QoS aware adaptive digital media delivery using a workflow system

About CineGrid

CineGrid’s mission is to build an interdisciplinary community focused on the research, development and demonstration of networked collaborative tools, enabling the production, use and exchange of very high-quality digital media over high-speed photonic networks.

CineGrid Description Language

CineGrid Description Language (CDL) is created to describe the various components and services running in the CineGrid network. CDL is build upon Semantic Web. Semantic Web provides a formal and reusable way to describe resources and allows one to and use and link to other semantic descriptions. RDF/OWL is considered an ideal solution because of its extended reasoning capabilities.

NDL is used for detailed description of networks. It enables description of single and multi-layer networks and can also be used in multi-domain environments.

CDL objects can link to their NDL equivalents using the owl:sameAs property. The combined description gives the ability to reason which service is able to connect to another given various compatibility and quality constraints. This reasoning is done by the workflow system.

A workflow for adaptive digital media delivery

In the use case of digital media delivery on demand, a user can interact with the CineGrid environment via a portal to 1) search media material, 2) request desired devices for playing back the media and 3) specify the requirements for the display quality, such as the minimal resolution.

The workflow system is used to automate the discovery of CineGrid resources and the optimal network paths between these resources. From the discovered candidates, the workflow system generates a workflow for provisioning resources and for delivering digital media. At run time, the workflow engine coordinates the invocation sequences of the network services to establish connections and to deliver the digital media.

The testbed network

As one of the winners of the Enlighten Your Research contest we received a network of dynamically configurable light paths from SURFnet. This network can provide up to two 1Gbps connections between four locations, SARA, Universiteit van Amsterdam, de Waag and de Filmacademie.

This circuit switched network is controlled by DRAC, which can be invoked by the workflow system via a web service interface.

In the use case of ‘adaptive digital media delivery’, the testbed will be used to test semantic descriptions of CineGrid and network resources, and to prototype workflow components for QoS aware media delivery in a multi-domain network environment.

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