

FileXfer

File Transfer Jobs

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Abstract

The FileXfer application is a system for automated file transfer jobs for copying files. “There are 3 applications that make up the usage collection framework: `filexfer`, which does the actual file transfers; `filexfer-jobmonitor`, which is configured to monitor various aspects of jobs and create NMS alarms when necessary; and `filexfer-dataloader`, which bulk-loads file data into database tables. There are also house-keeping scripts called `filexfer-filearchive`, which keeps files in the data directory pruned and compressed, and `filexfer-fileunarchive`, which allows files to be pulled out of the archive so filexfer jobs can work with them again.”¹

¹[Usage Collection Framework \(filexfer\)](#)

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List of Definitions and Abbreviations

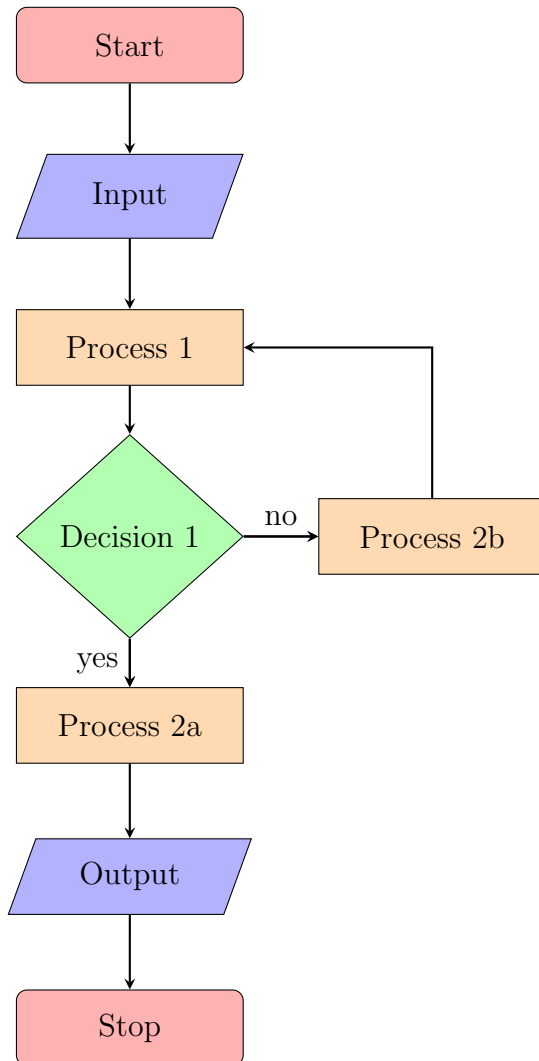
- **MOA** - Municipality of Anchorage

1 Introduction

The FileXfer system...

2 Design

[FIXME: Need data here...]



[FIXME: Customize flowchart FileXfer]

3 Schema

4 Implementation

[FIXME: Need data here...]

4.1 File Transfer Jobs

[FIXME: Need data here...]

4.2 Job Monitor

[FIXME: Need data here...]

4.3 Data Loader

[FIXME: Need data here...]

4.4 Logging

Application Logging

The filexfer applications log to the `/var/log/filexfer` directory on `prod-prov4-cdr1.Operations.gci.com`. The parent filexfer jobs log to `filexfer-get.log` and `filexfer-put.log`. The jobmonitor and dataloader applications log to `jobmonitor.log` and `dataloader.log`. The filexfer applications log to the `/var/log/filexfer` directory on `prod-prov4-cdr1.Operations.gci.com`. The parent filexfer jobs log to `filexfer-get.log` and `filexfer-put.log`. The jobmonitor and dataloader applications log to `jobmonitor.log` and `dataloader.log`, respectively. Each file transfer job is executed as a child process and gets its own log file. The format is `filexfer-{neName}-{idJob}-{get,put}.log`.

By default, the jobs log at the warn level. Adjust the level to info to get a high-level view of the application's state. Adjust log verbosity by modifying the appropriate config file in `/etc/filexfer`. The changes will take effect after the next program execution.

