Ferro Backup System ™

NETWORK BACKUP SYSTEM

User manual

version 4.3

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www.ferrobackup.com
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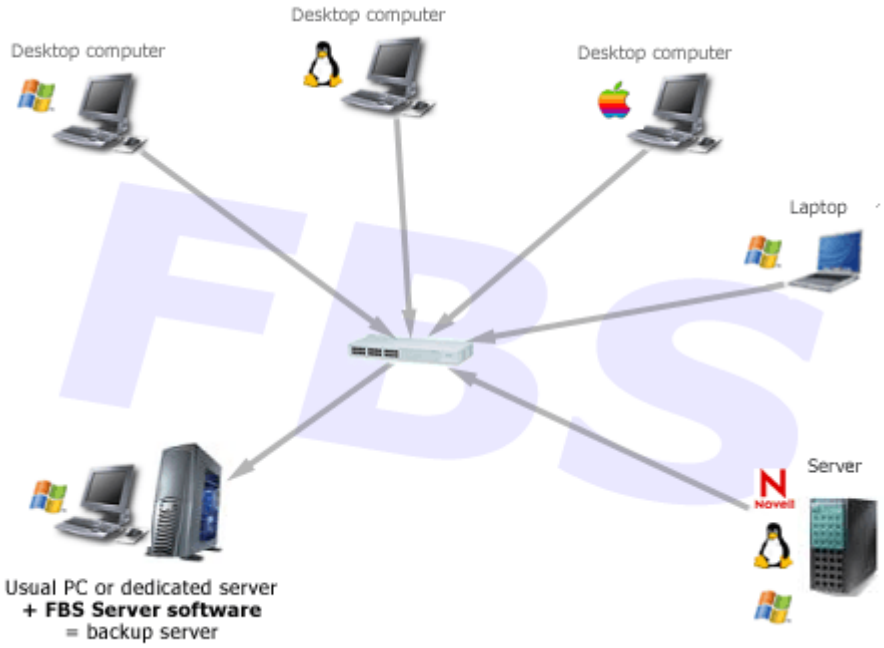
TABLE OF CONTENTS

1

Introduction

Network Data Backup and Recovery Software solution for IT Pros

Ferro Backup System™ (FBS) is a professional, network backup system intended for small offices and large corporations and institutions alike. It allows you to protect data stored at desktops, laptops and network file servers operating under Microsoft Windows®, Novell NetWare®, Linux, MacOS.



Complete Backup, Replication and Recovery solution based on client-server architecture

With **Ferro Backup System™** it takes just moments to backup data of critical importance for your company's operations, which is stored on computers connected to a LAN.

- From 60% to 80% of critical data are stored on office computers and laptops
- 90% of laptops and office computers never have their data backed up

Fast Parallel Backup
Thanks to techniques used such as delta backup, differential backup, compression at desktop level, symmetric multiprocessing, Ferro Backup System enables you, in a very short time, to make copies of files from all computers connected to the LAN.

Low Costs Solution
Ferro Backup System requires no expensive server, server version of the operating system or tape drives. As data compression is done at desktop rather than server level, an ordinary cheap PC with a bigger hard drive can be used as a backup server.

Fail-safety & Auto-resume backup process
If connection is lost, backup processes will be stopped and resumed after the connection is re- established, without the need for any administrator involvement.

Quick Implementation
To use the Ferro Backup System, you don't need to change anything in the current setup of the computer network, servers and office computers. Ferro Backup System is completely independent of existing services, account settings and protections.

No maintenance
The automatic freeing of disk space combined with an alert module which sends an e-mail to the administrator on any possible errors and warnings, limits the need for constant supervision of the program.

Transparent backups
Backup is done in the background and is invisible to the company's ordinary employees.

Comfort Backup & Restore
The Administrator doesn't need to worry about the date of the last full backup and about when and how many differential backups have been executed. Ferro Backup System takes control over data recovery from differential backups and displays their content the same way as for full backups.

Open File Backup
The Open File Manager option embedded in Ferro Backup System allows backup of open system files and files locked by other processes.

Backup Copy of the Operating System
Ferro Backup System allows you to make a backup of the entire operating system and restore it, at a later time, without the need to re-install.

Network backup and restore system documentation

Ferro Backup System™is based on client-server architecture. Those are two separate programs: the server - FBS Server and the client - FBS Worker.

Installation location
You only run FBS Server once on the computer which will be used as the backup server, while FBS Worker needs to be installed on workstations that is on all computers from which you want to back up any information (office computers, portable computers, file servers, database servers etc.)

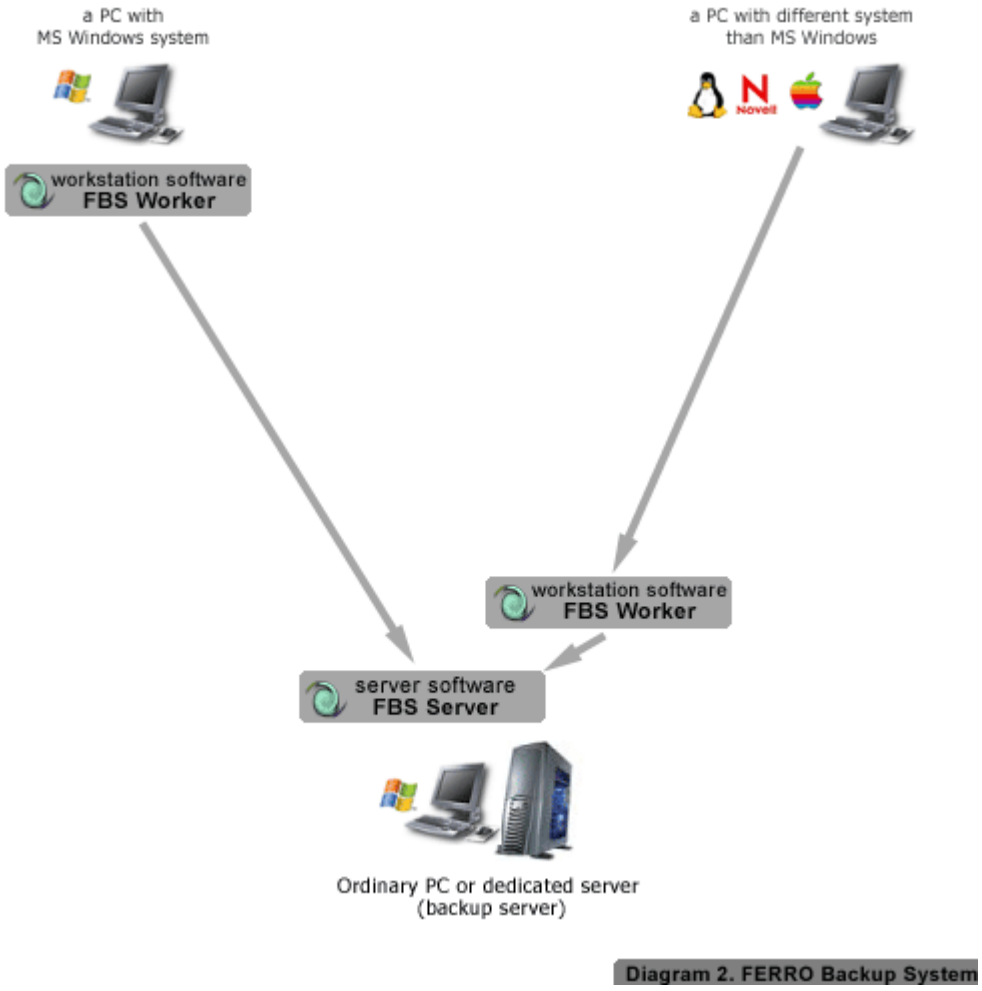


DIAGRAM 2. Ferro Backup System™ - Client and server installation locations depend on the operating system version.

If the computer from which you want to back up any information works under a system different than MS Windows, its resources can be backed up using mapped network drives. You can back up files from such a computer from any workstation under MS Windows. Often it is best to install the workstation software - FBS Worker - also on the backup server, as shown on diagram 2.

Main task - backup
The main function of FBS Server is to send backup tasks to workstations at appropriate times. Such a task includes information on data to be backed up (files, folders) and what type of backup should be used (full backup or differential backup). After a task is received, the workstation will look for files to be backed up and then start compressing them (a ZIP archive will be created). The newly created archive will be transferred to the backup server.

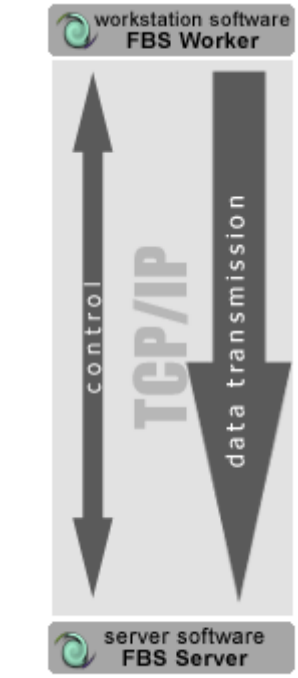


Diagram 3. FERRO Backup System

DIAGRAM 3. Ferro Backup System™ - Transfer of data between a workstation and the backup server.

FBS Server receives the transmitted ZIP archive file piece by piece and saves it on the server disk. After receiving the last segment the server verifies the archive by checking checksums of compressed files.

This procedure may be followed at the same time by all workstations operating within the System.

Task scheduling, that is telling each station when and what to back up can be carried out from a single place in FBS Server. The program's console also lets the user monitor the entire System, configure it, verify scheduled tasks based on the event log and restore data.

Backup file location.
Backup archives are stored on the hard disk in a folder specified in the Settings tab in the central module of FBS Server. For each workstation a subfolder FBF is created here, whose name includes the name of the workstation plus the .FBF extension (Ferro Backup Folder). ZIP files are saved in those subfolders, and their names have the following format: DATEfbsTIME.zip.

Ferro Backup System™ stores data in the PKZIP format (64-bit) created by PKWARE, Inc. The ZIP64 format enables the creation of archives (single .zip files) sized up to 9 exabytes (1 EB = 1,000,000 TB).

.zip files can be viewed and unpacked using a variety of programs supporting the PKZIP ZIP64 format, for example the popular WinZip®. Considering the differential backup model used by Ferro Backup System™ it is, however recommended to perform those steps directly in FBS Server (Restore tab).

Easy data restore
Ferro Backup System™ supports full backups and differential backups. Nevertheless, whatever backup type you choose selected for your workstation, the restore procedure is always carried out in the same, user-friendly way.

While for full backups the restore process is simple, involving only the unpacking of all files from a selected archive (ZIP), for differential backups it is a little more complicated. In the latter case, only the first (the oldest) archive contains all the files originally selected in the backup settings. During all subsequent backup sessions only files modified or created since the previous backup are included. If backups from subsequent days do not include all files selected in the backup settings, then restoring data in most backup systems may prove very difficult.

