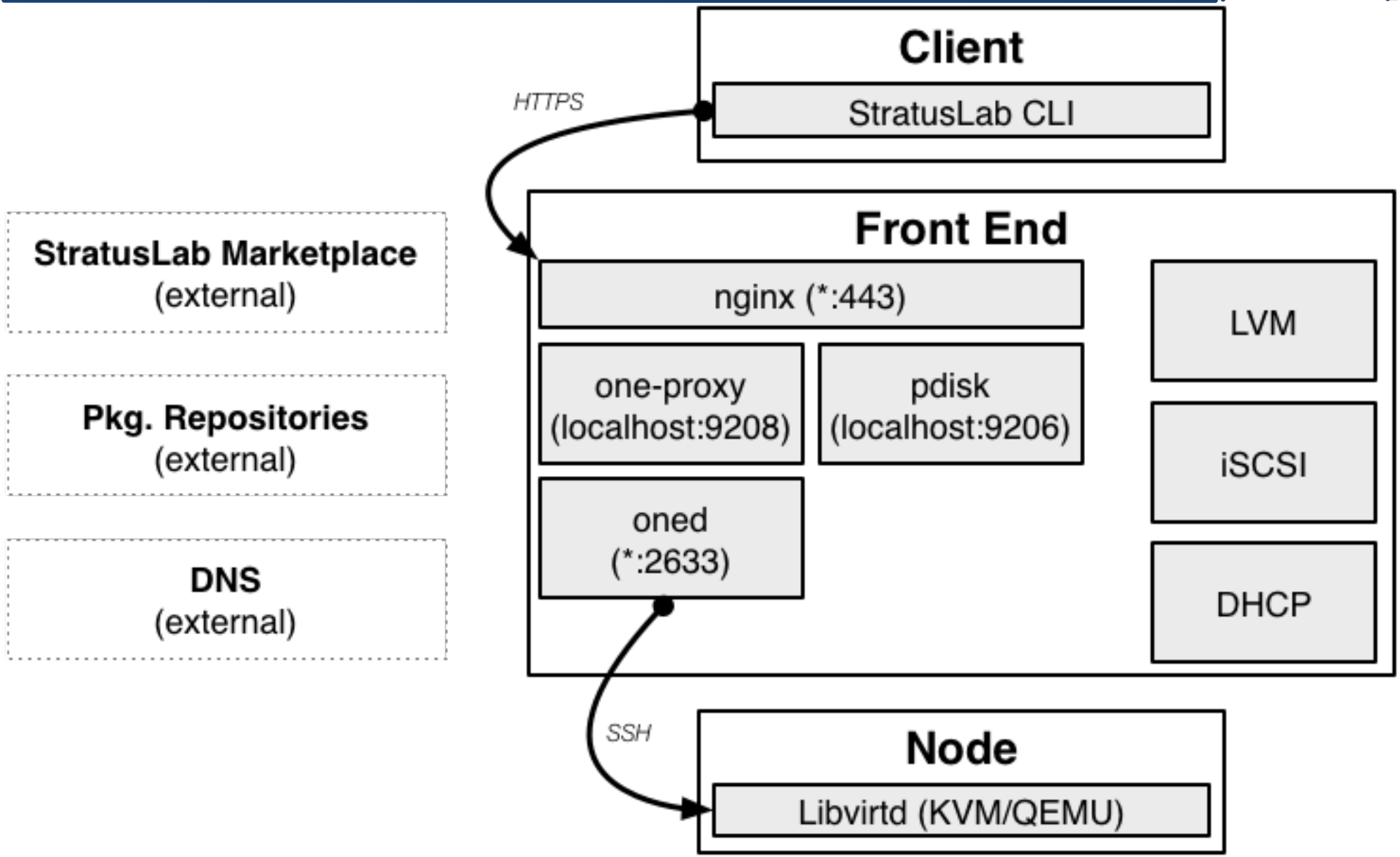
- Interface to the `/etc/stratuslab/stratuslab.cfg` file
- Easier to view and set particular parameters in configuration file
- Lots of parameters but most have reasonable defaults
- Most parameters that must be set are related to the network

Installation: `stratus-install`

- Script that uses parameters in `stratuslab.cfg` file to install services
- Does the installation and config. of StratusLab and system services
- Can be rerun in the case of errors or configuration problems
- Intended for ***installation***, limited functionality for maintenance

Installation Tutorial: http://stratuslab.rtfd.org/

Minimal Installation



Overview

1. Verification of all of the prerequisites
2. Installation of the StratusLab administrator tools
3. Definition of all of the StratusLab service parameters
4. Configuration and installation of the Front End
5. Configuration and installation of the Node
6. Validation of the cloud installation