Errors are also logged to a database table which can be browsed in the filexfer web interface under the 'Logs & Errors' view. This view includes messages logged at `warn`, `error`, and `fatal` severity.²

File Transfer Logging

Every file transfer is recorded in a database table. There are two reasons for this table: first, it tells `filexfer` which files have already been transferred, and second, it provides an audit trail for SOX compliance. The table is `filexfer.logs` on `sadc-cdr-mysql1.Operations.gci.com`. Use the `filexfer.joblogs` view to easily find logs by job name or network element ID.

²[Usage Collection Framework \(filexfer\)](#)

File transfer logs may also be viewed in the 'Logs & Errors' page of the web interface.³

³Usage Collection Framework (filexfer)

4.5 Test

[FIXME: Need data here...]

4.6 Issues

[FIXME: Need data here...]

5 Operation

[FIXME: Need data here...]

5.1 Job Scheduling

Jobs are scheduled using a web interface at `nms.operations.gci.com/relevance`. Navigate to the “FileXfer” application and click the “File Transfer Jobs” link. Job execution happens on `prod-prov4-cdr1.operations.gci.com`. A `cron` job executes every minute from `/etc/cron.d/filexfer` to kick off the various `filexfer` scripts.⁴

Job Timing

The parent `filexfer` script is responsible for spawning child processes for each job. Since a large number of jobs can be scheduled at any given interval, the parent process limits how many children can run concurrently. As long as the limit is reached and more jobs need to be spawned, the parent process must stay alive. Since this may take longer than 1 minute, it is possible for `filexfer` to miss certain scheduling intervals.

For example, if 500 jobs are scheduled to run at the top of every hour (`0 * * * *`) and the maximum child process limit is 50, there is a good chance `filexfer` will not execute any jobs scheduled to run at 1 minute past the hour (`1 * * * *`). The best way to avoid this is to use 0, 15, 30, or 45 in the minute field of the job schedule. These intervals are always executed.⁵

5.2 Dataloader

Dataloader jobs are configured using the web interface at `nms.operations.gci.com/relevance`. Navigate to the “FileXfer” application and click the “Data Load Jobs” link. These jobs are executed every minute as long as there are files in the load queue.⁶

⁴Usage Collection Framework (`filexfer`)

⁵Job Timing

⁶Usage Collection Framework (`filexfer`)

Appendix

Source

There are 3 primary FileXfer perl scripts on prod-prov4-cdr1:⁷

File name	Attributes	Description
filexfer.plx	181 lines	File transfer jobs
filexfer-dataloader.plx	132 lines	Data loader
filexfer-jobmonitor.plx	132 lines	Job Monitor

Table 1: FileXfer perl scripts on prod-prov4-cdr1

⁷prod-prov4-cdr1.operations.gci.com (192.168.161.47, NATed IP: 66.223.199.228), data including CDRs and such under /data/usage/ — Network Services, OSS.

filexfer.plx — File Transfer Jobs

```

1  #!/usr/bin/perl
2
3  use strict;
4  use warnings;
5
6  use Modules::App::FileXfer ();
7  our $VERSION = $Modules::App::FileXfer::VERSION;
8
9  # Core modules
10 use Clone qw( clone );
11 use File::Basename ();
12 use File::Spec ();
13 use POSIX ();
14
15 $SIG{CHLD} = \&Modules::App::FileXfer::REAPER;
16
17 MAIN: {
18     # Process and merge command-line and config file options
19     my $getopt = Modules::App::FileXfer::get_command_line_options();
20     my $fileconf = Modules::App::FileXfer::read_config_file( $getopt->get_conf );
21     Modules::App::FileXfer::merge_options( $getopt, $fileconf );
22
23     # Make sure we're the only instance running
24     Modules::App::FileXfer::check_pid_file( $Modules::App::FileXfer::Options->pid_file );
25
26     # Get logger and eveenge objects
27     Modules::App::FileXfer::create_eveenge_obj();
28     my $logger = Modules::App::FileXfer::create_logger_obj(
29         $Modules::App::FileXfer::Options->{logger}, $Modules::App::FileXfer::Options->{logfile} );
30
31     # Get the ready jobs
32     my $fx = Modules::App::FileXfer::create_filexfer_obj( $Modules::App::FileXfer::Options->{fx} );
33     my $jobs = Modules::App::FileXfer::get_jobs( $fx );
34     my $loadjobs = Modules::App::FileXfer::get_jobs_with_load_jobs( $fx );
35     undef $fx;
36
37     for my $job ( @{ $jobs } )
38     {
39         # Enforce the "max children" constraint
40         $logger->info( 'Max child processes reached. Waiting for one to complete.' );
41         if ( scalar keys %Modules::App::FileXfer::Children
42             >= $Modules::App::FileXfer::Options->{maxchildren} );