Ferro Backup System™ automatically handles the entire restore process, which enables the user to easily restore information differential backups, just like in the case of full backups.

What’s new in Ferro Backup System™

Version 4.3 (build: w1048 s1350) / 2013.10.17 (CURRENT)

- New control console. FBS Server program runs only in the system service mode. The built-in web server shares the control console as an Internet application.
- Stopping FBS Server service is not required to access the control console
- Possibility to access the control console from a remote computer (or tablet) without a remote Desktop
- Multiple administrators may use the control console simultaneously
- Access control to the control console with various permissions (Administrator, Operator, Observer)
- Backup and recovery of encrypted files (EFS)
- Backup and recovery of permissions to files and directories (DACL and SACL)
- Backup and recovery of reanalysis points (Reparse Point, Junction Point and Symbolic Links)
- Bypassing protections of access control list (ACL) during backup
- Autoloaders and tape libraries support

Version 3.5.4 (build: w900 s894) / 2011.08.16

- New backup solution for open files based on copy-on-write (COW) technology replaces the mechanism of suspending processes
- New command line parameter /REPAIRDB intended for emergency repair of corrupted program database
- Automatic backup server updates added
- Command Show Plan added, helping set periodic full copy parameters
- Reattempting to open the file if “Write operations are too frequent” error occurs
- Error repeating backup of file fragments after full backup for delta copy has been deleted or corrupted - fixed
- Error computing the virtual cluster number while conducting backup of files larger than 32 GB - fixed
- Standard waiting time for backup completion when shutting down system extended from 1 to 2 hours
- Error planning backup tasks fixed. It can occur only at a given time with over 100 work stations connected
- Error processing large file names fixed
- Error automatically launching FBS Server service fixed
- Error adding a new work station without defined schedule fixed
- Error recovering 0 byte-sized files directly to work station fixed
- Error recovering data from work station which is not in database fixed (option: Choose FBF folder)

Version 3.4.5 (build: w812 s826) / 2010.10.29

- Collective editing of work stations' settings
- Long file names (>260 characters) supported
- Multiple backup tasks can be run during power off
- Bandwidth limit can be imposed on workstations
- Data read speed at work stations displayed in the Network Monitor tab
- Automatic database compacting if last program shutdown was unexpected
- Event Log filtering by time, operation type, task name and message
- Operation Type (Op.) column addend to the Event Log
- Additional filters in the Backup tab (Stations and Tasks)
- Specific recovery information stored in the Log Event
- Access to the program's control panel password-protected
- Number of exceptions (errors/warnings) displayed in the back-up summary
- User can choose a time interval after which backup resumes
- New IBM and DELL tape drives supported
- Possible to use system variables (%ProgramFiles%, %SystemRoot%, etc.) for back-up
- Accurate information on back-up progress displayed when processing large files
- Task Summary report now shows tasks completed successfully, tasks with warnings and tasks not completed
- Linux and Mac OS support
- Optimized ZIP archive loading
- Local Commands scripts returning runtime error messages for console programs directly to the FBS Server
- FBS Worker, FBS Server and installation suite digitally signed with the Microsoft Authenticode certificate
- Access paths to back-up and replication folders can be changed manually by clicking on the edit field while holding the [Shift] button
- Back-up and recovery of Windows 64-bit editions (x64) supported
- Search for files to back-up optimized
- Permanent exclusion of <drive_letter:>\System Volume Information catalogues from back-up
- Direct data recovery to work station
- New Local Commands - to extend FBS Server functionality using scripts (Java Script, Visual Basic Script, PHP Script, etc.)
- A radical improvement in FBS Server load speed

- Search engine to look for files in archives
- New network resources management panel
- New report which sums up the last back up task completed for each station
- New window to browse and read files from tapes
- Possibility to hide detailed entries in the Event Log
- Possibility to group entries in the Event Log
- Entries can be exported from the Event Log in various formats (text, HTML, Excel spreadsheet, XML or SQL)
- Optimized performance of Log Events with more than 20 thousand records
- Added warning about ongoing replication to an optical medium or tape on FBS Server shutdown
- Replication cancelling possible
- Tables can be sorted in reports
- Reports can be saved to a file and printed
- For differential backups, users can specify when periodical full backups should be performed
- Damaged and empty archives automatically deleted upon task completion
- New format of the task completion summary message
- UNC paths can be used without mapping network disks
- The default value of "split file segment size" changed from 10 MB to 1 MB to ensure more efficient backup of Microsoft Office Outlook mail files

Version 3.1.3 (build: w590 s578) / 2009.04.10

- Increased transfer speed from backup server to workstation
- Backup of empty folders
- Saving and reading folder attributes
- Additional checks of accessibility of path files for backup before task execution with recording of possible warnings
- Generation of warnings in the event of a significant drop in the number of backed-up files in relation to the number of files included in the previous backup
- An additonal horizontal scroll bar displaying in the Event Log
- Corrected error in unpacking data from differential copies containing more than 65,000 files
- Improvements to the FBS Server console interface
- Corrected error in differential backup of NTSF partitions which appeared when changing the system clock from standard time to summer time

Version 3.1.0 (build: w567 s559) / 2009.02.10

- Replication to tape drives
- Added Type column in the Restore tab. This column specifies backup type (full/differential).
- Database compacting on launch can now be skipped (-NOCOMPACT switch).
- Types of replicated backups can now be selected (all/full only).
- Accelerated restore and backup list building, faster preparation of tasks on the server by eliminating unrelated differential backups.
- Improved freeing up of disk space.
- Improved searching for IDs of processes writing to locked files.
- Corrected bug which caused lack of support for non-standard system date format, which could lead to wrong backup scheduling.
- Corrected bug in marking replicated backups.
- Corrected bug in rewritable optical media support (CD-RW, DVD-RW, DVD+RW).

Version 3.0.8 (build: w544 s535) / 2008.11.26

- Added "Backup only at selected times" option - to switch off the default backup of delayed tasks when the computer reconnects to the network.
- Corrected error in the updater which could prevent automatic software updates on workstations (works only after updating from 3.0.8.559 to a newer version).
- Corrected bug in workstation settings which could prevent automatic changing of backup names and locations after a task name or backup folder name was changed.
- Improved Event Log performance.

Version 3.0.7 (build: w544 s526) / 2008.11.13

- Network transfer speed reduction
- Periodical complete backups in differential tasks
- Minor fixes

Version 3.0.5 (build: w530 s514) / 2008.10.08

- FBS Server console fixes
- Administrative alert name quoted in email subject line
- Improved code page in email subject line

Version 3.0 (build: w530 s504) / 2008.08.29

- Refreshed FBS Server console interface
  - Sorting and filtering of lists and tables
  - Statuses displaying active warnings for workstation
  - New table displaying all defined backup tasks
  - Copying displayed information to clipboard
- Reports
  - Task summary - information on backup tasks
  - Outstanding tasks - information on unfinished tasks
  - Task statistics - information on times, sizes and completion speeds of different tasks
- Backup of information from FTP servers (ftpuse)
- Replication of backups to FTP server (/ftpuse)
- Replication to optical drives(CD/DVD/Blu-Ray/HD-DVD)
- New Administrative Alerts - sending reports and event log to web server or by email
- Minor fixes

Version 2.9 (build: w530 s504) / 2008.05.14

- %TASKNAME% parameter in remote commands added to differentiate tasks
- Bug causing errors during restore of data from tasks including corrupt ZIP files fixed
- Bug causing errors during backup of folders including symbolic links, which led to scanning errors fixed
- Optimized task preparation on server, backup browsing and unpacking

Version 2.8.5 (build: w507 s408) / 2008.02.08

- Cancel button can be locked during backup process on system shutdown
- Improvements in Open File Manager - now files stored directly in MFT can be backed up (files with sizes of ~1kB)
- Added warning of insufficient privileges to open folder
- Outgoing SMTP mail server port for administrative alerts can now be changed

Version 2.8.2 (build: w507 s408) / 2008.01.19

- Option to put processes on hold added, improving functionality of Open File Manager
- Fixes improving stability of network connections

Version 2.8.0 (build: w507 s408) / 2008.11.22

- Backup task preparation, restore file list building, restore process now three times faster
- Local commands - commands (scripts, programs) can now be run on backup server
- Network drive can now be mapped on backup server
- Bug preventing shutdown of operating system after backup completion if errors occurred during backup process fixed
- Improved handling of file names containing national characters in languages other than default operating system language
- Handling of exceptions in FBS Worker changed
- New Installer

Version 2.7.5 (build: w507 s408) / 2007.08.24

- Fixes in restore module
- Improved handling of skipped folder masks
- Improved handling of file names containing special characters
- File name code page changed from OEM to ANSI
- No files, folders or drives selected for backup warning added

Version 2.7 (build: w530 s504) / 2007.07.16

- File fragment differential backup
- Fixed breaking connection bug
- Minor fixes in FBS Worker and FBS Server

Version 2.6.1 (build: w507 s408) / 2007.06.06

- Remote commands - commands (scripts, programs) can now be run on workstations before and after backup

- Replication - backup copies can be duplicated from backup server to another network location or another hard disk
- Optimized task preparation on server
- Improved user interface for more convenient backup task editing
- FBS Server control module compatible with 64-bit Windows versions
- Fixes in FBS Worker task execution module ("fpiBackup error" fixed)

Version 2.5.0 (build: w507 s408) / 2007.02.01

- FBSServer can run as system service - backup server can now run whether or not administrator is logged in to system
- FBSWorker can be run as system service - backup tasks can now run whether or not user is logged in to workstation
- Masks of files and folders to be backed up can now be defined, including all local hard disks
- Repack functionality added for optimized management of available disk space by quicker removal of differential backups (issue concerning automatic freeing of space on disk for differential backups fixed)
- Several backup tasks can now be defined for one workstation
- Powerful task scheduler now added for improved scheduling according to day, day of week, or time
- Multiple destination paths can now be selected (Backup file location)
- Maximum event log size can be defined (issue of long FBSServer startup fixed)
- Bug concerning time sync between workstations and backup server with Time synchronization Off fixed
- Bug affecting creation of ZIP indexes for backups smaller than 4GB and containing more than 65 thousand files fixed

Version 2.4.7 (build: w507 s408) / 2007.03.06

- Automatic backup on system shutdown added
- Advanced data transmission, compression, buffering and CPU usage settings added
- Server console start minimized, start minimized to tray and accidental program shutdown prevention added
- Empty remote drives listing bug fixed
- Bug where backup storage folder was read, which could prevent program from creating incremental backup fixed
- Bug where partially-locked files were skipped and task was interrupted after error when backup ranges were overlapping fixed
- Bug causing problems with backup when masks with square brackets were used for files to be backed up and skipped fixed

Version 2.4.0 (build: w507 s408) / 2005.09.07

- Backup of open/locked files (open file manager)added
- Backup encryption engines - Rijndael (AES), Serpent and Twofish added
- A number of minor fixes

Version 2.2.0 (build: w507 s408) / 2005.07.15

- Program can now work on computers with active Terminal Services
- Increased stability by changing database access methods
- Task in progress on server can now be cancelled
- Instant backup of all workstations added
- Task scheduler optimized
- Preview of workstation status in Network monitor tab added
- File and folder directories on remote computers now read faster
- Field to enter remote path manually added
- Multiple connection detection and prevention added
- Broken connection detection (transfer rate decrease detection) added

Version 2.1.5 (build: w507 s408) / 2005.03.14

- Number of backups to be kept can be set (rotating backups)
- Administrative alert module sending error notifications to designated email address added
- Current backup task can be cancelled
- FBS Worker optimized - executable file size reduced from 231 KB to 115 KB
- Faster backup preparation (file searching)
- File and folder directories on remote computers now read faster
- Faster backup through addition of file buffering (CONNECTION - CACHE SIZE option)
- COMPRESSION-PRIORITY option added to set maximum CPU usage in order to ensure work can be performed comfortably during backup process.

