



# **Status report on DataMover-Lite (DML) and Bulk Data Mover (BDM)**

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**Scientific Data Management Group  
Computational Research Division  
Lawrence Berkeley National Laboratory**



# DataMover-Lite (DML)

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- **ESG-specific simple file download transfer tool with graphical user interface**
  - Available in both webstart and stand-alone
  - Supports http, https, gridftp, ftp and scp
- Latest update info: <http://sdm.lbl.gov/dml/>
- DML Webstart: <http://datagrid.lbl.gov/dml3/jnlp/dml.html>
  - New test version available on:  
<http://datagrid.lbl.gov/dml3test/jnlp/dml.jnlp>



# DML Recent Features

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- **wget script integration with DML downloads.**
  - **All http downloads from wget are integrated with DML webstart**
    - Works for both old and new wget download scripts generated from Gateways
    - Select the wget script as an input file of DML, and DML will parse the wget script to download
- **DML now includes myproxy servers as a dropdown list that user can choose from.**
- **ESGF certificates are bundled in DML package.**
- **Retrieving credentials from myproxy servers and GridFTP/HTTPS transfers are tested.**



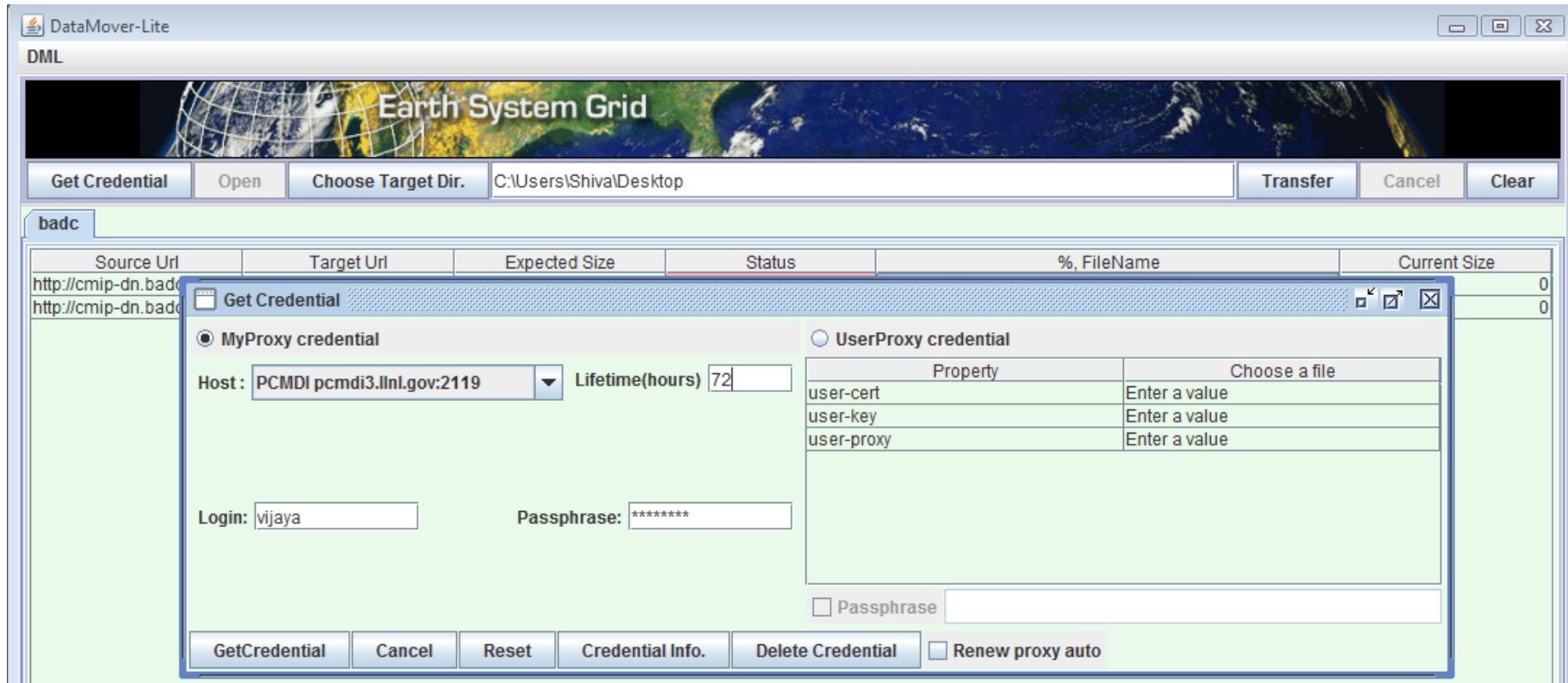
# DML Upcoming Features

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- **ESG catalog browsing within DML**
  - **Enable user friendly search criteria for selecting files**
  - **About 70% done.**
- **Downloading a single file by splitting into multiple HTTPS connections for faster downloads**
  - **Partial file downloading from each https stream to compose a whole file**
  - **Partial file downloading from multiple replica to compose a whole file**
    - **Will be supported when replica info is known in the catalog**
  - **Better error recovery mechanism is also added.**