```

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80
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84
85
86

```

sleep 1 while ( scalar keys %Modules::App::FileXfer::Children
                >= $Modules::App::FileXfer::Options->{maxchildren} );

# Fork a child process for this job
$logger->info( sprintf( 'Spawning child process for job "%s".', $job->name );

my $pid = fork;
defined $pid or Modules::App::FileXfer::log_event(
    5, sprintf( "Can't fork for job \"%s\": %s", $job->jobName, $! ),

if ( $pid == 0 ) # child
{
    # Set random seed for this child
    srand();

    # Lower the OS scheduling priority based on job priority
    POSIX::nice( Modules::App::FileXfer::pri_to_nice( $job->priority );

    # Add the NE name to our command line string
    $0 .= " @ARGV " . $job->neName;
    my $jobtag = Modules::App::FileXfer::get_jobtag( $job );

    # Set the subresource for this job in the evenge object
    $Modules::App::FileXfer::Evenge->subresourceName( $job->jobName );

    # Create a logger specific to this child process
    my $logopt = clone( $Modules::App::FileXfer::Options->{logger} );
    my ( undef, $logdir ) = File::Basename::fileparse( $logopt->{file} );
    $logopt->{file}{filename} = File::Spec->catfile( $logdir, "$jobtag" );

    $logger->delete();
    my $logger = Modules::App::FileXfer::create_logger_obj( $logopt,
        Log::Log4perl::MDC->put( 'idJob', $job->idJob );

    # Make sure another instance isn't still running
    Modules::App::FileXfer::check_pid_file( $jobtag );

    # Create a FileXfer object for database updates
    my $fx = Modules::App::FileXfer::create_filexfer_obj( $jobtag );

    # Execute the job
    Modules::App::FileXfer::run_job( $fx, $job, $loadjobs );

```

```
87         $logger->info( 'Child exiting.' );
88         exit 0;
89     }
90     else # parent
91     {
92         $logger->debug( sprintf( 'Spawned child process %d for job "%s".',
93             $Modules::App::FileXfer::Children{ $pid } = $job->jobName;
94         }
95     }
96
97     $logger->info( 'Main application exiting.' );
98 }
99
100 # Safely exit
101 $SIG{CHLD} = 'IGNORE';
102
103 __END__
104
105 =head1 NAME
106
107 filexfer — Move a file from point A to point B over an IP network
108
109 =head1 VERSION
110
111 0.51
112
113 =head1 SYNOPSIS
114
115 filexfer.plx -c configfile -t {get|put} [options]
116
117 =head1 ARGUMENTS
118
119 =over 4
120
121 =item -c, --configfile
122
123 Specify the configuration file to load. Must be in YAML format.
124
125 =item -t, --transfertype
126
127 One of "get" or "put". Get jobs download files and put jobs upload files.
128
129 =back
130
```



```
131 =head1 OPTIONS
132
133 =over 4
134
135 =item -d, --piddir
136
137 Directory where the pid file will be written. Defaults to /var/run/filexfer.
138
139 =item --db
140
141 Sets the database connection parameters. Valid keys are: server (default
142 localhost), port (default 3306), driver (default mysql), uid, pwd, database,
143 and table. Specify tags as key/value pairs, e.g.:
144
145     --db server=localhost --db database=filexfer
146
147 =item -e, --evegehost
148
149 Address of the Evege web server. Used to send indicators and events to the N
150
151 =item --evengetimeout
152
153 Timeout in seconds for communicating with the Evege web server. Defaults to
154
155 =item -f, --cachefile
156
157 Template cache file location. Defaults to /var/lib/filexfer/filexfer.kch.
158
159 =item -h, --help
160
161 Output this documentation.
162
163 =item -m, --maxchildren
164
165 Maximum number of child processes to spawn. Defaults to 50.
166
167 =item -p, --pidfile
168
169 PID file name. This will be appended with a ".pid" suffix.
170
171 =item -r, --resource
172
173 Resource name of this application. Used in indicator and event messages sent
174
```