Version 2.0.1 (build: w507 s408) / 2004.08.01

- Backup format changed from Microsoft&reg CAB (Cabinet) to PKWARE&reg ZIP (64-bit extensions)
- Files larger than 4 GB can now be backed up
- Files up to 9 EB (theoretically) now supported
- On-the-fly compression added - no temp files created during backup
- Differential/incremental backups added
- Data restore module added

- Data transmission protocol bugs fixed and transfer rate increased
- Lower hardware and system requirements for FBS Worker:

Version 1.0.0 (build: w507 s408) / 2002.05.22

- File backup from computers connected to local area network (TCP/IP)
- Centralized control
- Backup task planning
- Event logging

2

Installation

System requirements

FBS Worker

- Intel® Pentium®
- 12 MB RAM
- 2 MB available disk space
- Operating system:
  Microsoft® Windows® 2000, XP, Vista, Windows 7, 8
  Microsoft® Windows® Server 2000, 2003, 2008, 2012
  Linux, BSD, Mac OS X (Wine)
- network adapter

FBS Server

- Intel® Pentium® III 1.5 GHz
  recommended: dual-core processor
- 512 MB RAM ((*recommended: 1 GB*+)
- 150 MB available disk space (+space for backups)
- Operating system:
  Microsoft® Windows® 2000, XP, Vista, Windows 7, 8
  Microsoft® Windows® Server 2000, 2003, 2008, 2012
  Linux, BSD, Mac OS X (Wine)
  recommended: XP, Vista, Windows 7, 8 or Server 2003, 2008, 2012
- network adapter
- Firefox 19, Chrome 25, Internet Explorer 8, Opera 12

Backup software installation

Ferro Backup System™ is based on client-server architecture. The installation file contains two applications:

- FBS Server (server) - a backup server application
- FBS Worker (client) - a workstation application

First installation
FBS Server is only installed once – on the computer which is used as a backup server. The other application – FBS Worker – is installed on all computers from which data will be backed up. In some situations FBS Worker is also installed on the backup server.

An incorrectly configured anti-virus software can disrupt disk operations. Before starting work with the software, the anti-virus software should be properly configured.

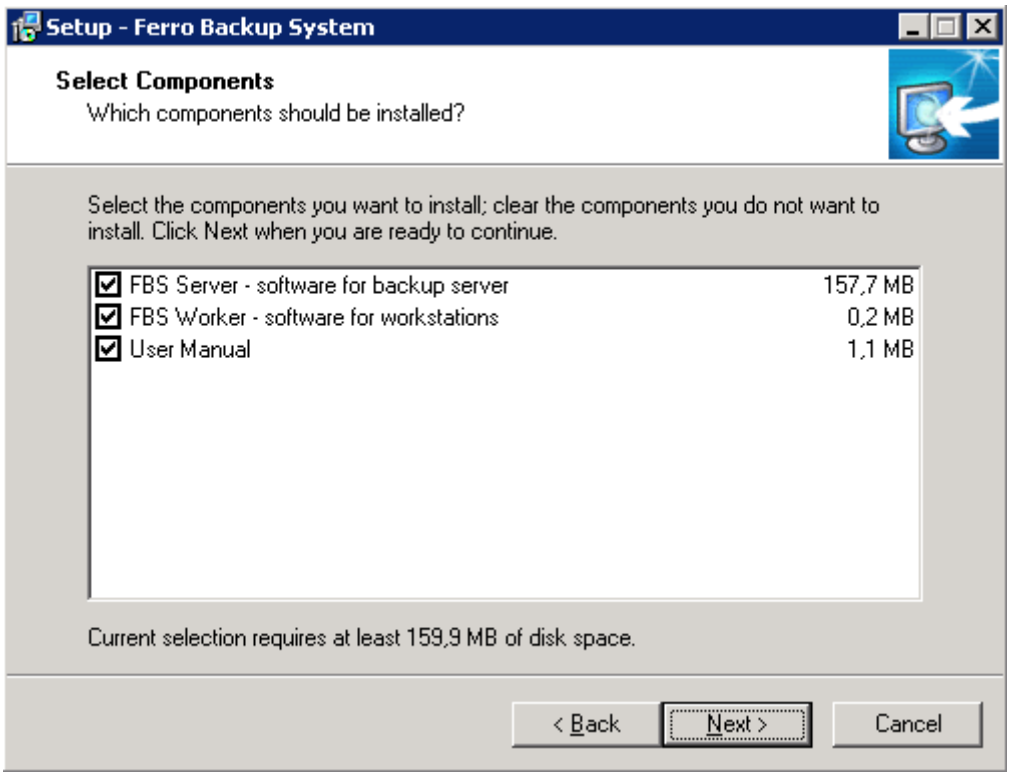


Fig. 1.1 Ferro Backup System - data backup system. Setup – component selection

Updates
Please note that Ferro Backup System™ includes automatic updates for FBS Worker. If new versions of the workstation application are released in the future, they will only need to be installed on the server. FBS Server will update FBS Worker automatically on all workstations. To update the application on the backup server, just install the new version in the same folder as previously. To preserve all settings, install the new version without uninstalling the previous one.

The order of installation is of no importance.

INSTALLATION OF THE SERVER APPLICATION (FBS Server).

Installation lcation:
FBS Server must be installed on the computer used as a backup server.

Description:
Two files are included in the server package: FBSServer.exe - a 915 KB executable file and FBSDataBase.abs – a configuration file with an initial size of 1.7 MB.
After copying FBSServer.exe and FBSDataBase.abs to the destination folder the installer will launch FBSServer.exe using the following parameters:

- `FBSServer.exe /INSTALL – FBSServer service installation`

Thus FBSServer will be installed as a system service and launched automatically on system startup. The FBSServer service works by default on a local system account. To change the default startup method or change the account of the service, open the properties window in the MMC console – Services (Control Panel -> Administrative Tools -> Services).

After the installation is complete the program is ready to run.

⚠ *Note. Although the FBSDatabase.abs configuration file immediately after installation takes less than 2 MB, after the program is configured, the file may grow (depending on the number of connected workstations) up to 150 MB.*

INSTALLATION OF THE WORKSTATION APPLICATION (FBS Worker).

Installation location:
FBS Worker should be installed on all computers from which data will be backed up, that is on office computers, portable computers and servers working under Windows.

Description:
Two files are included in the workstation package: FBSWorker.exe - a 140 KB executable file and FBSWroker.ini– a configuration file with an initial size of 2 KB. During the installation you need to enter the name or IP address of the computer on which FBSServer is being installed.

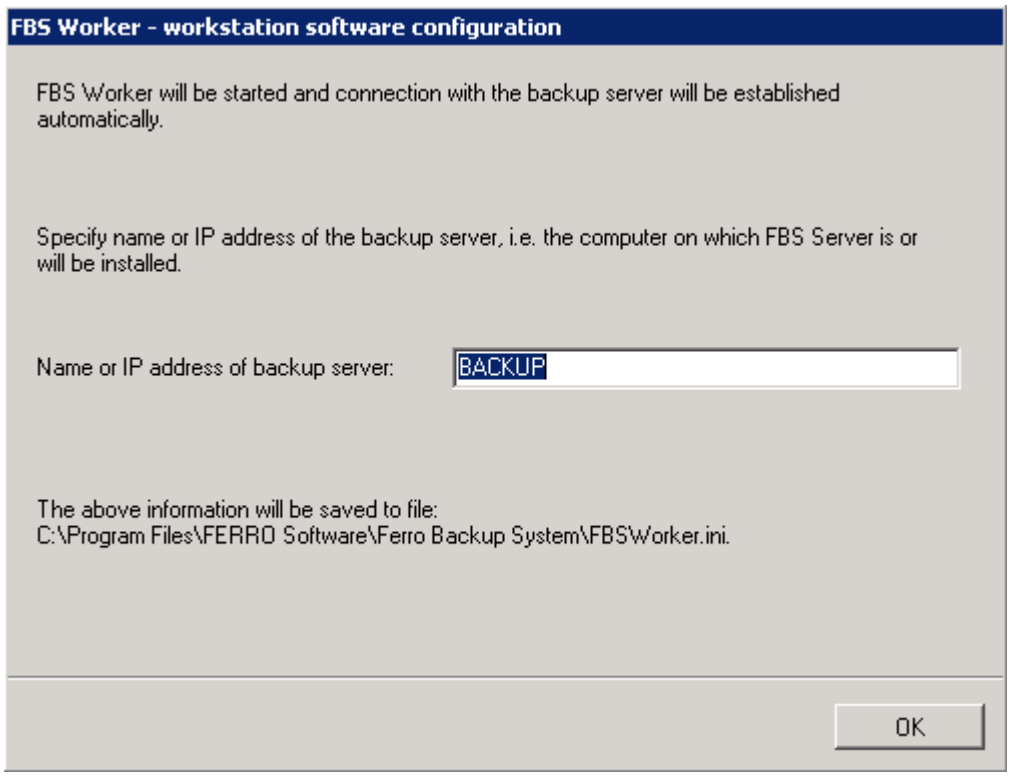


Fig. 2.1 Ferro Backup System™. Installation and configuration of FBS Worker

This information is written in the FBSWorker.ini file.

After copying FBSWorker.exe and FBSWorker.ini to the destination folder the installer will launch FBSWorker.exe using the following parameters:

- `FBSWorker.exe /INSTALL – FBSWorker service installation`
- `FBSWorker.exe /START - FBSWorker service launch`

Thus FBSWorker will be installed as a system service and launched automatically on system startup. The FBSWorker service works by default on a local system account. To change the default startup method or change the account of the service, open the properties window in the MMC console – Services (Control Panel -> Administrative Tools -> Services).