- **File selection support from the wget download script for downloading subset of files within the request**

# DML screen samples (1)

- **User login window**
  - **Retrieving Myproxy credential**
  - **Using the user credential files**



The screenshot shows the DataMover-Lite DML interface. The main window has a header with the Berkeley Lab logo and the text "Earth System Grid". Below the header is a toolbar with buttons: "Get Credential", "Open", "Choose Target Dir.", "C:\Users\Shiva\Desktop", "Transfer", "Cancel", and "Clear". The main area contains a table with columns: "Source Url", "Target Url", "Expected Size", "Status", "%, FileName", and "Current Size". The table has two rows of data.

A "Get Credential" dialog box is open in the foreground. It has two radio buttons: "MyProxy credential" (selected) and "UserProxy credential".

**MyProxy credential section:**

- Host: PCMDI pcmdi3.llnl.gov:2119
- Lifetime(hours): 72
- Login: vijaya
- Passphrase: \*\*\*\*\*

**UserProxy credential section:**

Property	Choose a file
user-cert	Enter a value
user-key	Enter a value
user-proxy	Enter a value

At the bottom of the dialog box, there is a checkbox for "Passphrase" and a "Renew proxy auto" checkbox. The dialog box has buttons: "GetCredential", "Cancel", "Reset", "Credential Info.", "Delete Credential", and "Renew proxy auto".

# DML screen samples (2)

- Wget script generation from the registered ESG portal
- Wget script import to DML for downloading files



pcmdi3.llnl.gov/esgct/browse/downloadLogicalFiles.htm

Earth System Grid

Home Data Account About Contact Us Logout

### Download Selected Data

Please select a download method below.  
[Learn more about data download...](#)



**Wget Script Download**  
*Unix, Linux, and Mac OSX only*

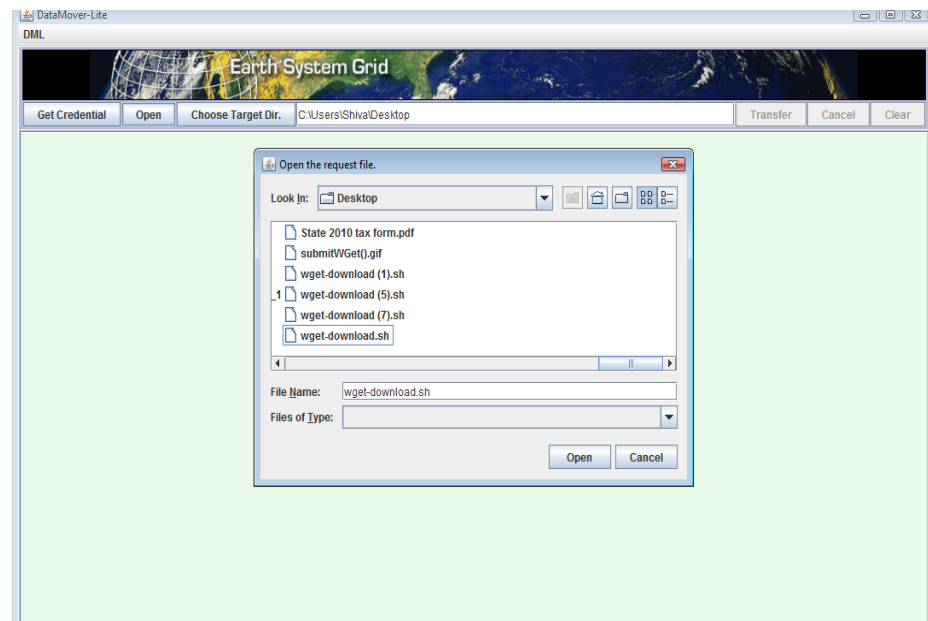
Download a Wget shell script that you can run from the command line on Unix, Linux, or Mac OSX.