175 =item --verbose, -v

176

177 Log to the screen at increasingly verbose levels. This option may be repeated

178 multiple times to increase the log level. For example, "-v" logs at info level

179 "-vv" logs at debug level, and "-vvv" logs at trace level.

180

181 =back

filexfer-jobmonitor.plx — Job monitor

```

1  #!/usr/bin/perl
2
3  use strict;
4  use warnings;
5
6  use Modules::App::FileXfer::JobMonitor ();
7  our $VERSION = $Modules::App::FileXfer::JobMonitor::VERSION;
8
9  MAIN: {
10     # Process and merge command-line and config file options
11     my $getopt = Modules::App::FileXfer::JobMonitor::get_command_line_options();
12     my $fileconf = Modules::App::FileXfer::JobMonitor::read_config_file( $getopt );
13     Modules::App::FileXfer::JobMonitor::merge_options( $getopt, $fileconf );
14
15     # Make sure we're the only instance running
16     Modules::App::FileXfer::JobMonitor::check_pid_file(
17         $Modules::App::FileXfer::JobMonitor::Options->{pidfile} );
18
19     # Get logger and evege objects
20     Modules::App::FileXfer::JobMonitor::create_evege_obj();
21     my $log = Modules::App::FileXfer::JobMonitor::create_logger_obj(
22         $Modules::App::FileXfer::JobMonitor::Options->{logger},
23         $Modules::App::FileXfer::JobMonitor::Program
24     );
25
26     # Get a list of job monitors
27     my $jm = Modules::App::FileXfer::JobMonitor::create_jobmonitor_obj();
28     my $mons = Modules::App::FileXfer::JobMonitor::get_monitors( $jm );
29
30     for my $mon ( @{ $mons } )
31     {
32         Log::Log4perl::MDG->put( 'idJob', $mon->idJob );
33         $log->info( sprintf( 'Executing monitor "%s".', $mon->monitorName ));
34
35         # Set the subresource for this monitor in the evege object
36         $Modules::App::FileXfer::JobMonitor::Evege->subresourceName( $mon->name );
37
38         # Execute the job monitor
39         eval { Modules::App::FileXfer::JobMonitor::run_monitor( $jm, $mon ) };
40         $@ and $log->error( "$@" );
41     }
42

```

```
43     $log->info( 'Main application exiting.' );
44 }
45
46 __END__
47
48 =head1 NAME
49
50 jobmonitor — Monitor filexfer jobs for any condition and generate alerts
51
52 =head1 VERSION
53
54 0.51
55
56 =head1 SYNOPSIS
57
58 jobmonitor.plx -c configfile [options]
59
60 =head1 ARGUMENTS
61
62 =over 4
63
64 =item -c, --configfile
65
66 Specify the configuration file to load. Must be in YAML format.
67
68 =back
69
70 =head1 OPTIONS
71
72 =over 4
73
74 =item -a, --mailhost
75
76 Address of the mail server. Used to send email notifications. Defaults to localhost.
77
78 =item -d, --piddir
79
80 Directory where the pid file will be written. Defaults to /var/run/filexfer.
81
82 =item --db
83
84 Sets the database connection parameters. Valid keys are: server (default
85 localhost), port (default 3306), driver (default mysql), uid, pwd, database,
86 and table. Specify tags as key/value pairs, e.g.:
```