After the installation is complete, the program is already running in the background.

⚠ *Note. The application does not have any window, so to make sure it is running, look for a process named FBSWorker in the Task Manager.*

REMOTE INSTALLATION OF THE WORKSTATION APPLICATION (FBS Worker).

The information in this chapter is for IT technicians only.

See below for details on remote installation of FBS Worker. Remote installation is not required to make full use of Ferro Backup System, but it saves time otherwise spent on local (manual) installations of FBS Worker on computers in the company's network.

FBS Worker includes auto-installation and configuration mechanisms. Running the program with the necessary switches will install (or uninstall) the FBS Worker system service. Before installation, FBSWorker.exe must be uploaded to the target computer. FBSWorker.exe can be found on any computer on which FBS Worker has already been installed locally, in the

```
Program Files\Ferro Software\Ferro Backup System\ folder.
```

.

After the FBSWorker.exe file is copied to the target computer, it must be launched using the /INSTALL switch. This will install FBS Worker as a system service. It will be launched automatically on the local system account every time the system boots. If in addition to the /INSTALL switch, the /HOSTNAME:<backup_server>switch is used, an FBSWorker.ini configuration file will be created during installation. It will contain an entry specifying the name of the host (backup server). This entry tells FBSWorker which computer to connect to, and is vital to ensure correct operation of the software in a network environment.

A number of different commands and techniques can be used to install FBS Worker on a remote computer, including: netexec, rcmd, WMI, GPO. See below for a description of how to install the program using a free application PsExec - PsTools. PsExec will automatically copy the selected program to a remote computer and launch it there.

PsExec - command line syntax and switches

Syntax

psexec [\\computer[,computer2[,...] | @file][-u user [-p psswd]][-n s][-l][-s|-e][-x][-i [session]][-c [-f|-v]][-w directory][-d][-<priority>][-a n,n,...] cmd [arguments]

Parameters:

Below only those switches have been described which are required to remotely install FBS Worker. For a full description of all switches see: PsExec By Mark Russinovich

computer

Runs the command on the selected computer(s). Using the "*" switch will run the command on all computers within a domain.

@file

Runs the command on each computer specified in the selected file.

-c

Before running the command, the selected program is copied to the remote computer.

-d

Does not wait for the program to stop (and does not remove the program when it is done)

-f

Copies the selected program to the remote computer even if the file already exists on the target computer

-p

User name (on the remote computer)

-u

User password (on the remote computer)

cmd

name of program for executing

arguments

Optional switches of the selected program

FBS Worker - command line syntax and switches

Syntax:

FBSWorker [[/install [/force] | /uninstall] [/hostname:n] [/silent]], [/start|/stop]

Parameters:

Below only those switches have been described which are required to remotely install FBS Worker. For a full description of all switches see: FBS Worker - command line syntax and switches

/install

installs the FBSWorker as a system service (automatic startup, SYSTEM account)

/hostname:backup_server_name

During the installation an FBSWorker configuration file will be created including the name (or IP address) of the backup server. During the uninstall operation using this parameter followed by an empty string (space) after the colon will delete the configuration file from the disk.

/silent

When used with the /install or /uninstall switch, the dialog showing FBSWorker install or uninstall progress will not be displayed.

Installation of FBS Worker using PsExec

To install FBS Worker on a remote computer, run:

```
psexec \\COMPUTER -u USER -p PASSWORD -c -f -d FBSWorker.exe /INSTALL
                  /HOSTNAME:BACKUP_SERVER/SILENT
```

To install FBS Worker on multiple computers at once, create a text file containing the names of those computers, one per each line. Save this file on the disk (e.g. as COMPUTER_LIST.TXT) and then run PsExec with the following switches:

```
psexec @COMPUTER_LIST.TXT -u USER -p PASSWORD -c -f -d FBSWorker.exe /INSTALL
            /HOSTNAME:BACKUP_SERVER /SILENT
```

Additional information

Remote installations are possible on computers working under Windows NT, Windows 2000, Windows XP, Windows 2003, Windows Vista, Windows 2008. The $IPC resource must be available and the TCP: 135 port must be open on those computers.

See also:

- Connection troubleshooting
- FAQ: After the server is launched the workstation connects and then disconnects.
- Free evaluation version

3

Use and configuration

User manual for the Ferro Backup System™ - Introduction

FBS Server is the main application within the Ferro Backup System. It is activated only on one computer in the network, which will function as backup server. It is used to prepare and send backup tasks as well as receive and save backups. The application console includes seven main tabs which allow the whole System (server and workstations) to be monitored, to configure it, check on scheduled tasks and restore data. All tabs and dialogs are described in the following chapters. FBS Server jest g³ównym programem wchodz±cym w sk³ad Ferro Backup System. Uruchamia siê go tylko na jednym komputerze w sieci, który bêdzie pe³niæ rolê serwera backupu.

Access to control console

FBS Server program runs in the background, as a system service. Access to control console by HTTP protocol on 4530 port. In order to connect the control console, open the Internet browser and type name or IP address of the backup server, i.e. the computer on which FBS Server runs, and 4530 port, e.g.:

```
http://127.0.0.1:4530/
http://localhost:4530/
```

If the Internet browser cannot display the page, read: Solving control console access problems

Table sorting

- Click on the heading of the column according to which you want to sort the table
- To reverse sorting order, click the column heading again
- To sort the table according to multiple columns, select their headings one by one while holding down SHIFT
- To disable sorting, click the column heading while holding down CTRL
- If after clicking on the column heading an arrow indicating the sorting order does not appear, it means that sorting is unavailable for that column

Table filtering

- Move the pointer over the column heading and click on the displayed filter button.
- To add a new filtering rule or modify an existing filter, click on Apply in the lower right corner of the table
- To turn off filtering, click on X in the lower-left corner of the table
- If the filter button does not appear when you move the pointer over a column heading, it means that filtering is unavailable for that column

1. FBS Server – Backup

The Backup tab is used to track the activities of workstations (active/inactive/task running), define new workstations in the System, change workstation settings and remove workstations from the System. The information window includes three views: Stations and Tasks, Stations, Tasks. Stations and Tasks tab includes tree display of the most important information on workstations and their backup tasks. The Stations tab displays detailed information about particular workstations. The Tasks tab displays a detailed list of all scheduled backup tasks. In all views the following information is displayed in columns:

- Station status – current status of workstation:
  -  No connection
  -  Ready to work
  -  Task preparation on server side
  -  Task running
  -  Software update
  -  Workstation disabled
- Task status - Current backup task status:
  -  Stopped
  -  Running
- Workstation/task name - workstation or backup task name
- Last time – date and time of last backup
- Delta time - time remaining until task execution (-), task duration (+) or task delay (+ red)
- Next backup – date and time of next backup
- Last event - last message on the workstation or backup task
- Description– any text describing the workstation or backup task

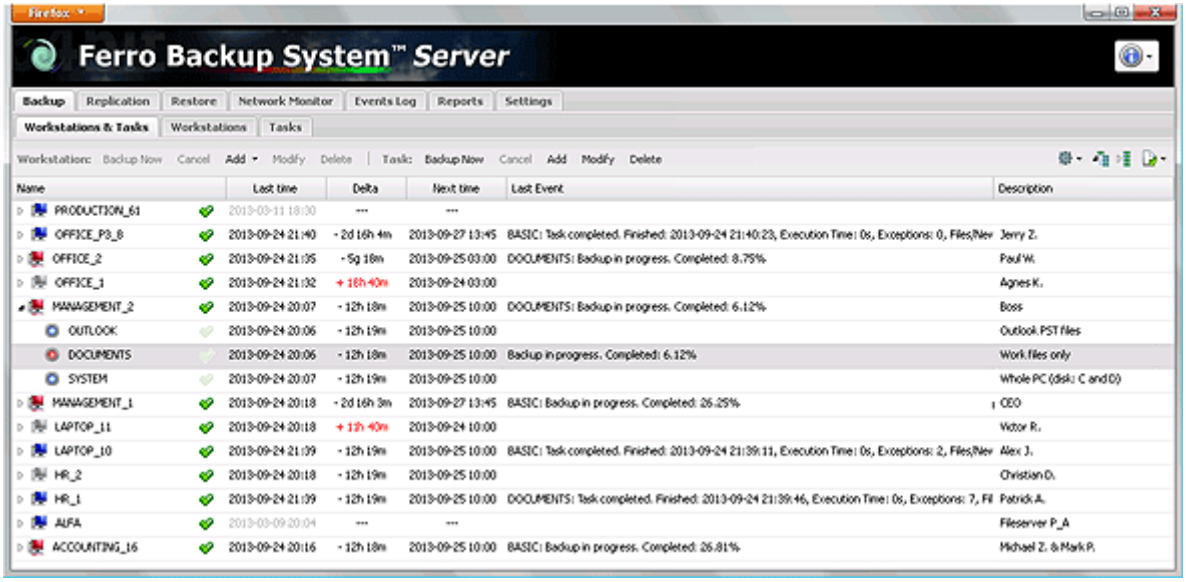


Fig. 1.1 FBS Server - Backup

Description of available commands (when one or more workstations selected):

- Backup now – performs default backup task on the selected workstations.
- Cancel – cancels the current backup task on the selected workstations.
- Add - adds a new workstation with default settings.
- Add all non-configured stations - adds all connected workstations, which are not yet added.
- Modify - displays a configuration window for adjusting the settings of the selected workstations.
- Delete - deletes selected workstations and their backup tasks.

Description of available commands (when one or more backup tasks selected):

- Backup now - starts selected backup task.
- Cancel - cancels selected backup tasks.
- Add – displays a configuration window for defining all parameters of a new backup task. New task will be added to all workstations, the existing tasks of which have been selected.
- Modify - displays a configuration window for modifying the settings of the selected backup tasks
- Delete – deletes the selected backup tasks. For every workstation there has to be at least one (default) backup task. A default task cannot be deleted. In order to delete all the tasks of the workstation, select and delete the entire workstation.

Multiediting - global settings editing

After selecting several workstations or backup tasks (SHIFT + Click, CTRL + Click), the type Setting window works in the global settings editing mode. In this mode, the multiediting menu, which helps define the modification mode, fields to save, is available in the lower part of the window. This way, it is possible to quickly change one or multiple settings for all selected workstations and tasks.

Input settings are read from the benchmark position. The benchmark position is the first selected workstation or backup task from the top. The name of the benchmark station or task is displayed as first on the settings window title bar.

To change the benchmark position after selecting a workstation group or backup task group, click the selected workstation or backup task while holding CTRL.

