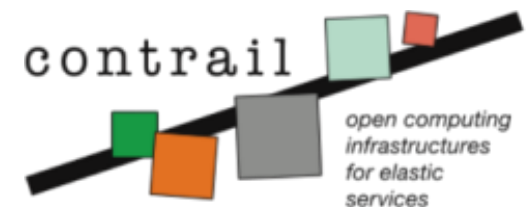


Contrail Virtual Execution Platform

Challenges in being part of a large federation

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Contrail Project

FP7 Call 5 Integrated Project

Duration

- 3 years, started in Oct 2010

Consortium

- 11 academic and industrial partners in 6 European countries

Project Objective

- Development of an integrated approach to virtualization offering services for federating IaaS clouds and PaaS services on top of federated clouds.

Contrail partners



Challenges in Cloud Computing



Inherent lack
of trust in
cloud
providers



Questionable
data placement
and protection
practices



Lack of
realistic
Service-Level-
Agreements
(SLAs)



High chances
of vendor lock-
in.



Need for a federation



People acting independently without common goals generally result in a chaos



Independent members operating towards a common goal governed by a common set of rules may result in synergies.

But federations have issues too

For a federation to be successful, the members must agree to abide by the common set of laws.

Similarly for clouds federations, providers must abide by common set of federation laws (a federation should be transparent).

There are difficult issues to be addressed

- Authenticity of reported statistics
- Verification of SLA adherence
- Scalability of interface APIs
- Authorization / Authentication issues
- Issue of trust in the federation.

Federation Issues

- Authenticity of reported statistics
 - User expects that they receive services that they have negotiated and paid for
 - A mischievous provider may fudge usage data
- Verification of SLA adherence
 - A negotiated SLA becomes a legally binding contract that needs to be honored by the provider
 - Penalties if SLAs are violated
 - Adequate logs must be maintained for verification if needed
 - Logs could be tampered with!

Federation Issues

- Scalability of Interface APIs
 - Necessary as federation user base could be much larger.
 - Provider's user interface must be able to withstand sudden deluge of federation user requests
 - Providers operating alone may not have anticipated interface load handling capabilities!
- Authentication / Authorization
 - Promote local users to federation? Probably a bad idea!
 - Have every possible federation user accounts mapped locally? Probably another bad idea!

Federation Issues

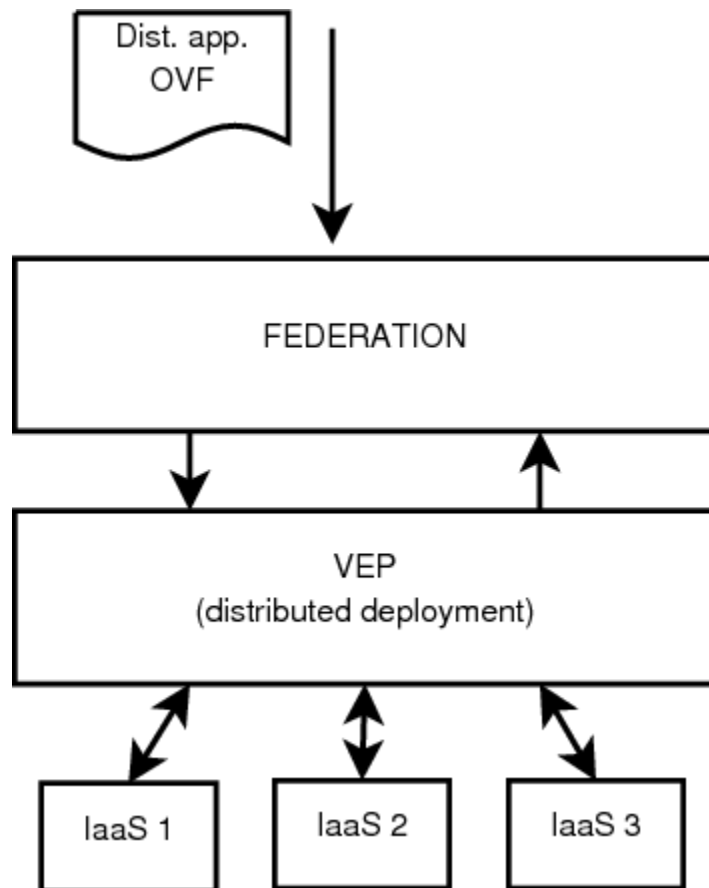
- Can the federation be trusted?
 - For federation users, it does accounting and billing.
 - Can providers trust the federation to be honest?
 - Most likely yes!
 - Most likely run by a committee of empowered people
 - To be successful, federation workings has to be transparent!

