

e-Science Applications: Network-requirements Questionnaire

1 Introduction

This document asks you to respond to some questions about your proposed e-science application with the aim of discovering some of the characteristics of the network traffic that the application is expected to generate. This information may be used to help with planning decisions by core e-science management and to help the Grid Network Team (GNT) and UKERNA to respond to the network requirements of grid applications.

We acknowledge that applications will vary widely in their use of the network and that some parameters and patterns of use may be unknown or difficult to determine in advance, but we would ask you to provide as much detail as you feel able. There is an open-response section at the end of the document where you may describe the application's network requirements in your own terms.

In some cases this information may be used as part of the evaluation process for proposals submitted in response to calls under the various e-science programmes of the research councils and the national and regional e-science centres. This will be stated explicitly when applicable.

At present JANET does not provide general support for mechanisms to prioritise or give preferential treatment to the transport of particular types of traffic, but there are plans for this to happen at some point in future so although you may not feel some of the questions being asked are relevant at the moment, your answers may provide useful information about integrating grid traffic into a general quality-of-service (QoS) architecture for JANET.

The following sections ask you to provide information on the architecture of your application and the types and quantities of network traffic you expect it to generate.

2 Application architecture

Please give an overview of your application architecture – a sketch of a typical implementation showing the interactions between the various components would be useful. This should include all architecturally significant components ranging from the software through which the user interacts with the application (user terminal or client component,) to data storage and computation servers and any components providing middleware services.

Please provide some details of the physical locations foreseen for the application components described above during the initial phase of your work, and if known, any future locations planned or modifications anticipated during subsequent phases. Any components located outside the UK should be noted, as should components within the UK but located at an organisation outside the community served by JANET.

2.1 Response

3 Identify and characterise the most significant traffic flows

We are aware that the number of interactions between software components will increase substantially in the e-science/grid environment. We ask you to identify and characterise the requirements of the most significant or challenging data-flows generated by the application between any pairs of components. These would be high-rate or high-volume flows, or flows with real-time constraints or requirements for high-reliability. Please highlight these flows and characterise them in terms of the following parameters:

- peak and average bandwidth required (bits/s)
- real-time requirements – latency (delay), jitter (delay variation)
- reliability requirements – guaranteed/assured delivery

In addition we ask for an aggregate assessment of the basic bandwidth requirements for the remaining flows.

We realise that it may not be possible to provide numeric values for some parameters such as latency and jitter, in which case useful comparisons might be made with the characteristics of traffic generated by existing applications with which you are familiar, such as:

- command window (telnet) or web browsing for reasonable interactive response
- interactive audio/video for low latency and low jitter
- streamed audio/video for less stringent latency and jitter requirements
- computational steering (configuring/setting application parameters) for low-volume, low latency, low rate and high reliability.
- file transfer (ftp) for bulk data transfer with no real-time requirements.

We expect that most applications will communicate between components using protocols transported over TCP connections, but if your application will make use of UDP or any other transport mechanism please highlight this. In addition, any use of multicast techniques should also be noted.

Please also note any other traffic characteristics or requirements that you foresee which are not covered by the parameters given above.

3.1 Response

4 Scalability

Please give some indication of how your architecture might scale with increased numbers of users. This should include some information on the geographic distribution of the user community for whom the application is intended. e.g. is the community concentrated at a few well-known locations or more evenly distributed among many organisations.

4.1 Response

5 Other requirements

Please describe any additional features or requirements of your application that you feel may not have been covered elsewhere

5.1 Response