7. Deployment of optional services (CIMI, Registration, Marketplace)

Evolution

Priorities for Evolution

Interfaces

- Adopt CIMI as the standard interface to services
- Provide complete browser interface for all services

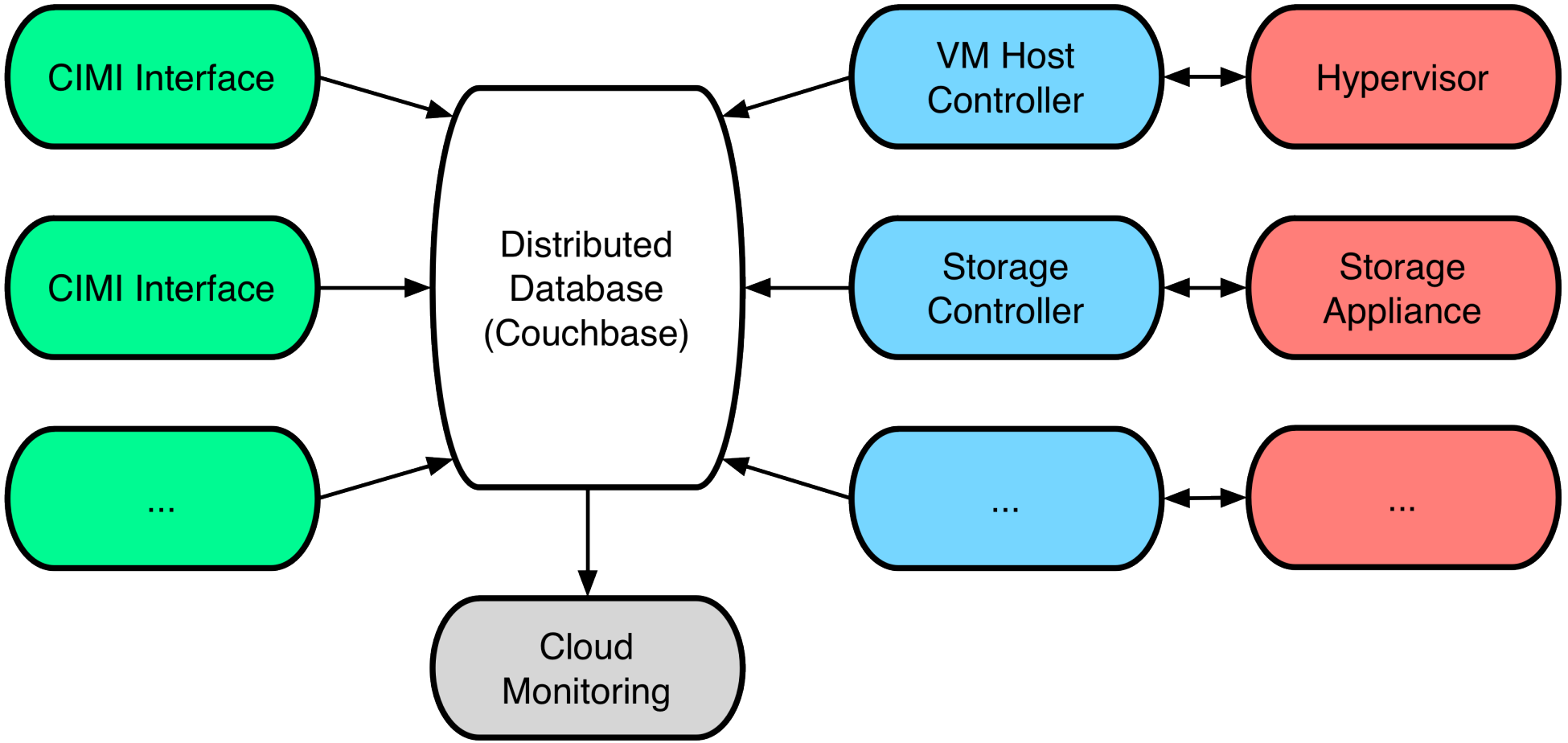
Simplicity, Scalability, & Robustness

- Direct use of libvirt as VM manager
- Distributed database (Couchbase) as information ‘bus’

Better services for system administrators

- Improved overview and monitoring of infrastructure
- Fine-grained accounting for all resources
- Migration control