Too many IaaS solutions

- There are numerous IaaS cloud solutions available in the market
 - Private IaaS clouds
 - Open-source tools – OpenNebula, OpenStack, etc.
 - Commercial tools – VMware's vCloud
 - Public clouds
 - Pay-as-you-go Public clouds – Amazon EC2, Microsoft Azure, Google AppEngine.

There is a need for an adapter layer for integrating variety of cloud solutions under a common federation.

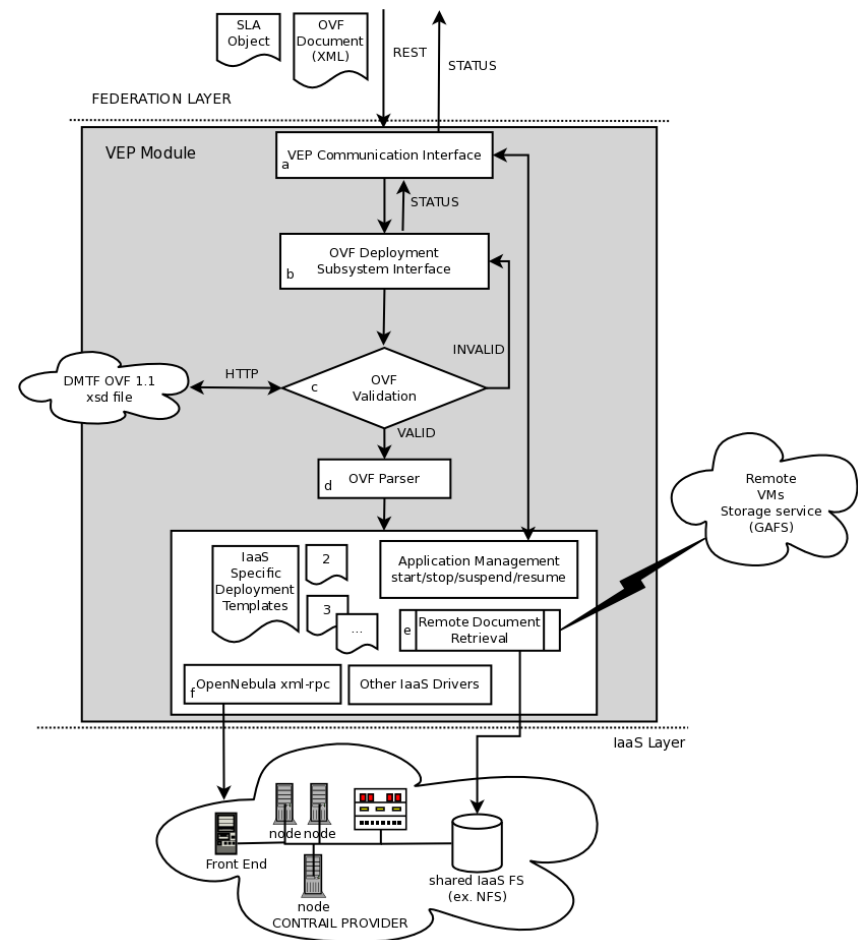
Contrail Virtual Execution Platform



- Supports open standards such as OVF.
 - Makes IaaS layer OVF-ready even if there is no native support.
- Clear APIs – Restful interface
 - Easily extendible, ease of integration
- Enables QoP and SLAs over underlying IaaS layers.
- Manages application deployment and provides full lifecycle management features.

Contrail Virtual Execution Platform

- Provides support for virtual organizations over IaaS layer.
- Provides comprehensive monitoring data to the higher layers.
- Provides advance resource reservation capability for IaaS resources.
- Provides support for federated user IDs and user management.