1A) Changing workstation settings

The Workstation Settings window is used to add or modify settings for selected workstations (of a remote computer) or the selected workstation group. The most frequent changes include: workstation description, compression level, blocked files backup and remote commands. The window appears after clicking Add or Modify in the main window in the Backup tab. See below for a detailed overview of all the settings available in this window.

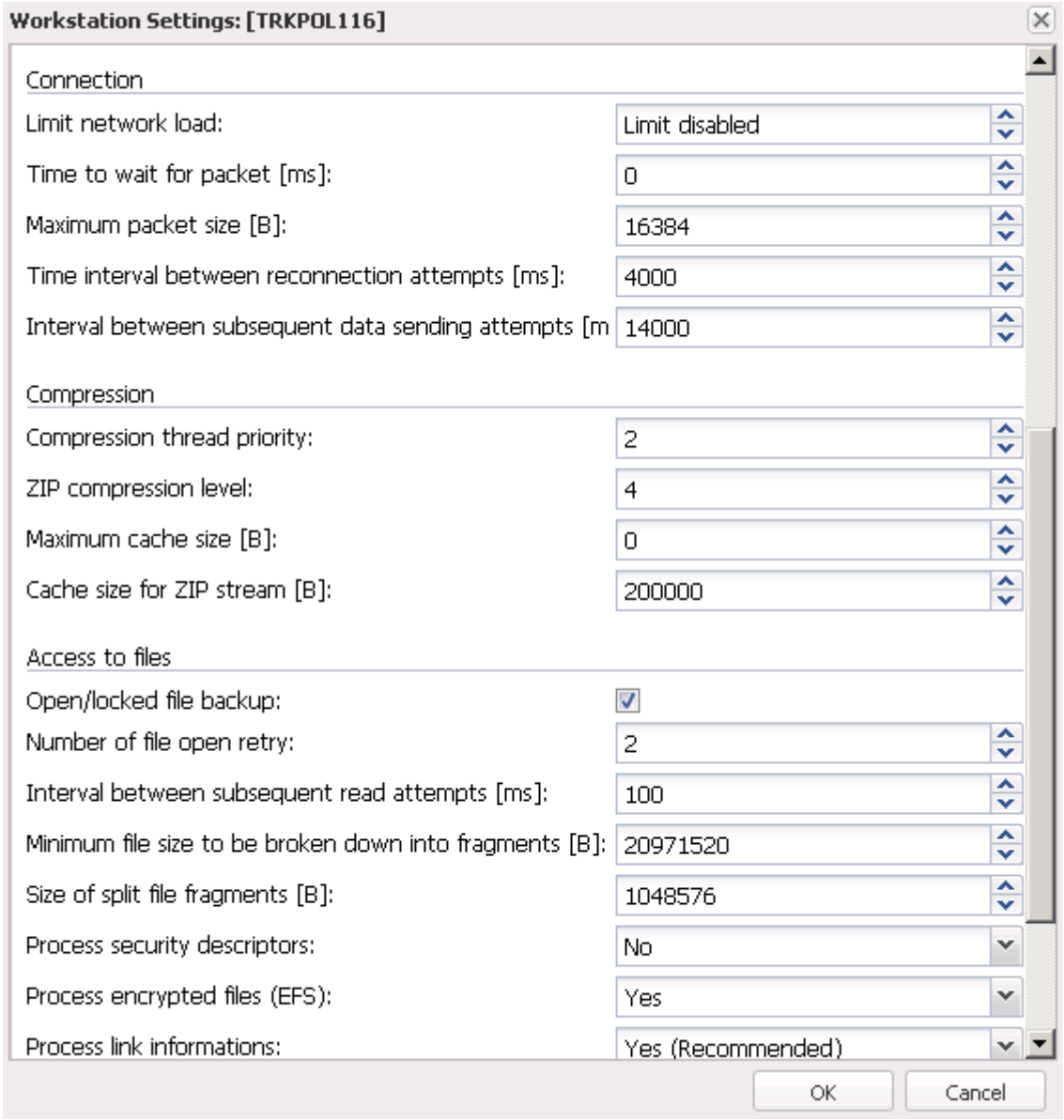


Fig. 1.2 FBS Server – Workstation Settings window

General

- Active workstation - turns the workstation on or off. If the workstation is not active, the server does not plan any backup tasks for it and does not warn about pending tasks.
- Computer description – space for comments regarding a workstation.

Advanced

⚠ *WARNING. Changing the advanced settings is not necessary to ensure proper operation of the software. Changing some parameters may disrupt data transmission or prevent the workstation from reestablishing the connection.*

Connection

- Limit network load – defines a given workstation's maximum network load. *See also: Limit connection speed for all workstations*
  - Maximum data transfer rate
    - `Unit: kilobit/sec. [kb/s]`
    - `Range: 50 - 1 000 000`
    - `Default value: 4 000 (= 4 MB/s)`
  - From/Until - defines the time interval in which the restriction is active

- Except – defines an exception or a situation when the restriction is not active
  - Saturdays and Sundays
  - Sundays

- Time to wait for packet - Time to wait for a packet. Currently this needs to be set to 0.
  - Unit: milliseconds [ms]
  - Range: 0 (no time limits) - 16777216
  - Default value: 0
- Maximum packet size – Maximum size of transmitted packets. Entering a value higher than 16384 can increase the transfer rate but if the transmission is broken while the backup is being sent the received file may contain errors (packets lost).
  - Unit: bytes [B]
  - Range: 512 - 16777216
  - Default value: 16384
- Time interval between reconnection attempts – Time interval between subsequent attempts to reconnect to the server.
  - Unit: milliseconds [ms]
  - Range: 0 (immediate) - 16777216
  - Default value: 4000
- Interval between subsequent data sending attempts – Time interval between subsequent attempts to send data
  - Unit: milliseconds [ms]
  - Range: 0 (no delay) - 16777216
  - Default value: 14000

Compression

- Compression priority – defines maximum CPU usage during backup. During a backup operation FBS Worker reads files from a disk, compresses them and sends them to the server. This places a significant load on the CPU, particularly using poor equipment. If the backup is performed while the user keeps working with the computer, it is possible, for comfort, to set a lower compression priority. 0 means the lowest and 6 the highest priority. To ensure user comfort, you can set it to 0, meaning the application will only compress when the CPU is idle. Setting it to anything below default value will involve less CPU usage and longer backup times. Setting it higher than default value may shorten backup times.

  Note. Setting the priority to 6 may mean that the operating system will not respond to the user's commands until the backup is completed.
  - Range: 0 - Idle, 1 - Lowest, 2 - Lower, 3 - Normal, 4 - Higher, 5 - Highest, 6 - Time Critical
  - Default value: 2
- ZIP compression level - ZIP compression level. Range: 0 (no compression), 1-3 (fast compression), 4-6 (standard compression), 7-9 (maximum compression). Default value: 4 0 means that the files will not be compressed. Values between 1 and 9 define compression level. Small values mean faster compression, less CPU usage and larger archives. High values mean better compression (smaller archives), longer compression times, more CPU and memory usage.
- Maximum cache – Maximum buffer used for file compression. If set to 0, the best buffer size will be used – ranging between 524288 and 1572864 B. If small values are used (less than the default) compression times are longer and the resulting ZIP archives are larger (lower compression). It is not recommended to use high values (higher than the default). This will consume more memory, lengthen compression times and only slightly improve compression.
  - Unit: bytes [B]
  - Range: 0 (default size), 512 - 16777216
  - Default value: 0
- Cache size for ZIP stream – The size of the cache memory for the compressed ZIP stream. 0 means switching off cache memory. The upper value is limited by the size of the available RAM. In order to limit demand on the application's memory, you can reduce the cache below the default value. However, if the cache is set below 65536 B, transmission speeds fall dramatically, the amount of information sent over the network rises sharply and the load on the workstation's and the backup server's CPU increases. Values higher than the default may increase the backup speed, reduce the amount of data sent over the network and reduce the load on the workstation's and the backup server's CPU. If the set cache value is higher than the available RAM, backup will not be possible (error: out of memory).
  - bytes [B]
  - Range: 0 - 1073741824
  - Default value: 200000

Access to files

- Open/locked file backup - (Open File Manager) this can be used to backup open files, i.e. files which are locked by other processes in the system. Files are backed up in the OFM only if they cannot be opened any other way. Most often locked files are database files and system files. For large files (> 100 MB) it is recommended to schedule backups for periods when information is saved less frequently. If the OFM cannot obtain a coherent file image within 60 seconds (for database files this is the status after a transaction), the file will be skipped and a relevant note made in the Event Log.

  Note. Files which are open (locked exclusively) can only be backed up under: Windows NT 4.0, Windows 2000, Windows XP, Windows 2003, Windows Vista, Windows 7, Windows 2008, Windows 8, Windows 2012. Files need to be placed on a local, uncompressed FAT 12, FAT 16, FAT 32 or NTFS partition.

- File open retry – Number of attempts to open a file. This is used to define how many times the application should retry to open an input file if a read error is encountered. If during the backup operation there are errors caused by the application's inability to ensure the integrity of input files, this should be set to a higher value.
    - Range: 0 (no retries) - 255
    - Default value: 2
- Interval between subsequent read attempts – The interval between subsequent read attempts of source files. This defines the time interval between subsequent attempts to read a source file. Set this value higher if there are integrity errors in input files.
    - Range: 0 (immediate) - 65535
    - Default value: 2
    - Unit: milliseconds [ms]
- Minimum file size to be broken down into fragments – sets the file size threshold – if this is exceeded, differential backups will be performed on the file fragment level. See also: Backup type - file fragment difference *See also: Backup type - file fragment difference*
    - Range: 100 - 2096128
    - Default: 20480
    - Unit: kilobyte [kB]
- Size of split file fragments – sets the size of fragments which the backed up file will be split into (virtually). Values lower than the default can save disk space on the backup server and speed up the backup process. The default value has been calculated for 1 GB files. If file(s) larger than that are backed up, setting this value lower may increase backup verification time and slow down backup preparation. *See also: Backup type - file fragment difference*
    - Range: 100 - 2006128
    - Default: 1024
    - Unit: kilobyte [kB]
- Process security descriptors - defines whether to save information on file and directory authorizations. This option may be useful for file servers in order not to redefine access privileges after file recovery. Turn off this option if saving security descriptors is not necessary. Turning this option off increases backup size, RAM use by program and slows down the backup process.
    - No (default value) - does not save information on security
    - DACL - saves the Discretionary Access Control List together with files and directories
    - SACL - saves the System Access Control List together with files and directories
    - DACL+SACL - saves both access control lists together with files and directories

  See also: Restoring security descriptors
- Process encrypted files (EFS) - defines whether to process encrypted files on NTFS partitions. Encrypted files are backed up encrypted and can be restored only on NTFS partition.
    - Yes (default value) - backs up encrypted files
    - No - skips encrypted files and reports warnings "Access denied"

  WARNING. EFS certificates and keys are required to decrypt files after restoring them on another computer. Remember to make a backup copy of certificates and EFS keys or a system register, in which they are stored. Otherwise, it will not be possible to decrypt the restored files.
- Process link information - defines whether after a link (Reparse Point, Junction Point, Symbolic Link) it is necessary to process elements in the target point or to store only information on the link.
    - Yes (Default value) - saves information about the link
    - No (Not recommended) - process links as target objects

  WARNING. Following hook ups is not recommended because the same files may be backed up more than once, which may lead to recursive looping.

