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Mantychore - Dynamic networks for e-Infrastructure

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Conclusions

In addition to the central development and deployment of dynamic networking as a service for e-Infrastructure, Mantychore will innovate the business model used for services based on IAAS, establishing a marketplace where all Infrastructure Providers can announce their available resources and all customers can automatically negotiate SLAs getting the best resources combination for their needs. Furthermore, Mantychore services will be used to contribute to the research performed in the GreenStar Network project to enable carbon-neutral infrastructures.

The Mantychore FP7 project is committed to incorporating as many viewpoints and potential uses as possible in order to reach a more complete and valuable software and expertise pool. For this reason, the project resources are open and available for any interested individual or community to join.

Overview

Mantychore aims to provide dynamic networking as a service for e-infrastructure users.

The e-science community has expressed a need for flexible and application-driven networks. Traditional methods for configuring networks for research users are impractical when the scale is international and involves several networks.

Mantychore takes an “infrastructure as a service” (IaaS) approach to networking to enable National Research and Education Networks (NRENs) and other e-Infrastructure providers to deploy a configurable, automatable network that allows virtual research communities to control routers, switches, optical devices, and IP networks as necessary to meet the needs of their applications.

Grid and cloud computing will provide some of the first real uses for this technology. Mantychore’s facilities should make it easier to share computing and storage resources between grid sites or to create a distributed computing cloud spanning several institutions.

Impact

Mantychore FP7 will carry out pre-operational deployments of the IP network service at two NRENs: HEAnet and NORDUnet. Part of the project effort will be dedicated to consolidate and enhance the community of providers (NRENs but also commercial) and users of the IP network service.

Initially three communities of researchers will benefit from this service: the Nordic Health Data Network, the British Advance High Quality Media Services and Grid-Ireland, the Irish NGL.

The Grid-Ireland Operations Centre (<http://grid.ie>) in Trinity College Dublin runs Ireland’s national computing grid infrastructure which connects grid nodes at many higher-education institutions around the country and is part of the European grid infrastructure.

Grid and cloud computing use-cases will be explored by the Grid-Ireland Operations Centre. As Grid-Ireland has resources distributed across Ireland and connected via HEAnet it is an ideal testbed for Mantychore.

The Grid-Ireland team will explore novel approaches to sharing and connecting computing and storage resources. This will include connecting grid worker nodes at multiple physical sites into a single virtual grid site over a dynamically configured virtual private network.

Further investigation will lead to creating a distributed computing cloud between institutions, with an intended use as a platform for agent-based computing. This will raise issues relating to adding and removing sites, and relating to dynamic provision of extra links for data migration for virtual machine migration and backups.

In general, by working with research communities in higher-education and research institutions Mantychore will gather real-world requirements for connecting dynamic and user-controlled networks to traditionally managed networks.

Description of the work

The Mantychore FP7 project aims to allow the NRENs to provide a complete, flexible network service that allows research communities to create an IP network under their control, where they can configure:

Layer 1, Optical links. Users will be able to get permissions over optical devices like optical switches, and configure some important properties of its cards and ports. Mantychore will integrate the Argia framework [3] which provides complete control of optical resources.

Layer 2, Ethernet and MPLS. Users will be able to get permission over Ethernet and MPLS (Layer 2.5) switches, and configure different services. In this aspect, Mantychore will integrate ETHER project and its capabilities for the management of Ethernet and MPLS resources.

Layer 3, IP. Mantychore FP7 suite includes set of features for:

- * Configuration and creation of virtual networks.
- * Configuration of physical interfaces
- * Support of routing protocols, both internal (RIP, OSPF) and external (BGP).
- * Support of QoS and firewall services.
- * Creation, modification and deletion of resources (interfaces, routers) both physical and logical.
- * Support of IPv6. It allows the configuration of IPv6 in interfaces, routing protocols, networks,

Mantychore FP7 is the natural evolution of its parent projects: MANTICORE and MANTICORE II. MANTICORE implemented a proof of concept which proves the idea of IP network and router as a Service (IPNaaS), all this management in Layer 3 where MANTICORE works. MANTICORE II continued its steps to implement stable software with the feedback, expertise and know-how received. Also, MANTICORE II added new and improved capabilities to the software and run a success pilot project where MANTICORE II partners got the chance to run some trials on their own network and equipment. The Mantychore FP7 project consolidates this trend.

URL

<http://www.mantychore.eu/>

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