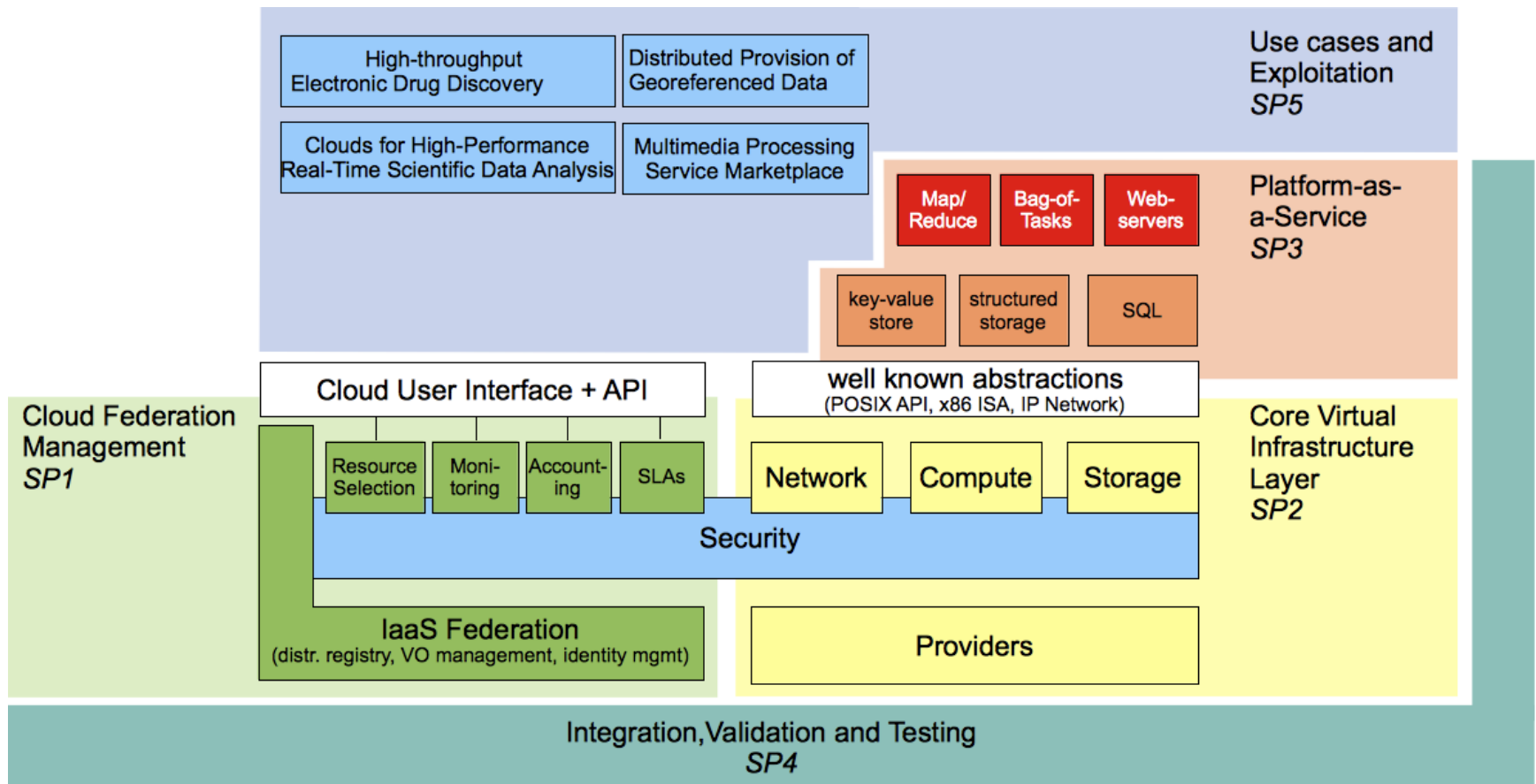
Does VEP addresses Federation issues?

- To some extent yes!
 - Complete stress tested VEP-Federation interface.
 - Manages federation users' authorization.
 - Manages monitoring data and reporting on behalf of the provider by using validated hooks at IaaS layer.
 - Open source code for public scrutiny to foster some level of user trust.

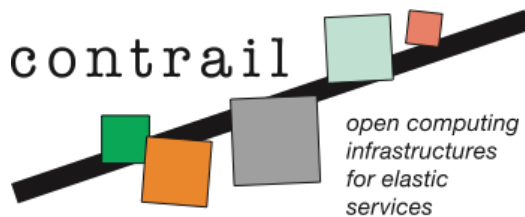
Is Contrail the answer?

- Yes, we would like to think so!
 - Provides comprehensive support for negotiated SLAs (reusing SLA@SOI components)
 - Strong emphasis on quality of protection, VM isolation, data and communication channel protection, and support for VM placement restrictions.
 - Full support for open standards – OVF, OCCI with a clear target of preventing vendor lock-ins.
 - Open source from the very beginning – independent code reviews to foster trust in the modules.

Contrail In a Nutshell



Questions & Comments



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Funded under: FP7 (Seventh Framework Programme)

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Contract type: Collaborative project (generic)

