

# Duke Office of Information Technology

## ResNet bandwidth constraints: Addressing bandwidth utilization

### Background

Network bandwidth at Duke is a shared resource - every user impacts every other user. Bandwidth usage in Duke's residential network has grown over the past years. At the beginning of the Fall 2001 semester, residence based applications consumed almost all of Duke's available bandwidth. Due to the networking problems which this caused, OIT Data Communications limited the bandwidth available for these applications to a more reasonable level.

Unfortunately, recent software releases make it difficult to make such specific limitations as they allow for network "port hopping." In order to address this problem, in the Fall of 2002, all outbound bandwidth from ResNet to off-campus sites was limited. However, this limit also unintentionally interfered with students' inbound bandwidth (due to technical issues involved in moving data across the Internet).

When examining this problem, OIT found that the majority of the bandwidth was used by a small percentage of the users. We believe that the majority of these users are unknowingly using the bandwidth. Education targeted at specific high-bandwidth users should be effective in curbing the bandwidth problem. Where education does not prove to be effective, targeted bandwidth limits may be implemented in order to ensure that there is enough bandwidth for everyone. The individual daily threshold for student traffic destined to off-campus sites will be 5 gigabytes (GB). We will monitor the effect of this bandwidth threshold and determine over time whether to maintain it at this level or adjust it.

### Procedure

It is possible to determine the bandwidth used by a single computer on ResNet over a set period of time. Based on this information, the following rules will be enforced:

1. On a daily basis, compute the per computer bandwidth usage for ResNet network traffic destined to sites off-campus.
2. For computers where the utilization exceeds a daily threshold of 5 GB (gigabytes), e-mail the owner of the computer ([view sample e-mail notification](#)), noting:
  - ? the bandwidth usage issues (e.g. shared resource, student's use as compared to the average, etc.)
  - ? pointers to information on curbing outbound traffic usage (See [Help Desk ResNet Bandwidth](#) page.)
  - ? consequences for continued over-use (include information about how many notices have been sent)
  - ? information on how to request additional bandwidth if needed for academic or research projects

3. After 5 such notices, the student's computer will have its outbound bandwidth restricted to 64 kb/s (kilobits per second) for the remainder of the semester.

It should be noted that Duke's privacy policy restricts the amount of personal information we keep to only the minimal amount necessary to ensure our ongoing network operations. Therefore, the only information maintained that relates to student compliance with the ResNet bandwidth constraints is the number of notices a student has received, not any information specific to the content or amount of bandwidth consumed.

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