87

88 --db server=localhost --db database=filexfer

89

90 =item -e, --evengehost

91

92 Address of the Evenge web server. Used to send indicators and events to the N

93

94 =item -f, --cachefile

95

96 Template cache file location. Defaults to /var/lib/filexfer/jobmonitor.kch.

97

98 =item -h, --help

99

100 Output this documentation.

101

102 =item -i, --mailinterval

103

104 Minimum time, in seconds, before repeat emails may be sent for the same monit

105

106 =item -l, --mailfrom

107

108 Sender's email address in email notifications. Defaults to [username]@[hostna

109

110 =item -m, --mailstatfile

111

112 Mail status file location. Defaults to /var/lib/filexfer/jobmonitor-mailstat.

113

114 =item -o, --mailport

115

116 Port on which the mail server is listening for SMTP traffic. Defaults to 25.

117

118 =item -p, --pidfile

119

120 PID file name. This will be appended with a ".pid" suffix.

121

122 =item -r, --resource

123

124 Resource name of this application. Used in indicator and event messages sent

125

126 =item --verbose, -v

127

128 Log to the screen at increasingly verbose levels. This option may be repeated

129 multiple times to increase the log level. For example, "-v" logs at info leve

130 "-vv" logs at debug level, and "-vvv" logs at trace level.

131

132 =back

filexfer-dataloader.plx — Data Loader

```

1  #!/usr/bin/perl
2
3  use strict;
4  use warnings;
5
6  use Modules::App::FileXfer::DataLoader ();
7  our $VERSION = $Modules::App::FileXfer::DataLoader::VERSION;
8
9  MAIN: {
10     # Process and merge command-line and config file options
11     my $getopt = Modules::App::FileXfer::DataLoader::get_command_line_options();
12     my $fileconf = Modules::App::FileXfer::DataLoader::read_config_file( $getopt );
13     Modules::App::FileXfer::DataLoader::merge_options( $getopt, $fileconf );
14
15     # Make sure we're the only instance running
16     Modules::App::FileXfer::DataLoader::check_pid_file(
17         $Modules::App::FileXfer::DataLoader::Options->{pidfile} );
18
19     # Get logger and evenge objects
20     Modules::App::FileXfer::DataLoader::create_evenge_obj();
21     my $logger = Modules::App::FileXfer::DataLoader::create_logger_obj(
22         $Modules::App::FileXfer::DataLoader::Options->{logger},
23         $Modules::App::FileXfer::DataLoader::Program
24     );
25
26     # Get the load jobs with pending files
27     my $dl = Modules::App::FileXfer::DataLoader::create_dataloader_obj();
28     my $jobs = Modules::App::FileXfer::DataLoader::get_load_jobs( $dl );
29
30     for my $job ( @{ $jobs } )
31     {
32         next if 414 == $job->idJob;
33         Log::Log4perl::MDC->put( 'idJob', $job->idJob );
34         $logger->info( sprintf( 'Executing job "%s".', $job->jobName ) );
35
36         eval {
37             # Get the list of pending load files
38             my $files = Modules::App::FileXfer::DataLoader::list_load_files(
39                 next unless scalar @{ $files };
40
41             # Import the class for this job's files
42             Modules::App::FileXfer::DataLoader::import_file_class( $files->[0]

```

```

43
44         # Bulk load the data from each file
45         for my $file ( @{ $files } )
46         {
47             Modules::App::FileXfer::DataLoader::load_file_data( $dl, $job
48             Modules::App::FileXfer::DataLoader::dequeue_load_file( $dl, $
49         }
50     };
51
52     $@ and $logger->error( "$@" );
53
54     # Close the external db handle
55     $dl->close_ext_dbh();
56 }
57
58 $logger->info( 'Main application exiting.' );
59 exit;
60 }
61
62 --END--
63
64 =head1 NAME
65
66 filexfer-dataloader — Bulk load file data from filexfer into a database tabl
67
68 =head1 VERSION
69
70 0.51
71
72 =head1 SYNOPSIS
73
74 filexfer-dataloader -c configfile [options]
75
76 =head1 ARGUMENTS
77
78 =over 4
79
80 =item -c, --configfile
81
82 Specify the configuration file to load. Must be in YAML format.
83
84 =back
85
86 =head1 OPTIONS