[Learn more about Wget...](#)

1 Files	140.18 KB
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[Home](#) | [Data](#) | [Account](#) | [About](#) | [Contact Us](#) | [Logout](#)

## DML



DataMover-Lite

DML

Earth System Grid

Get Credential Open Choose Target Dir. C:\Users\Shiva\Desktop Transfer Cancel Clear

Open the request file.

Look In: Desktop

- State 2010 tax form.pdf
- submitWGet().gif
- wget-download (1).sh
- 1 wget-download (5).sh
- wget-download (7).sh
- wget-download.sh

File Name: wget-download.sh

Files of Type:

Open Cancel

## ESG-PCMDI Portal

# DML screen samples (3)

- HTTPS downloads from wget script file
- Active downloads with file information displayed

DataMover-Lite

DML

Earth System Grid

Get Credential Open Choose Target Dir. C:\Users\Shiva\Desktop Transfer Cancel Clear

wget-download.sh

Source Url	Target Url	Expected Size	Status	%, FileName	Current Size
http://cmip-dn.badc.rl.ac...	rsuscs_3hr_HadGEM2-...	26749408	Active	3hr_HadGEM2-ES_rcp45_r1i1p1_209912010130-20991	1936683
http://cmip-dn.badc.rl.ac...	rsuscs_3hr_HadGEM2-...	?	Pending	0%	0

**Summary Information**

Total Requested	2
Total Transferred	0
Total Failed	0
Total Pending	1
OverAll TransferRate	0.0
EndPoint:	PCMDI pcmdi3.llnl.gov:2119

**Detailed File Transfer Status Information**

**SourceUri:**  
[http://cmip-dn.badc.rl.ac.uk/thredds/fileServer/esg\\_dataroot/cmip5/output1/MOHC/HadGEM2-ES/rcp45/3hr/atmos/3hr/r1i1p1/v20110117/rsuscs/rsuscs\\_3hr\\_HadGEM2-ES\\_rcp45\\_r1i1p1\\_209912010130-209912302230.nc](http://cmip-dn.badc.rl.ac.uk/thredds/fileServer/esg_dataroot/cmip5/output1/MOHC/HadGEM2-ES/rcp45/3hr/atmos/3hr/r1i1p1/v20110117/rsuscs/rsuscs_3hr_HadGEM2-ES_rcp45_r1i1p1_209912010130-209912302230.nc)  
**TargetUri:**rsuscs\_3hr\_HadGEM2-ES\_rcp45\_r1i1p1\_209912010130-209912302230.nc  
**Expected Size (in bytes):** 100000000 (default size)  
**TimeTaken (in seconds):** 0  
**Status:**  
 Click on above table row to see detailed information about each file transfer.

# DML screen samples (4)

- GridFTP downloads

DataMover-Lite

DML

Earth System Grid

Get Credential   Open   Choose Target Dir.   C:\Users\Shiva\Desktop   Transfer   Cancel

sara\_download.txt

Source Url	Target Url	Expected Size	Status	%	FileName	Current Size
gsiftp://vetsman...	vas_WRFG_ccs...	853345292	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	853345292	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	853345288	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	853345292	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	853345288	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	853345292	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	512102412	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	512102408	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	853345288	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	838854152	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	853345292	Pending	0%		0
gsiftp://vetsman...	uas_WRFG_ccs...	853345288	Pending	0%		0
gsiftp://vetsman...	vas_WRFG_ccs...	838854156	Pending	0%		0

**Summary Information**

Total Requested: 14

Total Transferred: 0

Total Failed: 0

Total Pending: 14

OverAll TransferRate: 0.0

EndPoint: vetswebprod.ucar.edu:7512

**Detailed File Transfer**

SourceUrl: gsiftp://vetsman.ucar.edu/vas\_WRFG\_ccsm\_2056010103.nc

TargetUrl: vas\_WRFG\_ccsm\_2056010103.nc

Expected Size (in bytes): 853345292

TimeTaken (in seconds): 0

Click on above table row to see detailed information about each file transfer.

