

# Optimizing Data Transfer Speeds of the TeraGrid Computers

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[http://www.csm.ornl.gov/Internships/rams\\_06/abstracts/j\\_collins.pdf](http://www.csm.ornl.gov/Internships/rams_06/abstracts/j_collins.pdf)

## Abstract

The advent of high speed network backbones such as the TeraGrid has brought the promise of ubiquitous computing closer to a reality. Users are less constrained by the overhead of transferring data between computational resources and are free to move between different platforms to select the one most appropriate for a particular stage of computation. Nevertheless, we are still not utilizing the full potential of our network bandwidth. In this poster, we detail our exploration of network transport characteristics for LUSTRE and other common TeraGrid data transport protocols. We show the general network throughput characteristics for these protocols and suggest possible areas of improvement for general data transport.

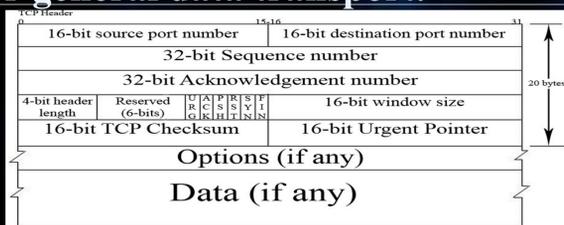


Fig 1. TCP Header

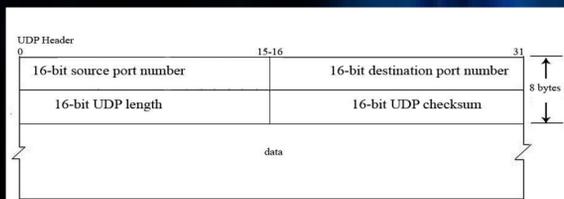


Fig 2. UDP Header



Fig 3. Cray XT3



Fig 4. TeraGrid Networks

## Goals/Tasks

- analyze data transfer speed of TeraGrid computers
- analyze TCP dumps
- create a C/C++ program that
- parses essential data
- calculates bandwidth
- create graph dumps from different data transfer tools
- compare results of data transfer tools to determine which has superlative results

## Processes

### Research application level protocols

- LUSTRE
- Ubertftp
- Sftp

### C++ program/parser

```

Borland C++ 5.5 - edit tdump.c
File Edit Search View Options Help
C:\Borland\BCC55\Bin\tdump.c

#include <stdio.h>
#include <string.h>

double TimeToSeconds(char *buff);

int main(int argc, char *argv[])
{
    FILE *infile;
    char buffer[1024];
    char token;
    char *timestamp;
    double TIS; /* Time In Seconds */

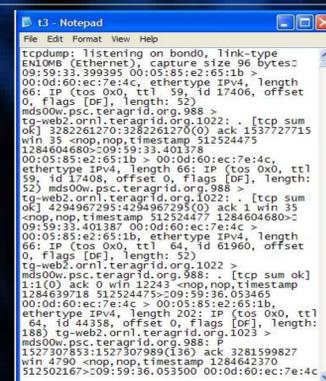
    /* Open the input file */
    infile = fopen("t3.txt", "r");
    if (infile == NULL)
    {
        fprintf(stderr, "Error opening file.\n");
        return(1);
    }

    /* Discard the first line */
    (void)fgetc(buffer, 1024, infile);

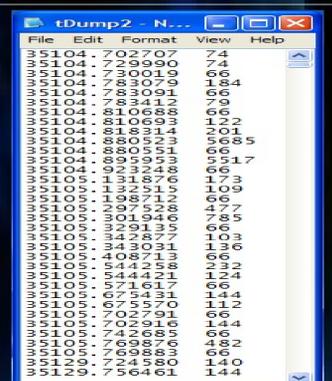
    /* process all lines in the file */
    while (!feof(infile))
    {
        (void)fgetc(buffer, 1024, infile);
        strncpy(buffer, buffer, strlen(buffer));

        /* Extract the timestamp */
        token = strtok(buffer, " ");
        timestamp = strdup(token);

        token = strtok(NULL, " "); /* Scan past first con
        token = strtok(NULL, " "); /* Scan past second co
        token = strtok(NULL, " "); /* This should be the
    }
}
    
```



Before execution



After execution

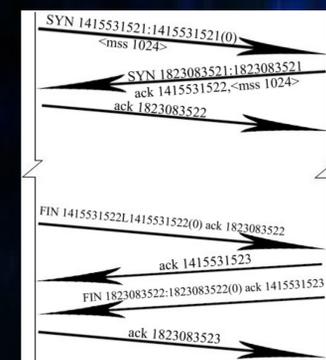
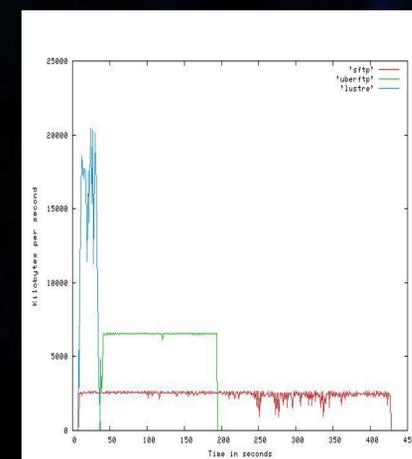


Fig 5. example timeline of connection establishment and termination



## Results

analysis of graph determines that LUSTRE is a better data transfer tool for the TeraGrid

## Prospective Research

- further research of other data transfer protocols
- implement other data transfer tools such as SABUL, Tsunami, UDT

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