Other

- Synchronize workstation clock with server – if this field is active, the date and time on the workstation will be synced with the date and time on the server. Synchronization takes place whenever a connection is established and whenever time or date settings are changed on the workstation.
- Generate warnings on network errors - if this field is active, the program will generate warnings if network errors occur (disconnection and reconnection of the workstation). If the workstation uses radio access network, this option can be turned off.
- Allow user to cancel backup – if this option is active, the user may cancel the backup and shut down the computer immediately. (This option is global for all of a given workstation's backup tasks. If this option is changed in one task, it will change in all other tasks.)

Remote Commands

Remote commands are plugins and they expand functionalities of FBS Worker - the client's software. They can be used to run additional commands, scripts or applications on workstations. For example: before backup you can map a network drive or stop a database server, and after backup you can defragment a drive or shut down the system.
Remote commands are launched with the privileges of the account, on which FBS Worker runs.

The available options are as follows:

- Add - adds a new remote command
- Delete - deletes a selected remote command
- Test – sends a remote command to the workstation and launches it. The result of a remote command will be returned to the control console.

- Launch – allows to specify when the remote command is supposed to be launched. The following types are available:
    - `When starting the application (FBS Worker)`
    - `Before backup`
    - `After backup`

- Wait – here you can choose whether FBS Worker, after launching a remote command, should wait for its completion before continuing with the task or not. This option should be active if a backup task or other remote commands depend on the result of the remote command (see: example no. 2).
- Command – defines the name of an executable file (.exe, .bat, .cmd, etc.). If necessary, enter the full path before the file name.
- Parameters - (optional) list of parameters to be sent to the executable file when it is launched. You can use Windows environment variables (local variables and system variables) (e.g.. %COMPUTERNAME%, %USERNAME%) and software variables %TASKNAME%. The %TASKNAME% variable will be replaced with the name of the current backup task when the command is launched (e.g. BASIC). The use of the %TASKNAME% variable enables you to execute a remote command on a contingent basis, depending on the backup task in progress.

Example 1 - passing %TASKNAME% variable value to a batch file as %1 parameter

```
Command: C:\example.bat
Parameters: %TASKNAME%
```

Example 2 - conditional execution of "defrag C:" command

```
Command: CMD
Parameters: /C if %TASKNAME% == BASIC defrag C:
```

See also:

- Mapping network drives using Remote Commands
- Local commands

1B) Changing backup task settings

The Task Settings window is used to add or modify settings for a backup task or group of tasks. The most often changed settings include: task name, schedule, range, backup type and versioning. The window appears after clicking Add or Modify in the main window in the Backup tab. See below for a detailed overview of all the settings available in this window.

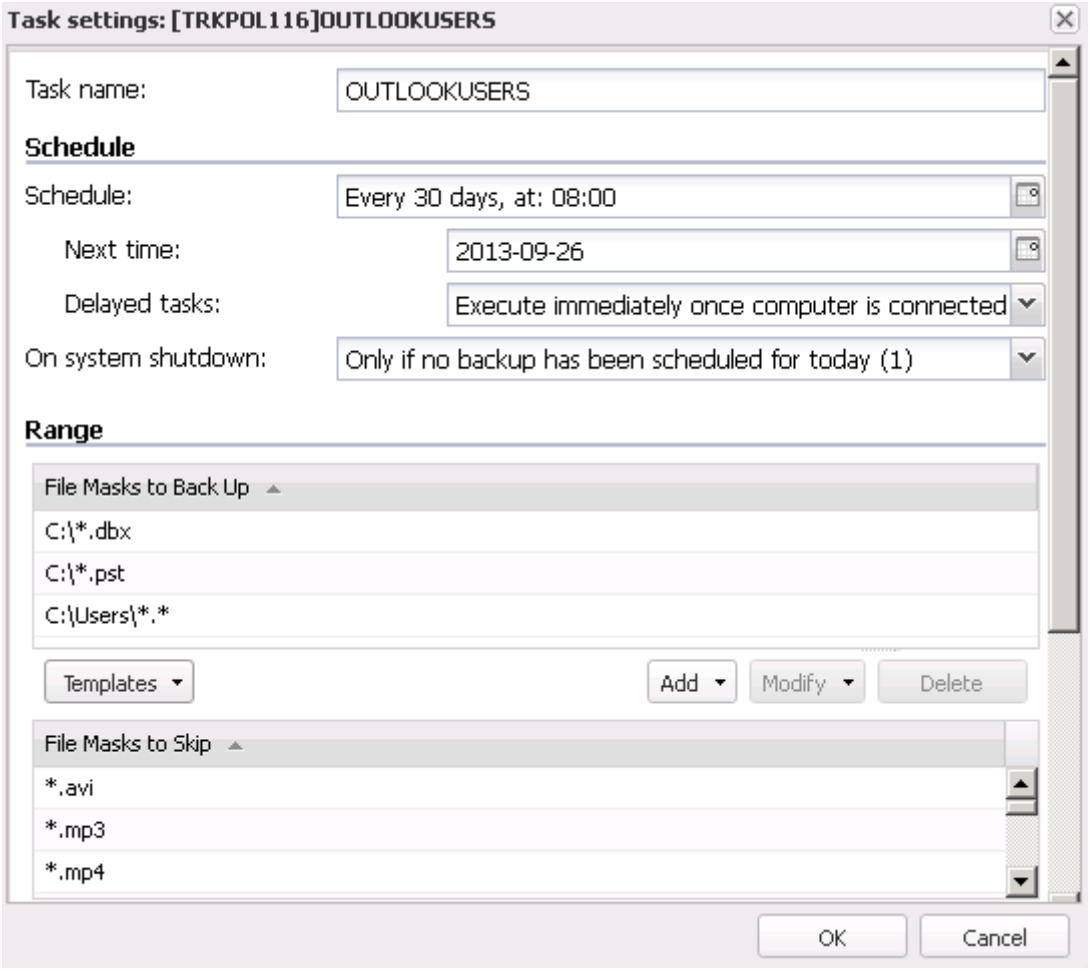


Fig. 1.2 FBS Server – Workstation Settings - Tasks/Schedule

General

- Task name - defines the back up task name. The most frequently used are names that describe backup range or frequency, e.g.: DOCUMENTS_EVERYDAY, SYSTEM_FRIDAY.
- Default task - a task marked as "Default" is run when the workstation is active and the button "Back up now" is pressed in the application's main window.

Schedule - scheduling backup tasks.

You can in the first available field select the schedule type. The following types are available:

- On demand – The backup operation will only be run by manually launching the task in the application's main window (button: Back up now)
- Daily – The backup task will be run every day at the time indicated in the field Start time.
- Day Intervals – The backup task will be run automatically after a certain number of days. The interval must be set in the Days field.
- Hour Intervals – The backup task will be run automatically after a certain number of hours. The time interval must be set in the Hours field.
- Days of the week – The backup task will be run automatically on selected days of the week as defined in the Days of the Week field.
- Start Time - In the Start Time field you can schedule the archive task start time to 1 minute.
- Next Time - In the Next Time field you can set the date for the next backup operation.
- Delayed tasks
  - Skip and execute later– the task will only be executed at a specified Start Time. If the workstation is not connected to the server at this specified time, the task will not be executed until the next time.
  - Execute immediately once computer is connected - if the workstation was unavailable at the specified time, the task will be executed immediately upon connecting the workstation to the server. *Note. An option recommended for laptops as they are often unavailable at a specified time.*
- Backup on system shutdown – you can choose whether file backup should be done before shutting down the computer.
  - `Turn off - do not activate backup on system shutdown`

- Only if no backup has been scheduled for today (1) – the backup will be performed before shutting down the system only if a backup operation has been scheduled for the current day. This option enables you to execute a backup operation scheduled for a given day even if the user shuts the computer down before the scheduled backup start time. After the backup is completed using this option, a new backup is scheduled based on the predefined schedule. The option is not available if the schedule is turned off (On demand only)
  Example:
  -Schedule: Daily, 5 pm, Back up before system shutdown: YES
  -Next time: 2007-08-20 17:00:00
  -The system is shut down at 3:30 pm. The task is launched. After the task is completed, the next backup is scheduled for: 2007-08-21 17:00:00
- Always (2) - a backup will be performed at each system shutdown. Unlike the previous option, the backup schedule with the "always" option on is not updated after the backup is completed (no new backup is scheduled).

Disk failures most often occur during power on or off. The "Backup before system shutdown" option has been added in order to enhance data protection. It backs up all files created or modified since the last backup, even when the user shuts down the computer prior to the scheduled periodical backup.

