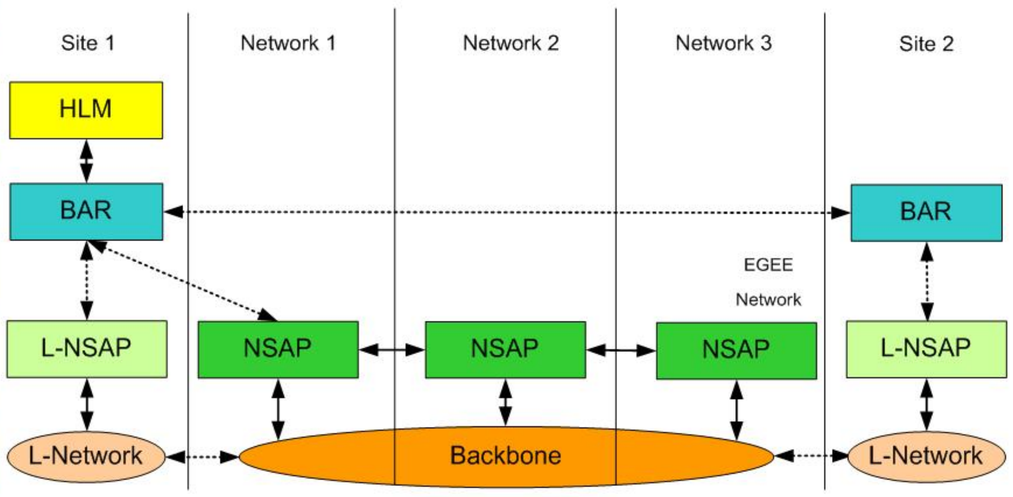
Bandwidth Allocation and Reservation

EGEE JRA4 BAR & GÉANT2 SA3 AMPS provide the world's first Web-service interface that allows advance reservation of inter-domain network services

The need for Bandwidth Allocation and Reservation

GÉANT2 is offering a Premium-IP service, as do some of the European National Research Education Networks. At the same time, lightpaths are rolled out in Europe and in some cases, like in the UK, they need to be shared amongst users. Booking these network services is a process that spans network domains. Users require a single-point of access, software-based method to request advance reservations. Also, the process of booking these services in the networks requires automation to increase their availability and reduce the lead-time for their set-up. The process is well placed to also handle and automate the set-up of User-Network Service Level Agreements.

Aims and architecture

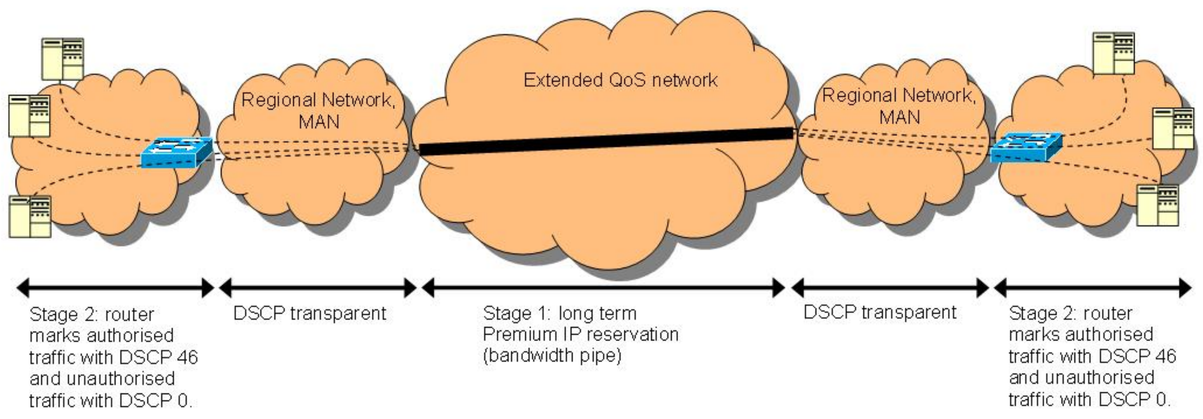


BAR architecture

The GÉANT2 SA3 activity aims to provide a Web-service interface to its Premium-IP service, to handle BAR requests and to automate the inter-domain process for the set-up of the Premium-IP path. EGEE JRA4 aims to provide a Web-service interface to broker user BAR requests to the network, and is thus a natural client for the GÉANT2 Web-service. The two activities collaborated closely to define the architecture and interfaces that allow end-to-end advance network reservation. It is assumed that networks wishing to participate in the *Extended Quality of Service network* deploy a *Network Service Access Point* that abides with the JRA4 interfaces. Any other networks in the end-to-end path need be transparent to the network service, to allow QoS in parts of the path. The BAR and NSAP (and also the Local-NSAP) interfaces are independent of the network service that they expose; BAR in particular provides an application-facing interface that insulates the user from the network nuances. The architecture is compatible with the EGEE JRA1 *Agreement Service* and with the SA2 SLA provisions.