```


87

88 =over 4

89

90 =item -d, --piddir

91

92 Directory where the pid file will be written. Defaults to /var/run/filexfer.

93

94 =item --db

95

96 Sets the database connection parameters. Valid keys are: server (default
97 localhost), port (default 3306), driver (default mysql), uid, pwd, database,
98 and table. Specify tags as key/value pairs, e.g.:

99

100 --db server=localhost --db database=filexfer

101

102 =item -e, --evengehost

103

104 Address of the Evenge web server. Used to send indicators and events to the N

105

106 =item --evengetimeout

107

108 Timeout in seconds for communicating with the Evenge web server. Defaults to

109

110 =item -f, --cachefile

111

112 Template cache file location. Defaults to /var/lib/filexfer/dataloader.kch.

113

114 =item -h, --help

115

116 Output this documentation.

117

118 =item -p, --pidfile

119

120 PID file name. This will be appended with a ".pid" suffix.

121

122 =item -r, --resource

123

124 Resource name of this application. Used in indicator and event messages sent

125

126 =item --verbose, -v

127

128 Log to the screen at increasingly verbose levels. This option may be repeated
129 multiple times to increase the log level. For example, "-v" logs at info leve
130 "-vv" logs at debug level, and "-vvv" logs at trace level.

131

132 =back

[FIXME: Need data here]

Table 2 – FileXfer directories and files on prod-prov4-cdr1

Directory	File(s)
/etc/filexfer/	*.conf
/usr/bin/	filexfer-dataloader filexfer-dataloader.plx filexfer-dataloader.plx.mbak filexfer-epg-dataloader.plx filexfer-filearchive filexfer-filearchive.sh filexfer-fileunarchive filexfer-fileunarchive.sh filexfer-jobmonitor filexfer-jobmonitor.plx filexfer.plx
/usr/lib/filexfer/	*.gz, *.sh, *.plx ExtractCarrierTurboZoneUsage*
/usr/share/filexfer/	filexfer.changelog-*.xml filexfer.changelog-master.xml liquibase.sh .gnupg/pubring.gpg .gnupg/random_seed
/var/cache/yum/build/packages/	filexfer-0.52-1.el5.centos.noarch.rpm
/var/lib/filexfer/	dataloader.kch dataloader_temp.kch filexfer-aaa01-13-get.kch ... filexfer-wps01-706-get.kch filexfer.kch jobmonitor-mailstat.kch jobmonitor.kch
/var/log/filexfer	*.log ExtractCarrierTurboZoneUsage_ACS.log archive convert-wps-om-counters-report-part2.log convert-wps-om-counters-report.log dataloader.log dataloader_temp.log dataloaderinsert.log
Continued on next page	

Table 2 – continued from previous page

Directory	File(s)
	datarecovery.log
	epg-dataloader.log
	ericsson-oss-rl-reports-preprocess.log
	ericsson-oss-sts-reports-preprocess.log
	filearchive.log
	filexfer-aaa01-13-get.log
	filexfer-aaa01-14-put.log
	...
	/var/log/filexfer/filexfer-wps01-706-get.log

L^AT_EX - Examples and Formatting

Comments

COMMENTS Comment — *Sean Weems, Spring 2003*

We should get the COMMENTS column searchable via the landrecords application before we do much anything else – shouldn't be too hard.

Errata: Plats spanning multiple sections

A few anomalies can be observed in the AKPLATS table. Specifically plats exist that span multiple sections. Since the table only has a single column, SCODE, that accepts a single section code, SGU (Status Graphics Unit) has handled this problem by entering multiple rows in the table, each with a different section that point to the same plat or file. Multiple section plats are indicated by setting the TCODE column to the value 37, and making an appropriate notation like *Section 24-25-26-27* in the REMARKS column.

[FIXME: Perhaps the SCODE column should accept an array of sections?]

Links

A Guide to L^AT_EX

<http://www.astro.rug.nl/~kuijken/latex.html>

L^AT_EX - From Wikibooks, the open-content textbooks collection

<http://en.wikibooks.org/wiki/LaTeX>

L^AT_EX Notes

http://luke.breuer.com/time/item/LaTeX_Notes/180.aspx