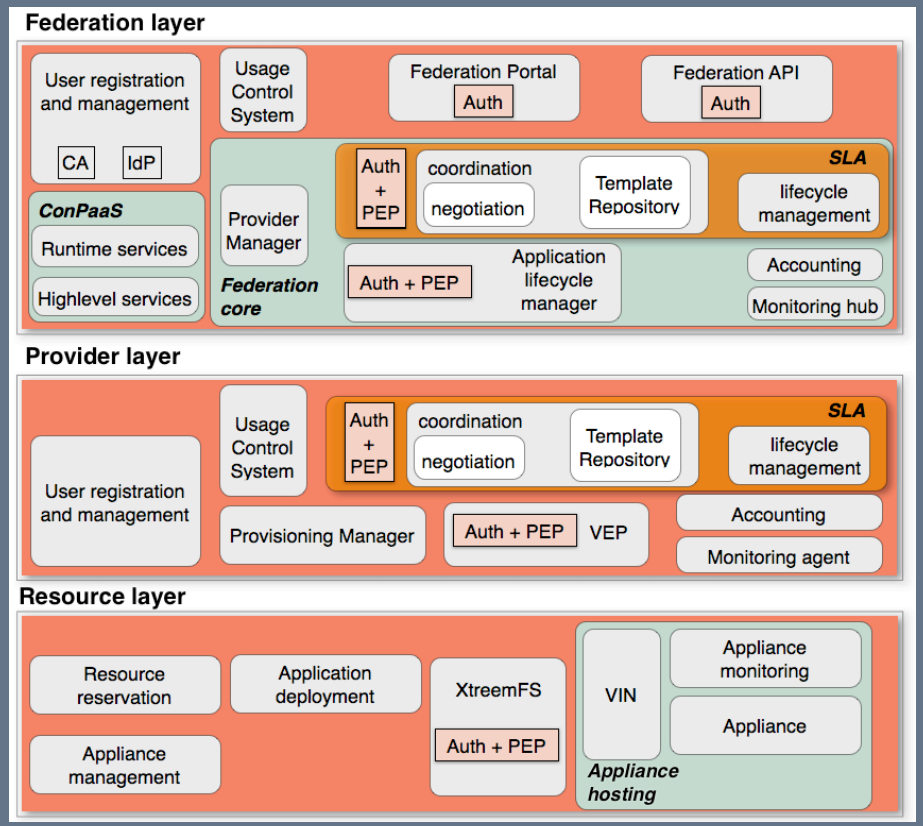
Contrail architecture



Contrail project partners

contrail

open computing infrastructures for elastic services

Contrail

Integrated runtime environment for elastic Clouds

XTREEMFS

VEP

ConPaaS

ConSec

http://contrail-project.eu

Bringing data centre versatility to the Cloud

Contrail components working together

Contrail is a Cloud software stack of components that are designed to work together to combine a number of independent clouds into one integrated federated cloud. Users can for instance submit work to the cloud federation and let the federation decide to which resource provider it should be sent for execution. The placing is decided by means of Service Level Agreements (SLAs). The user can define the SLA for his/her work. The federation can split work, if possible, and split the associated SLAs, thus distributing the work over the resource providers that (best) meet the SLAs.

The Contrail Federation layer builds on top of the Virtual Execution Platform (VEP) layer. VEP provides an integrated standard view of the resources layer. It can be considered as a kind of virtualisation of a cloud.

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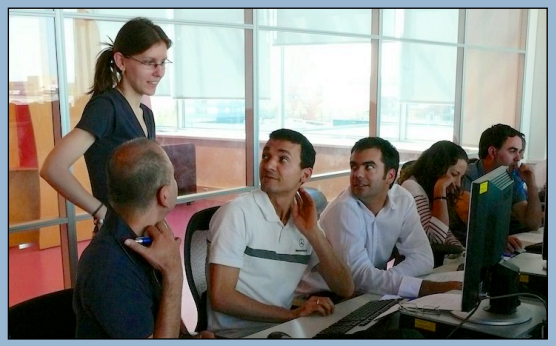
The data in a Contrail federated Cloud are stored on a file system designed especially for the Cloud. XtreemFS, as this Cloud file system is called, can handle and distribute data on widely dispersed centres. It is designed for high availability, even in the case of not too reliable networks and data centres. Data can be placed in specific centres or specific countries, depending on the user requirements.

In a federated cloud, often different networks with different address and naming schemes are used. The Virtual Infrastructure Network (VIN) component of Contrail combines these networks into one virtual network. This frees the user from the burden of configuring networks on different Clouds and adapting his applications to them.

Together, these components provide and Infrastructure-as-a-Service view of a set of federated Clouds to a user. In addition there is a Contrail Platform-as-a-Service component, called ConPaaS that provides an even higher level of abstraction. Here, typically an application developer can compose an application consisting of several parts, such as PHP, Java, SQL, NoSQL. The deployment is done automatically on the Federated Cloud by the ConPaaS software.



When one is using several clouds in one federation, managing the identity is important to the user and his applications: you do not want to login to five different Clouds all with different user names and passwords before being able to submit some work to the Cloud federation. Also the security of the user's actions and data and security of the providers and their resources needs to be respected. Contrail Security (ConSec) has been developed to handle this.

To demonstrate the use of the complete Contrail stack, it has been implemented in several use cases. One is available on-line as a fully functioning "Demonstrator". In these use cases all the components work together with application specific software.

The Contrail stack federates existing Clouds that are built by Cloud management software. Contrail fully supports OpenNebula based Clouds and to some extent OpenStack Clouds.

ConPaaS can be used independently of the other Contrail components on top of Amazon EC2 too. Most other components of Contrail are designed in such a way they can be used in other settings outside a Contrail federated Cloud. Some are widely used already, such as XtreemFS, others are being deployed in recently started research projects.

Contrail components are available in open source hosted by OW2.

Contrail is developed in the Contrail project. Contrail is a project managed by the Contrail consortium. It develops a stack of federated Cloud computing tools that can work together.

Contrail is partially funded by the FP7 Programme of the European Commission under Grant Agreement FP7-ICT-257438.