Sarastro: Virtual Internets in the Cloud

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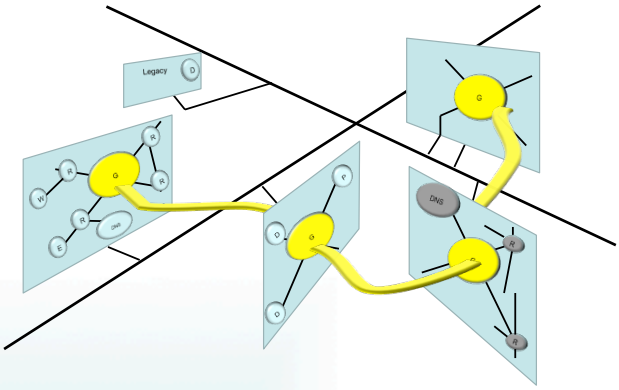
We present software, Sarasto, to create and operate IPv4 and IPv6 based overlay networks between cloud-based virtual machines. On the virtual machines, the Sarasto instantiates internet routers and connects them with tunnels via the Internet. The overlay network can be actively managed by Sarasto, for instance by changing its topology and connecting nodes. The overlay networks have in many properties a strong resemblance to the Internet, justifying to name them “virtual internets”. Sarastro is able to support control programs that continuously adapt virtual internets to maintain application specific properties. We present two virtual internets that we generated. The first one wrapped around the world and illustrates the use of our software and typical properties of virtual internets. The second virtual internet demonstrates the concept of a control programs by showing how every network element can maintain at least two connections. Major use cases of virtual internets:

- **better then best effort routing over the Internet,**
- **private internets for closed user groups,**
- **run-time environments for distributed applications and operating systems.**

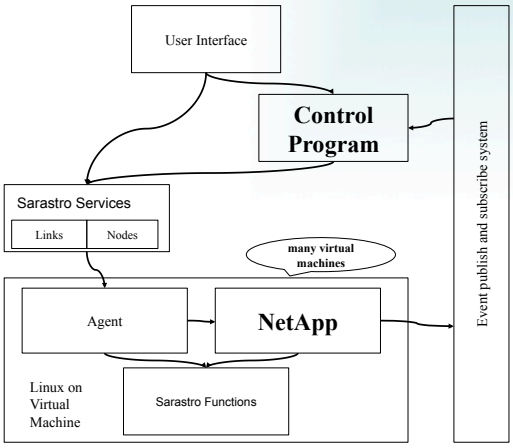


Multiple virtual internets connected with each other. Each virtual internet provides a collaboration platform for complex applications.

Demo Scenario: Deployment and Operation

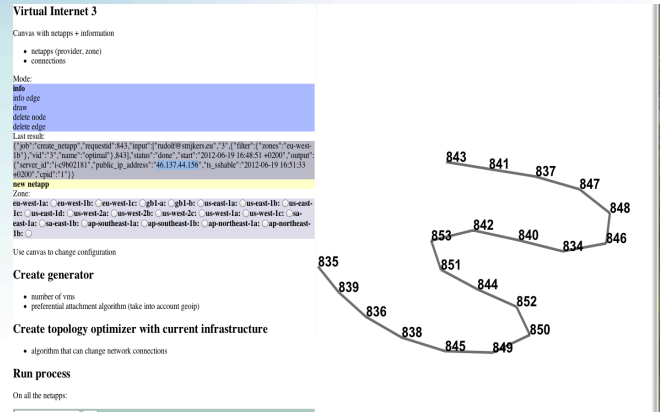
Sarastro virtual Internet nodes

Framework:



Use Cases:

- Closed-user groups: i.e. Children's internet, …
- Better then best effort routing over the Internet,
- Dynamic security and robust against cyber attacks,
- Canvas for distributed applications,
- Operating Systems for distributed applications,
- Operating System for cyber-physical systems.



The Sarastro interface: creating a 163 node network circling the globe.

Contributing projects:

- COMMIT **P20 – e-Infrastructure virtualization for e-science applications**

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