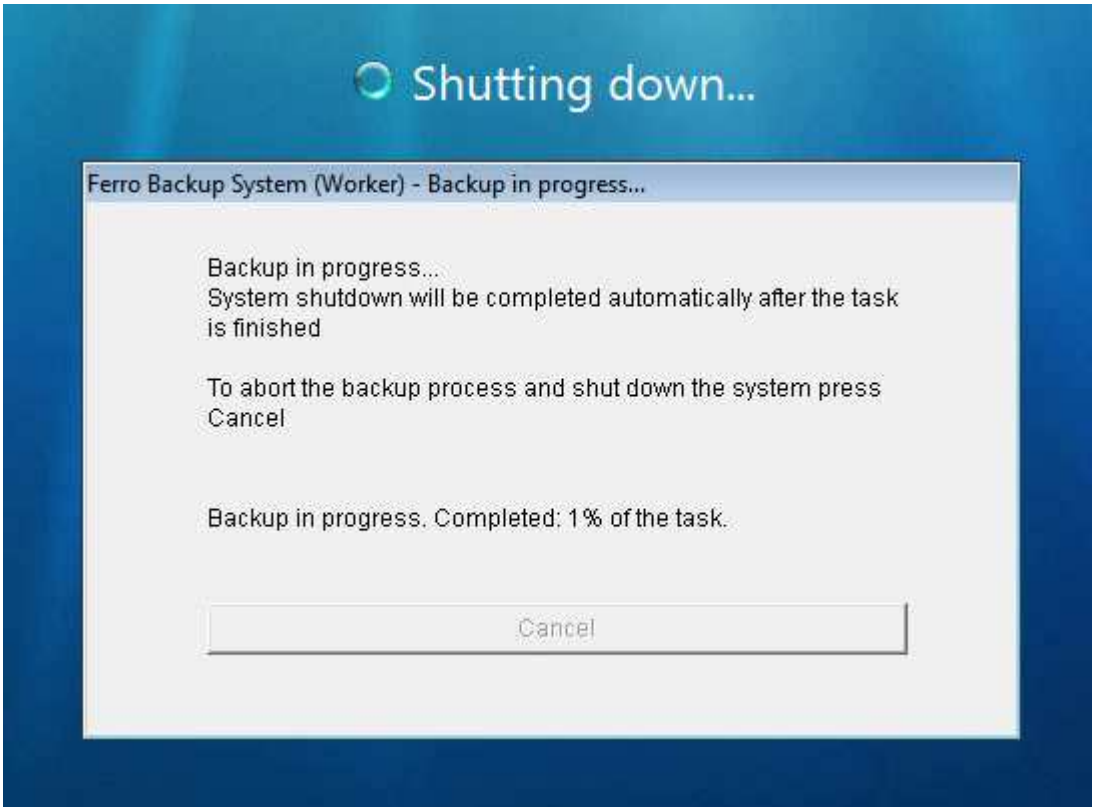


Fig. 1.3 FBS Worker – the information window displayed during system shutdown

If this option is on, the backup is started when the user attempts to shut down the system (selecting "shut down" or pressing the power button on the computer). A dialog appears informing the user that the backup operation has started. The workstation user may cancel the backup and shut down the system immediately by pressing the Cancel button.

If this option is active and the user shuts down the computer during the backup process (launched according to the schedule or manually by the administrator), this task is continued as if it has been launched by the system shut down event; if this option is disabled, the backup task will be aborted.

Note. If the "Back up before system shutdown" option is on, the dialog may be displayed for a certain time (~10 seconds) at each system shutdown, even if no backup is required according to the current settings. During that time FBS Worker will interface with the FBS Server to check whether the task needs to be launched.

The system shutdown will be completed after the backup operation is finished or connection with the backup server is lost.

Range – here you can select files and directories for backup

In the Range part, you can define volumes, masks or full paths to files and directories, for which backup is going to be executed and those, which are going to be excluded from backup. After clicking Add or Modify, a dialog is displayed, which contains a list of drives, directories and files of the remote computer.

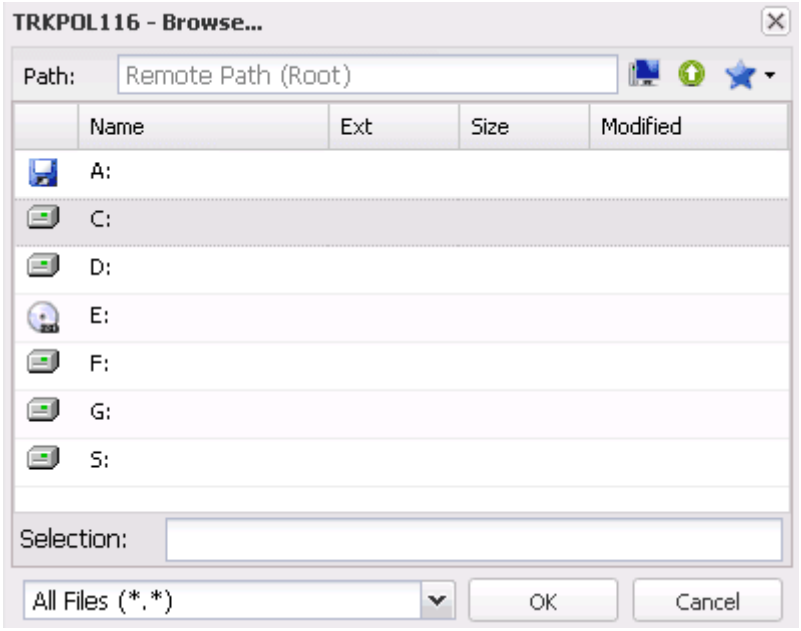


Fig. 1.4 FBS Server - Viewing remote computer resources

- Files and directories for backup – a list of files and directories for backup. The list can include specific files or file masks.
- File Masks to Skip – a list of files and directories to be omitted from the backup operation. The field is used to exclude a file or a number of files from the File Masks to Back up list. The list can include specific files or file masks. See below for a list of files and directories to be excluded from backup. Files and directories from the list are not important to restore. If the backup includes the following files and directories, the backup process may be significantly prolonged. In some situations, backing up these files and directories may make it difficult to complete the task.

    - *\Temp*
    - *\Temporary Internet Files*

⚠ *Note. If you intend to back up the whole hard disk, remember to skip the abovementioned files and directories.*

- Add – adds files or file masks to a list (back up list or skip list).
- Modify - enables to change the highlighted file or mask.
- Delete – deletes selected entries from a list.

Examples of the use of wildcard masks in the Files/directories to back up and Files/directories to skip fields:

Files backed up	Skipped files	Overview
C:*.*	-N/A-	All files from C: and all subdirectories will be backed up.
C:*.doc C:*.rtf	-N/A-	All DOC and RTF files from C: and all subdirectories will be backed up.
C:*.*	C:\Windows*.*	All files from C: and and all subdirectories will be backed up except for files from C:\Windows\ and its subdirectories
.	*\temp*.* *\temporary internet files*.*	All files from all local hard disks will be backed up except for files from “temp” and “temporary internet files”

Remarks on network drives mapping
In order to back up files located on another computer on which you cannot install FBS Worker and perform the backup operation locally, you need to map the resources of the remote computer under a local drive letter. Please note that the mapped drives visible to the logged user are not available (not visible) to FBS Worker. That is why the drives need to be mapped directly in Ferro Backup System using Remote command (command: NET USE).

Direct access to network resources
The application also allows you to back up the shared resources of another computer without previously mapping it under a local drive letter. In this situation the resources on the remote computer must be available without authentication because there is no way to enter the user name and password. To display a list of files and folders available on the other computer, enter the following path to the

UNC in the Path field, in the View window: \\server_name\share_name\ and press ENTER.

Note. ACCESS TO NETWORK RESOURCES – A local system account on which the FBSWorker is installed by default does not have access privileges to network resources. Therefore it is necessary to switch the FBSWorker service to an account which has such privileges (e.g. an administrator account) or to set relevant privileges for the Local system account. This can be done from the MMC Services console (Control panel->Administrative tools->Services).

See also:

- Backup of operating system or disk partition
- Backup of databases and mail files

Options – setting backup task properties

- Backup type
  - Full - full backup
  - Differential - differential backup. It is recommended in most cases due to greater speed and space savings on the backup server compared to full backup.
  - Delta - differential backup at file fragment level. An advanced option of the differential backup recommended for tasks including files larger than 20 MB which are often modified (mail files, databases, etc.).

    Note. Since additional information needs to be stored in backup archives (checksums), the "file fragment difference" option only works from the third backup operation on.

- Periodical full backup – this enables you to reduce the level of dependency between differential backup archives. In the case of differential backups the application only backs up those files which do not exist (or exist only in older versions) in the previous backup files. Thus after a certain time dependency develops between backup archives – newer archives which are connected with older ones. When information is restored from a differential copy, files are extracted from the selected differential backup archive and previous archives linked to it. If a large number of archives is stored (see: Rotation copies) and any of the differential backups is damaged or deleted, some of the files may not be recoverable. To reduce that risk, check this option.

  Note. This option is not required to ensure correct backup and restore.

  The period is calculated differently for various backup schedules. Two solutions are used: one based on the quantity of files (ZIP archives), and the other based on the quantity of scheduled dates. The first one is used for schedules where it is not important when (on what day) the full backup copy will be made. The other allows specifying the exact date and time of performing a full backup. See the table below for an overview of the Period option functionality along with examples.

Backup schedule setting	Full backup period calculation

- Only on demand
- Daily
- Once in a specified number of days
	The period is determined based on the number of differential backup copies. In this case, a full backup will be executed once per given number of differential copies. Example (F = full; d = differential):
	`- Period = 2; F/d/F/d/...`
	`- Period = 3; F/d/d/F/d/d/...`

- Once per given number of hours
- On weekdays
	The period is determined based on the scheduled dates. In this case, a full backup will be performed once per given number of scheduled dates. If backup cannot be performed on the scheduled date when the full backup falls (e.g. the computer is unavailable), full backup will be scheduled for another date as per the scheduled period. The field Period Start defines the date from which a period runs. Example:
	`-Schedule: On weekdays = Mon Tue Wed Thu Fri; Period = 5; Period Start = Fri; Full backup performed every Friday`
	`-Schedule: On weekdays = Mon Tue Wed Thu Fri Sat; Period = 3; Period Start = Wed; Full backup performed every Wednesday and Saturday`
	`-Schedule: On weekdays = Mon Wed Fri; Period = 6; Period Start = Fri; Full backup performed every other Friday`
	`-Schedule: Once per given number of hours = 2; Period = 4; Period Start = 1.00 p.m.; Full backup performed once every 8 hours - at 1.00 p.m., 9.00 p.m., 5.00 a.m.`

- File encryption algorithm – here you can select an algorithm for file encryption. Three encryption algorithms, currently considered the best, are available: Rijndael, Serpent, Twofish. Just as during compression, encryption is performed on the computer on which the backed up files are located. Thus the backup copies are already secured when they are sent to the backup server over the network. All of the implemented encryption algorithms use 256-bit keys. The encryption password must be set in the Password management window.

  Note. Encryption may significantly slow down the backup process (Twofish is the fastest encryption, Serpent the slowest). Please note that ZIP archives encrypted in the Ferro Backup System can only be opened with FBS Server - Restore tab.

- Rotation backups (how many previous copies should be stored) – defines how many backup copies can be stored on the disk. If this option is on, the application will delete the oldest backup file (ZIP file) from the disk if the current number of backup files in the FBF directory is higher than the value set in this field. E.g. if the value is 7, after the 8th copy is completed the application will delete the oldest ZIP file.
  For differential backups, the last differential backup is deleted. The option “Optimize to save disk space” applies to differential backups. If it is on, the application will move files between different ZIP archives so that a ZIP file can be deleted as soon as possible, thus freeing up disk space.

