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Learning about User Behaviour and Needs from 4 Years of Cloudstor Usage

This paper analyses and draws conclusions from 4 years of Cloudstor (FileSender) use in Australia, with over 500,000 transactions recorded. It reports on the patterns of usage and traffic flows, locally, nationally and internationally, as well as the characteristics of file sizes. It examines the reasons why so many users (16,500 in Australia) have used it and continue to use it, and why it has been adopted by 26 other countries. It also makes comparisons with usage in other countries and, it seeks to draw conclusions and lessons about the nature of user (especially researcher) activity that may guide future service initiatives. It then also looks briefly at usage of the newer ad hoc cloud storage product, Cloudstor+, also developed by AARNet in response to a perceived need and as a follow-on product to Cloudstor, to check if the lessons learned with Cloudstor are evident in data on Cloudstor+ usage.

Cloudstor (also known as FileSender) is a file transfer utility that was developed by AARNet in conjunction with HEANet (the Irish NREN) and UniNett (the Norwegian NREN), and more recently SURFnet (the Dutch NREN). It was developed in response to the perceived need for an easy-to-use way of transferring large files between researchers. The traditional way of transferring files has been to attach them to emails. But most email systems will not permit files to be sent larger than 10 or 100Mbytes. And files larger than 2Gbytes are especially hard to transfer, given certain Web limitations. There is no practical limit to the size of files that Cloudstor can handle.

University users quickly took to this system when it was first introduced in 2010, with 16,500 users having used it in Australia by September 2014. It has also been adopted and offered by the NRENs in over 25 other countries. It therefore clearly meets a real need among the university and (particularly) research community. When considering how researchers (in particular) find suitable tools and choose which to use, it is recognised that they are frequently impatient with IT Service departments (sometimes viewing them as the "Department of Nyet"), and will use a variety of other sources of information about IT services that will meet their needs. Most often, this will be from their peers, not necessarily from within their own institution, but can also be from commercial providers, where the

convenience factor can outweigh any additional cost. It was in order to explore such motivations of users of Cloudstor that the following analyses have been performed.

Accordingly, the log files have been analysed for all transactions involving the Cloudstor service, which now amount to over 500,000 records. The transaction records of other nations using Cloudstor/FileSender have also been analysed. The following analyses have been undertaken, to see what light they throw on the nature of file transfers taking place, to identify the most prolific users and other factors which may help understand user behaviour:

- The numbers of files transferred;
- the size distribution of files being transferred;
- comparison between files uploaded and files downloaded (ie sent vs received);
- the total amount of file traffic generated;
- the growth in numbers of users using the service;
- the pattern of usage over the past 4 years;
- local, national and international transfers;
- patterns of use by time of day;
- details of very large files transferred (>2Gbytes);
- an analysis of the type of files being transferred;
- the "top-10" users, as judged by various patterns of usage;
- comparisons with usage in other countries.

Based on the above analyses, the paper draws what conclusions it can about what can be learned about user activity and requirements, in particular relating to needs to move data about, that might shed light on user needs, and also inform future service development. It demonstrates how these lessons have been applied to the development of Cloudstor+, the ad hoc researcher cloud storage facility also developed by AARNet.

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