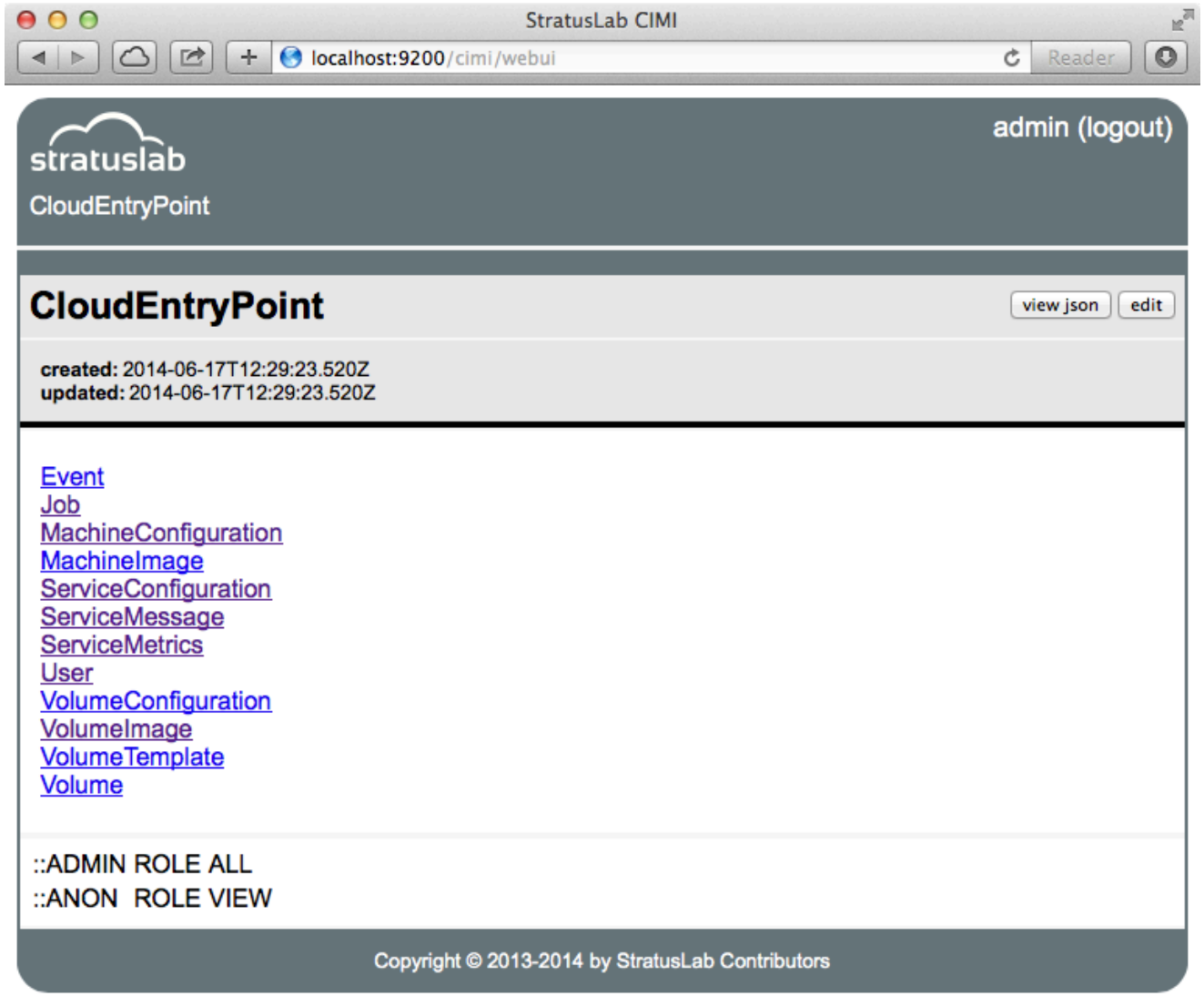
New Architecture



All of the cloud's state is stored in Couchbase.

All other components are stateless and can easily be scaled by creating new instances.

