

VINCI : Virtual Intelligent Networks for Computing Infrastructures

Thursday 16 February 2006 14:00 (20 minutes)

To satisfy the demands of data intensive grid applications it is necessary to move to far more synergetic relationships between applications and networks. The main objective of the VINCI project is to enable data intensive applications to efficiently use and coordinate shared, hybrid network resources, to improve the performance and throughput of global-scale grid systems, such as those used in high energy physics and many other fields of science.

VINCI uses a set of agent-based services implemented in the MonALISA framework to enable the efficient use of network resources, coordinated with computing and storage resources. VINCI is an integrated network service system that provides client authentication and authorization, discovery of services and the topology of connections, workflow scheduling, global optimization and monitoring. Our strategy in integrating applications with geographically distributed complex services that may join and existing ones leave is the use of a multi-agent systems. Agents will act on behalf of applications describing their environment and requirements, locating services, agreeing information, and receiving feedback from services and presenting results. Agents will be required to engage in interactions, to negotiate, and to make pro-active run-time decisions while responding to changes in the environment. In particular, agents will need to self organize, and dynamically collaborate for effective decisions. The distributed agent system can create on demand end to end optical connections in less than one second independent of the location and the number of optical switches involved. It monitors and supervises all the created connections and is able to automatically generate an alterative path in case of connectivity errors. The alternative path is set up rapidly enough to avoid a TCP timeout, and thus to allow the transfer to continue uninterrupted. Dedicated agents are used to monitor the client systems and to detect hardware and software configuration. They can perform end to end performance measurements and if necessary to configure the systems. We are developing agents able to interact with GMPLS controllers and integrate this functionality into the network services provided by the VINCI framework.

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Session Classification: Computing Facilities and Networking

Track Classification: Computing Facilities and Networking