System and Network Engineering

University of Amsterdam

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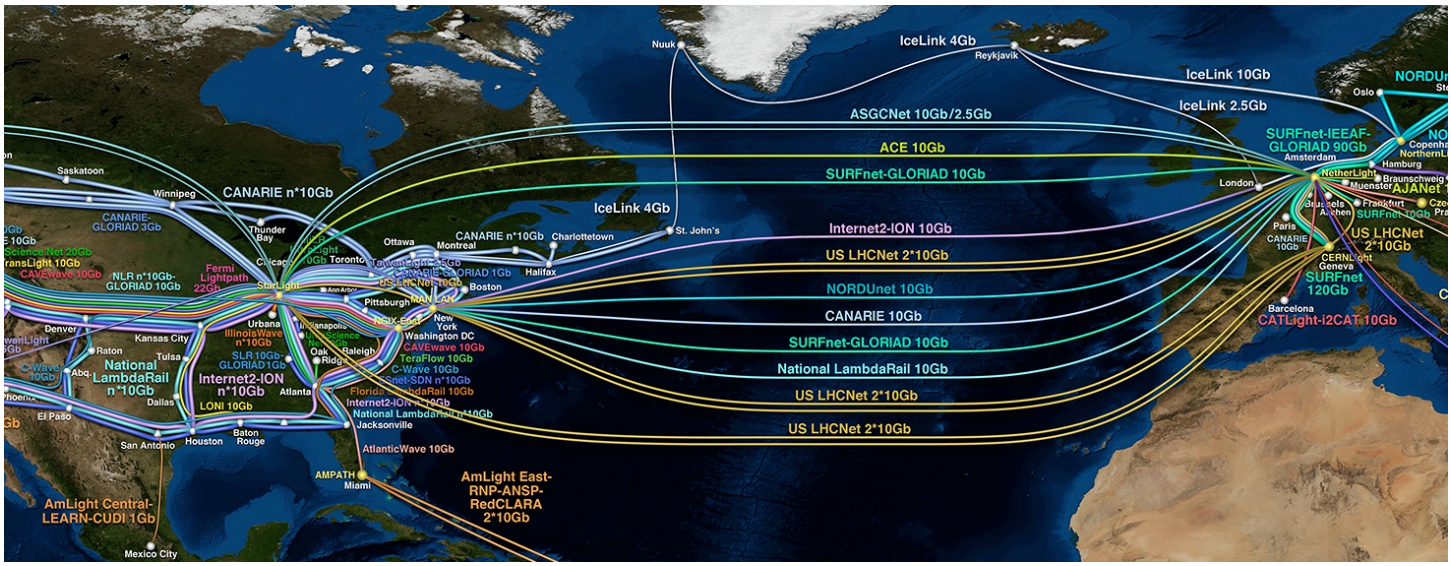
Computer networks have opened up new possibilities in providing enhanced services to end users. Our group researches new architecture and models for these type of future e-Infrastructures where computing and networking are highly integrated. We focus our work on the following sub-topics.

Describing Computing Infrastructures

We develop semantically rich information models to describe resources and services in e-Infrastructures. These models provide us the means to develop inter-domain path finding algorithms that are capable to handle aggregated or incomplete information. The same models are also at the basis of federation methods for integrated services in Future Internet platforms. An interesting challenge ahead is the modeling of clouds with their virtual devices and virtual networks and how to make scheduling in these environments more efficient and energy-aware.



Security and Policy

Research on generic AAA models for dynamically provisioned distributed Authentication, Authorisation and Identity Management services that are exposed as independent infrastructure services or integrated with distributed applications. This includes models, architectures mechanisms for security context, and trust management in dynamically provisioned service environments such as Cloud or SOA platforms. Implementation is provided as GAAA Toolkit pluggable Java library and composable OSGi service bundles; defines specialised XACML policy and attribute profiles.

Network Workflow Planning

focuses on including network quality in the life-cycle of the scientific workflow for selecting resources, composing workflow logics and for scheduling runtime processes. A NEtwork aware Workflow QoS Planner (NEWQoSPlanner) is prototyped using semantic web and software agent technologies. The prototype of NEWQoSPlanner has been successfully demonstrated in SC10 and 11 in the context of the CineGrid project, where supporting distributed parties collaboratively work on large quantity of very-high-quality digital media is the main mission.

Programmable Networks

Research on architectures, service models and interoperability frameworks in heterogeneous multi-domain multi-stakeholder environments of interconnected clouds, campus and general transport networks. This defines the open multi-layer Inter-Cloud architecture. This also includes supporting infrastructure services and mechanisms to support on-demand service provisioning, as well as dynamically provisioned manageable security infrastructure for cloud and trustworthy ICT.

Privacy

Processing privacy-sensitive information in Grid or cloud environments places high demands on security and reliability of the systems on which the data is processed. Our research focuses on trust models, security and authorization, policies for data use, and on privacy-preserving techniques, in middleware and in operating systems. We address technical (infrastructural) aspects, but also consider applications, data, and users. Control over the disclosure of data by the data subject is a central aspect of our work.

http://www.science.uva.nl/research/sne/