**Login Dialog Box.**

EndPoint:

Login:

Password:

Ok   Cancel





# Bulk Data Mover (BDM)

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- Latest updates are on <http://sdm.lbl.gov/bdm/>
- Bulk Data Mover
  - Scalable data movement management tool
  - Designed for climate community (Earth System Grid) needs
    - Efficient and reliable transfer management from user's point of view
    - Simple to install and maintain as a novice user
    - Scalable to large in volume
    - Scalable to large in number of files
    - Efficient handling on extreme variance in file sizes
    - Scalable to future performance expectations
      - Network performance improvements – 100Gbps and beyond
      - Storage performance improvements – distributed, parallel, SSD, etc.
      - Multiple transfer protocol support
  - Able to work with other applications with similar needs



# BDM Features

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- **Transfer mode**
  - Able to transfer in “pull mode” for security reasons
  - Able to transfer in 3<sup>rd</sup> party mode
- **Scalability**
  - Handle large in volume and number of files
  - Designed to move 100s of terabytes to petabytes (many thousands of files)
  - Efficient handling on extreme variance in file sizes
- **Reliability and Robustness**
  - **Asynchronous long-lasting operation**
    - On-demand transfer request status
    - Estimation of request completion time
    - Monitoring and statistics collection
  - Recovery from transient failures and automatic restart
  - Support for checksum verification at the end of the entire request for priority in the transfers
- **Multiple transfer protocol support**
  - Use GridFTP and other transfer protocols if necessary
  - Take advantage of network and storage provisioning



# BDM Upcoming Features

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- **MyProxy integration into BDM**
  - **Currently users need credential separately and perform the transfers.**
- **Add 3<sup>rd</sup> party transfer capability from single source to multiple destinations**
  - **Current 3<sup>rd</sup> party transfer includes transfers from multiple servers from a single source to multiple servers at a single destination**
- **Enhancement on performance tuning parameters such as pipelining depth**
  - **By default, pipelining is included in BDM**
- **FDT (Fast Data Transfer) service support**
  - **<http://monalisa.cern.ch/FDT/>**



# BDM Technology

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- **High performance using a variety of techniques**
  - Load balancing on multiple transfer servers
  - Multi-threaded concurrent transfer connection management
  - Transfer queue management
  - Single control channel management for multiple data transfers
  - GridFTP supporting data channel caching, pipelining, and more
- **Performance Adaptability**
  - Adaptable transfer management to the dynamic end-to-end bandwidth and system performance changes
  - Dynamic tuning: setting control parameters dynamically for throughput optimization
    - Does not require any complex model for parameter optimization
    - Does not depend on external profilers for active performance measurements
    - Adapts to changing environments



# BDM runs (1)

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- **BDM run on DKRZ**
  - **Successfully tested on DKRZ on Feb 09, 2011.**
    - DKRZ directory structure is found to be with several soft links. To enable soft link transfer, the "-symlink" option needs to be used in the command for BDM. BDM will follow soft links to replicate files.
- **BDM runs for BADC**
  - **Successfully tested on BADC on Mar 22, 2011, up to 1 Gbps**
- **BDM runs on ANU**
  - **Successfully tested on ANU on Feb 19, 2011.**
    - When BDM runs on a machine with DHCP enabled, the local IP address of the machine might be incorrectly detected by Java. Most commonly, the detected IP address might be the local loop-back address, 127.0.0.1.
    - You can fix it by configure bdm with "--with-globus-hostname" option during the BDM configuration.
      - e.g. --with-globus-hostname=64.34.58.128 or  
--with-globus-hostname=myhost.mydomain.com