Complete Web Interface



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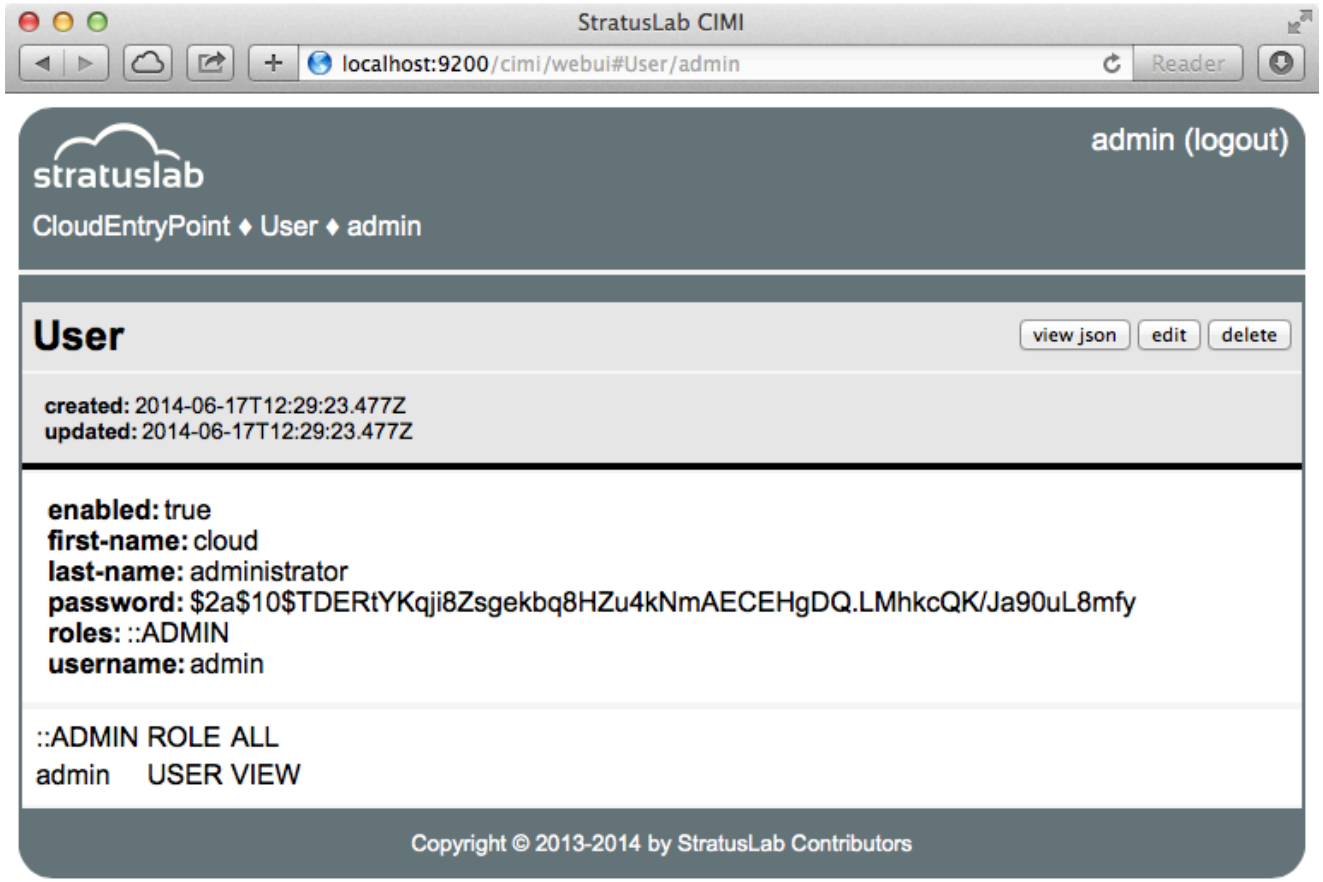

RoadMap: Current Release

14.06.0 (final tag probably around 7 July)

- Bug fixes for client and services
- Marketplace: appliance tags, server replication
- Proxy-based deployment model; all services on port 443
- Non-root users for services (except pdisk)
- Upgrade possible “with care”

Roadmap: Future Releases

14.09.0 (September 2014)

- Complete use of new architecture and CIMI
- Migration of data will be necessary when upgrading
- Existing CLI will have “same” behavior; new CLI with git-like structure
- Monitoring utilities for overview of resources and use

14.12.0 (December 2014)

- Use of new architecture to provide new functionality
- Support for linux containers
- Multiple types of storage: normal, backed up, shared (e.g. NFS)
- Possible incorporation of SAML-based authentication systems
- Foundations for quota, fair-share, etc.

Conclusions

StratusLab Cloud Distribution

- Supported, stable, and production-quality IaaS cloud distribution
- Used for reference cloud service for ~4 years
- Other academic and commercial deployments
- Defined, ambitious roadmap for its continued evolution
- Frequent administrator and user tutorials and workshops

StratusLab Collaboration

- New collaborators welcome: developers and documenters!
- Weekly phone conference between developers

Questions and Discussion

website	http://stratuslab.eu
twitter	@StratusLab
support	support@stratuslab.eu
StratusLab source	http://github.com/StratusLab
SlipStream source	http://github.com/slipstream

http://stratuslab.eu/