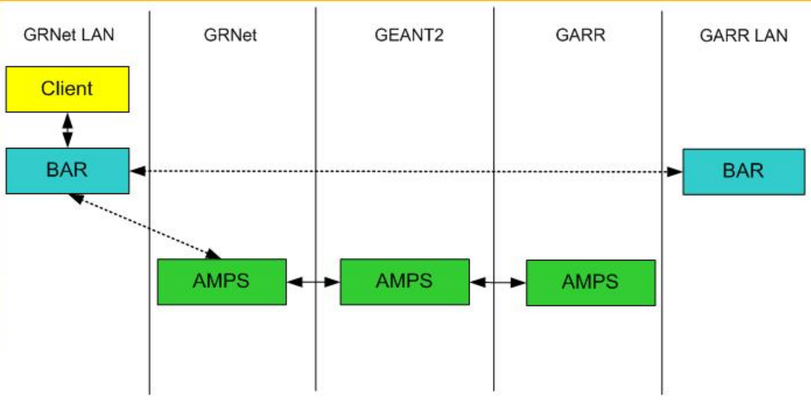
Two-stage provisioning

Networks impose a minimum reservation period (circa two weeks) because configuration is manual. Even when the reservation process is automated, a minimum reservation period will minimise the amount of configuration needed in the network. This reservation period may be significantly longer than the requirement of the applications and it is desirable to allow the subdivision of such reservations among nodes and users in a subnet, for more efficient and effective use of the service. In addition, typical Grid jobs can only specify the IP flow parameters (exact source and addresses etc.) just before a job starts. EGEE SA2 and JRA4 have defined a two-stage (*Service Reservation/Service Activation*) provisioning model. This model also addresses the constraint of the lead-time between receipt of the request and effect of the reservation.



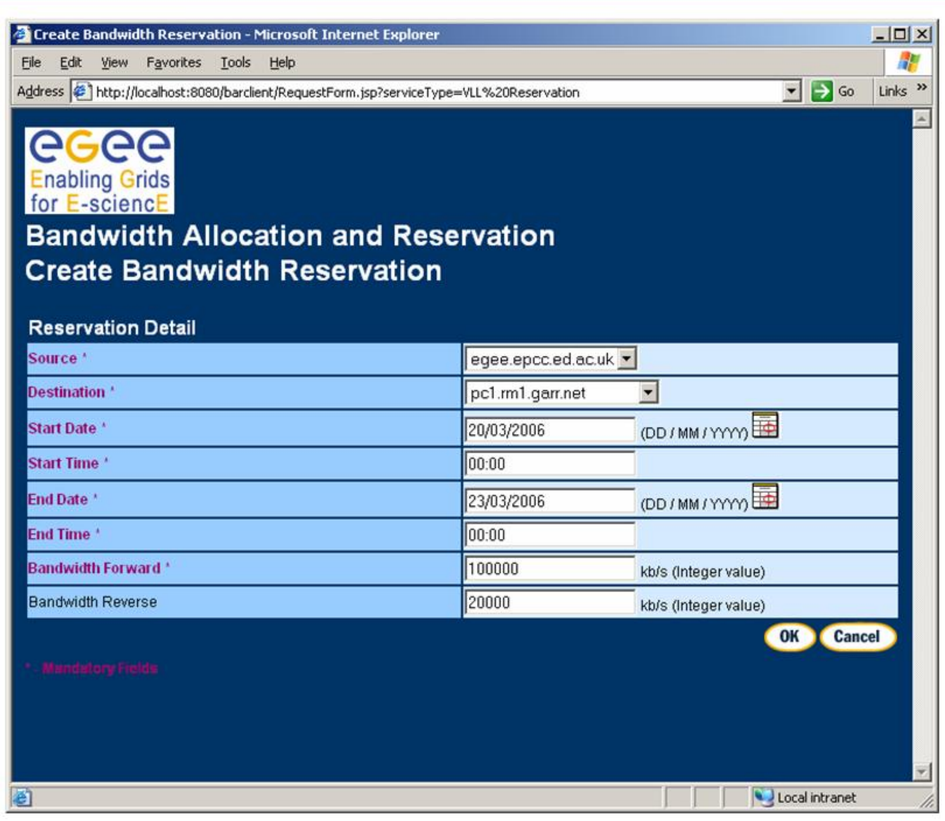
Two-stage provisioning

First inter-domain BAR demonstration



BAR demonstration

We deployed on GARR, GRNet and GÉANT2 the GÉANT2 NSAP implementation, *Advanced Multi-domain Provisioning System* and used our GUI client to request reservations and activations between the GARR and GRNet LANs. These were the first such inter-domain requests, validating our architecture and interfaces.



BAR demo client

Future work

BAR would benefit from further and validated requirements from users; the L-NSAP Web-service needs to be implemented; the BAR Web-service requires work in security, service discovery and other features to improve its robustness and functionality; accounting and book-keeping need to be addressed in tandem with GEANT; and action needs to be taken, again in collaboration with GEANT to encourage deployment of the relevant Web services in NRENs, EGEE sites and intermediate networks.

The BAR software is released under the EGEE licence.