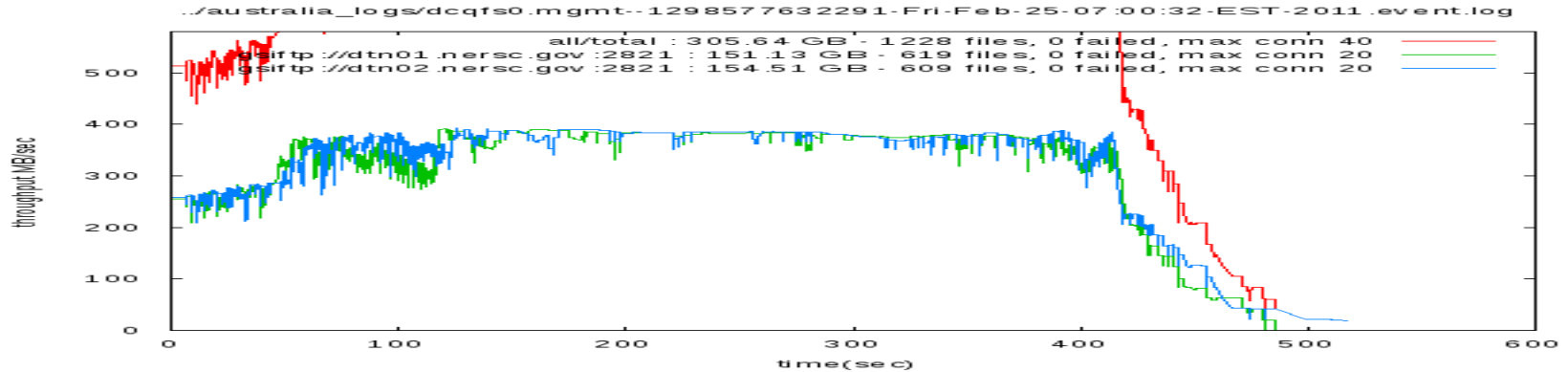
## BDM runs (2)

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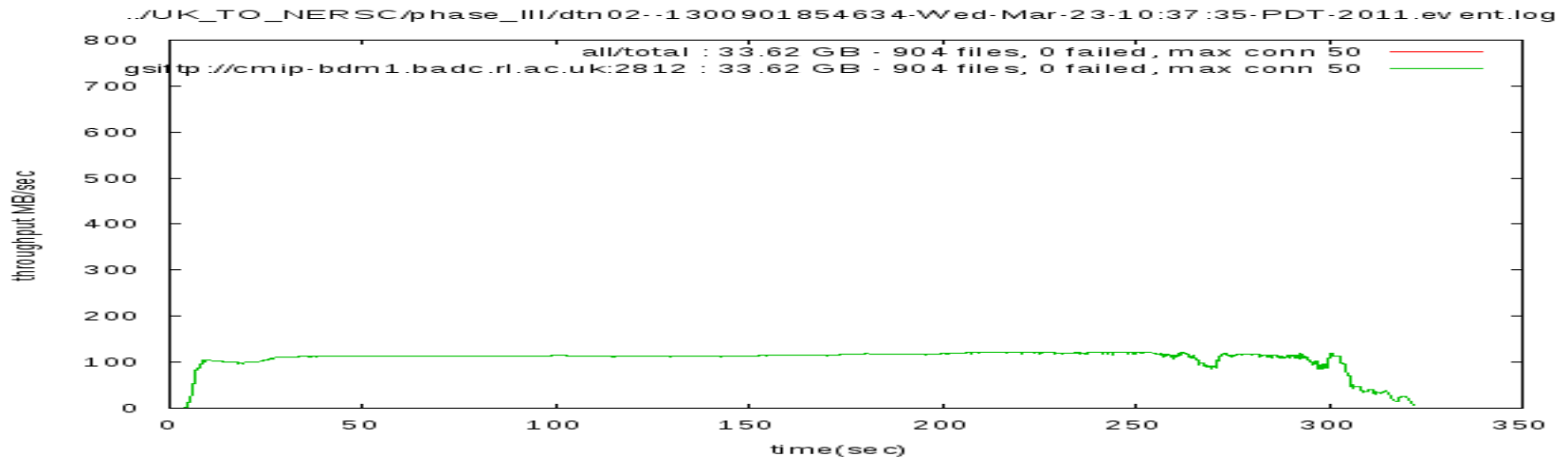
- **Sample BDM transfer performance**
  - <https://sdm.lbl.gov/wiki/Software/BDM/BDMSamplePlots>
  - **from NERSC DTNs to ANU test node**
  - **From BADC test node to NERSC**
  - **From PCMDI/LLNL to NERSC**

# Sample BDM runs (1)

- **BDM performance plot for data transfers from NERSC to ANU on 2/24/2011**
  - ~5.6 Gbps (700MB/sec) on average with ~6 Gbps at the peak

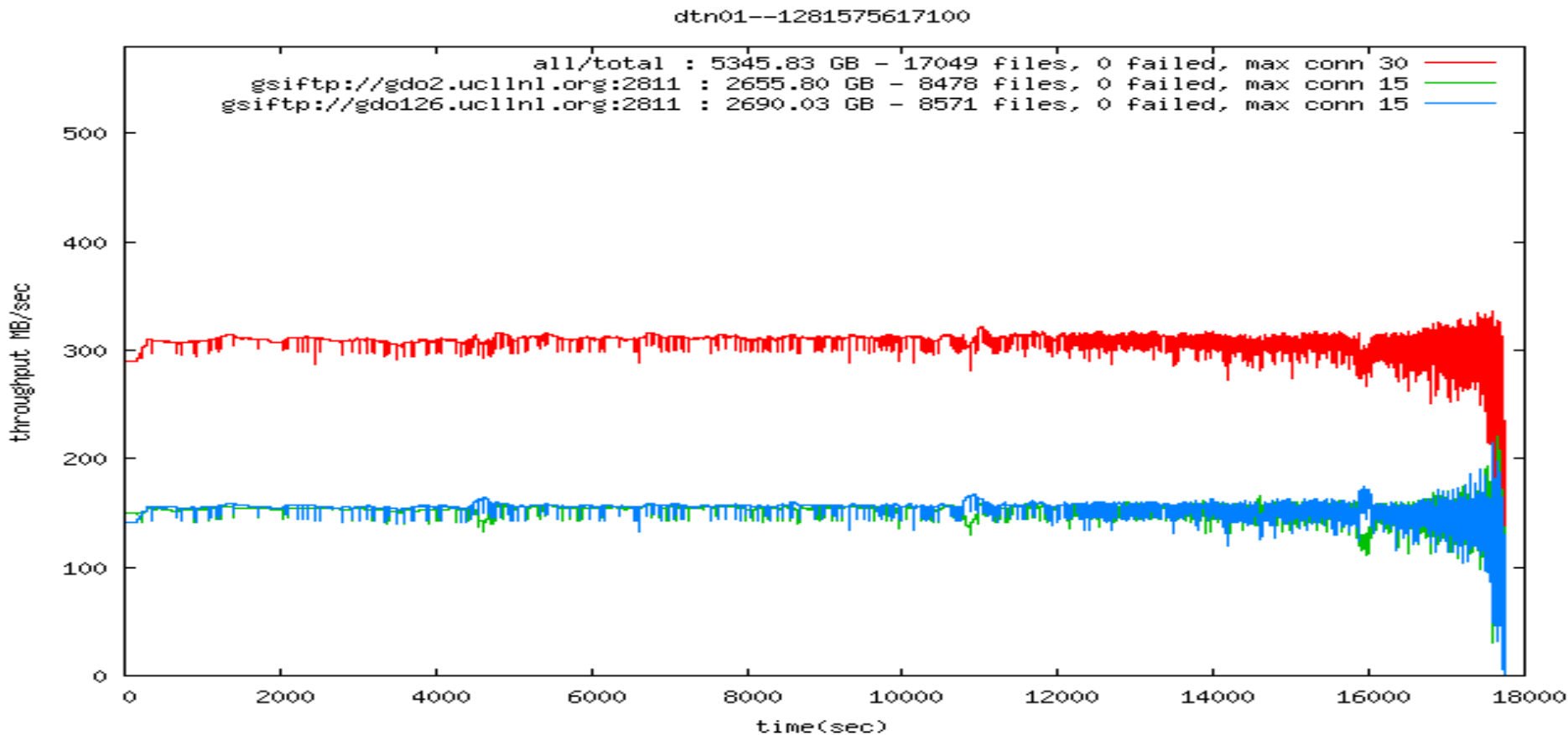


- **BDM performance plot for data transfers from BADC to NERSC on 2/24/2011**
  - ~0.9 Gbps (110 MB/sec) on average



## Sample BDM runs (2)

- **BDM performance plot for data transfers from LLNL to NERSC on Aug. 2010**
  - ~2.4 Gbps on average







# Information

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- **Bulk Data Mover**
  - <http://sdm.lbl.gov/bdm/>
- **Earth System Grid**
  - <http://www.earthsystemgrid.org>
  - <http://esg-pcmdi.llnl.gov/>
- **Support emails**
  - [esg-support@earthsystemgrid.org](mailto:esg-support@earthsystemgrid.org)
  - [srm@lbl.gov](mailto:srm@lbl.gov)