  Note. Ferro Backup System uses advanced mechanisms to move files between ZIP files without actually unpacking and repacking (decrypting and encrypting) them again, which significantly speeds up the operation. This should not, however, be used on slower backup servers since the time to complete a backup task may then be significantly longer.
- Backup Location - can be defined by an alternative, in relation to the Main Backup Location, backup storage path for the selected backup task

  In order to ensure the necessary level of efficiency, the backup directory should be located on a local hard disk or an internal disk array (RAID). Using network disks is not recommended. A network disk can be used as an additional storage location. For details see:Replication.
- Comment – here a comment can be added to a backup task

Task replication

Here you can define if the backups that belong to the selected backup task should be copied into another location. Replication may be executed on hard drives, optical drives and streamers. For each type of drive, the following options are available:

- Turn off - the replication will not be executed
- All backup files - all backup files that belong to the given back task will be replicated
- Only full backups - only full backup files that belong to the given back task will be replicated

See also: Replication tab

2. FBS Server – Replication

Replication enhances the security of backup files stored on the backup server by replicating them to another location. Files can be replicated to another disk drive (removable hard drive, disk array, network drive, NAS, FTP server), optical media (CD/DVD/Blu-Ray/HD-DVD) or tape media (QIC, 4mm DAT/DDS, 8mm, DLT, etc.).

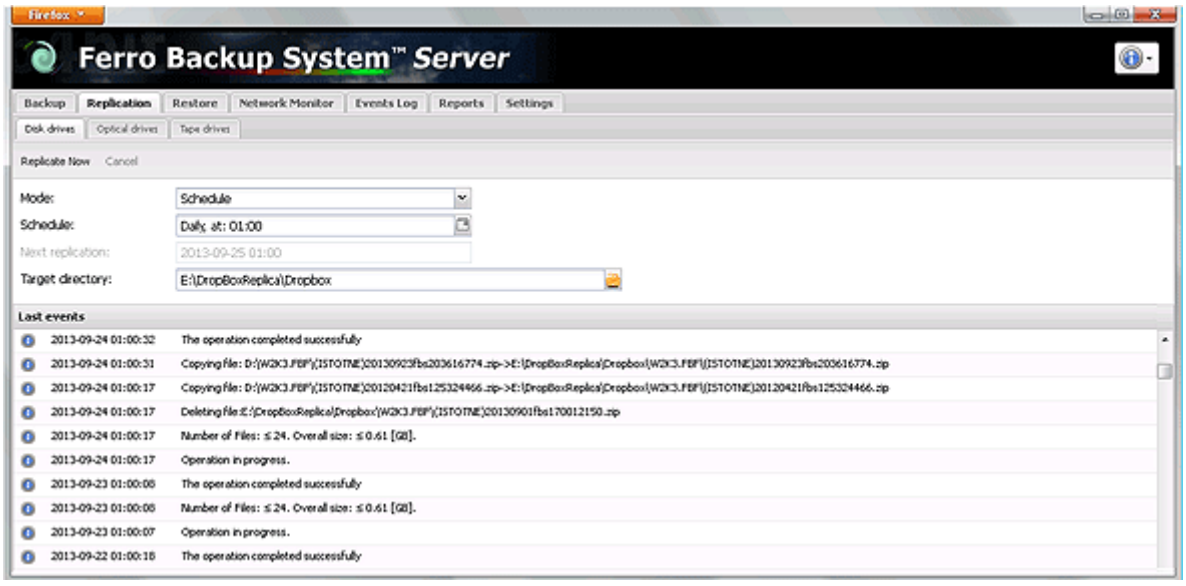


Fig. 2.1 FBS Server - Replication

The Replication tab is divided into three separate subtabs: Disk drives, Optical drives and Tape drives. In each one you can configure replication settings for the selected media. Replication options, which are the same for all drive types, are described below. Drive-specific options are described further on.

All Replication drive types

- Replication (Replication mode):
  - Automatic – the replication will be performed automatically when backup and verification operations are completed.
  - Schedule – the replication will be performed according to a schedule defined by the administrator
  - Manual – the replication will be performed on demand only (Replicate now button)
- Set Schedule - here the user can schedule replications. Replications can be performed at a preset time based on one of the following patterns: daily, every number of days, every number of hours, on selected days of the week. This option is only active when the replication mode is set to "Schedule".
- Replicate now - this will replicate all backups included in backup tasks selected for replication. This is only active when the replication mode is set to "Manual".
  - Simulation Mode - this will check that the replication settings are correct and the drives are ready. This command will perform all activities involved in the replication of backups except the actual copying, deleting, writing and marking replicated backups.
- Cancel – use this to stop the current replication process. As writing must be successfully completed, it may take up to several minutes to cancel a replication to optical media or tape media.
- Next replication - here the user can choose the next scheduled time of replication. This option is only active when the replication mode is set to "Schedule".
- Events - an extract from the Event Log describing replication events for the selected drive type.

Replication for the backup task is activated in the Task Settings window, in the Replication section.

Disk drives (external hard drive, network drive, remote share, FTP server etc.)
Backup files on the backup server will be synced with files from the location specified in the field “Target replication directory." FBF subdirectories in the replication location will be created automatically. Replication to disk drives involves the synchronization of those backups from the FBF folder which belong to a selected backup task located on the backup server with a folder of the same name stored in the location selected as the "Target (replication) directory". Backups stored on the backup server which are not in the replication folder will be copied to the replication folder. Backups in the replication folder which are not on the backup server will be removed from the replication folder. Archives whose contents on the backup server differs from backups of the same name located in the replication folder will be deleted from the replication folder and copied again. After the replication of backups assigned to a selected backup task is complete, the backups stored on the backup server and in the replication folder will match.

See also: Using NAS hard drive for data backup

Optical drives (CD, DVD, HD-DVD, Blu-Ray)
Backup files located on the backup server will be saved on a medium located in the optical drive. FBF subfolders will be created automatically. Saved files are marked as “replicated to optical drive” and will not be saved again during the next replication (*see: RepAttrib command*).

Tape drives (streamers) and tape libraries (autoloaders)
Backup files located on the backup server will be saved on a medium (DDS, DLT, LTO, AIT, etc.) located in the tape drive. FBF subdirectories will be created automatically. Saved files are marked as “replicated to tape drive” and will not be saved again during the next replication (see: RepAttrib command). Before using a tape for backup replication it should be formatted in FBTF (Ferro Backup Tape Format) using the “Delete" command. FBTF files can be retrieved using the "Read file..." command.

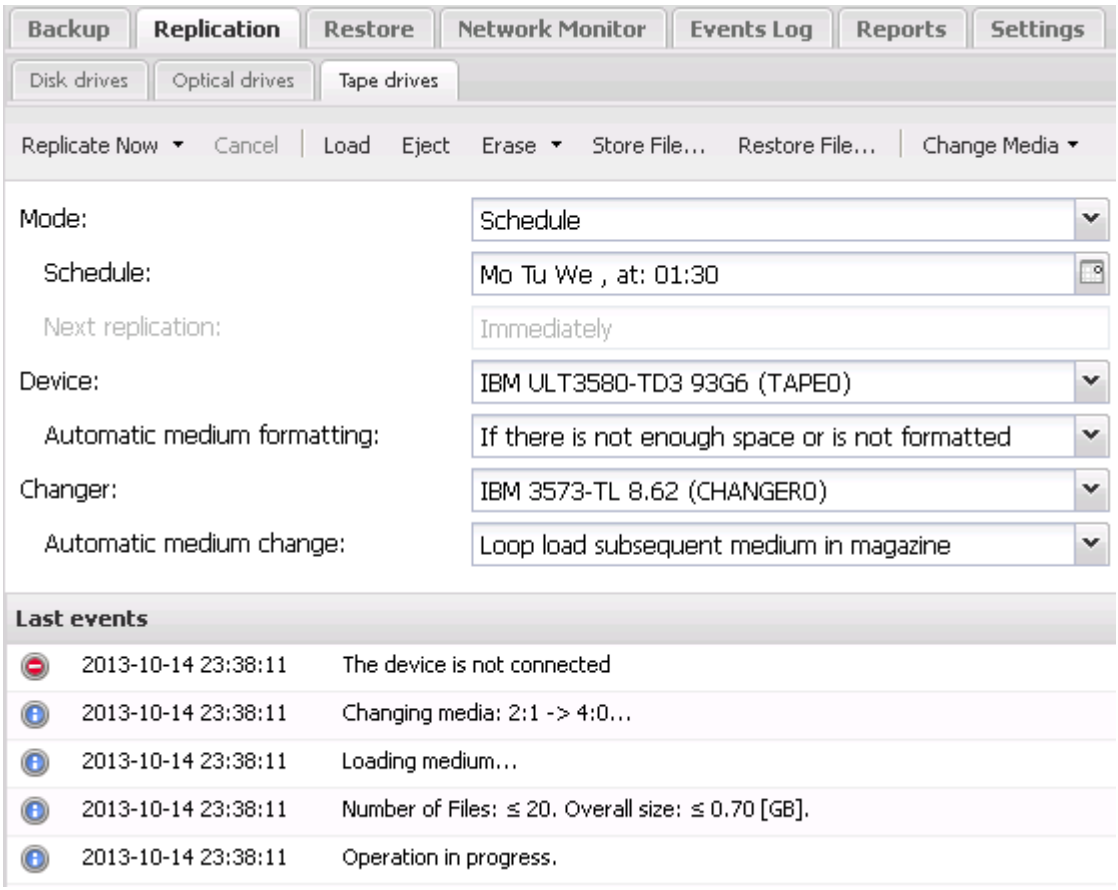


Fig. 2.2 FBS Server - Replication on a streamer with autoloader support.

Below, only options available for tape libraries and autoloaders are described.

- Change the drive (a command available only for tape libraries and autoloaders)
  - From the socket to the drive - it enables to load a tape from a defined socket to the drive
  - From the drive to the socket - it enables to load a tape from a defined drive to the socket
- Automatic medium formatting
  - Disable - the program does not execute automatic tape formatting
  - Always - before every replication - program formats the tape before every replication
  - If there is not enough space or is not formatted - the program formats the tape when there is not enough space for replicated backup files or when the medium has not yet been formatted
- Automatic medium change (the option available only for tape libraries and autoloaders)
  - Disable - the program does not execute automatic change of the medium in the drive
  - Loop load subsequent media in storage - prior to every replication, a medium is loaded from subsequent socket. If the socket is empty, the program checks and loop loads tapes from subsequent sockets.
  - Load medium from the socket for a given day of the week (0 - Mon, 1 - Tue, etc.) - prior to every replication, the program loads a tape to the medium from a socket corresponding to a given day of the week. It means that on Monday the tape from the first socket will be loaded, on Tuesday from the second socket and on Sunday from the seventh one.
  - Load medium from the socket for a given day of the week (0 - 30) - prior to every replication, the program loads a tape to the medium from a socket corresponding to a given month.

3. FBS Server - Data restore

In the Restore tab you can view backups and restore data from them. The Ferro Backup System makes it possible to perform full backup and differential backup. Nevertheless, whatever backup type you choose for your workstation, the data restore procedure is always carried out in the same, user-friendly way.

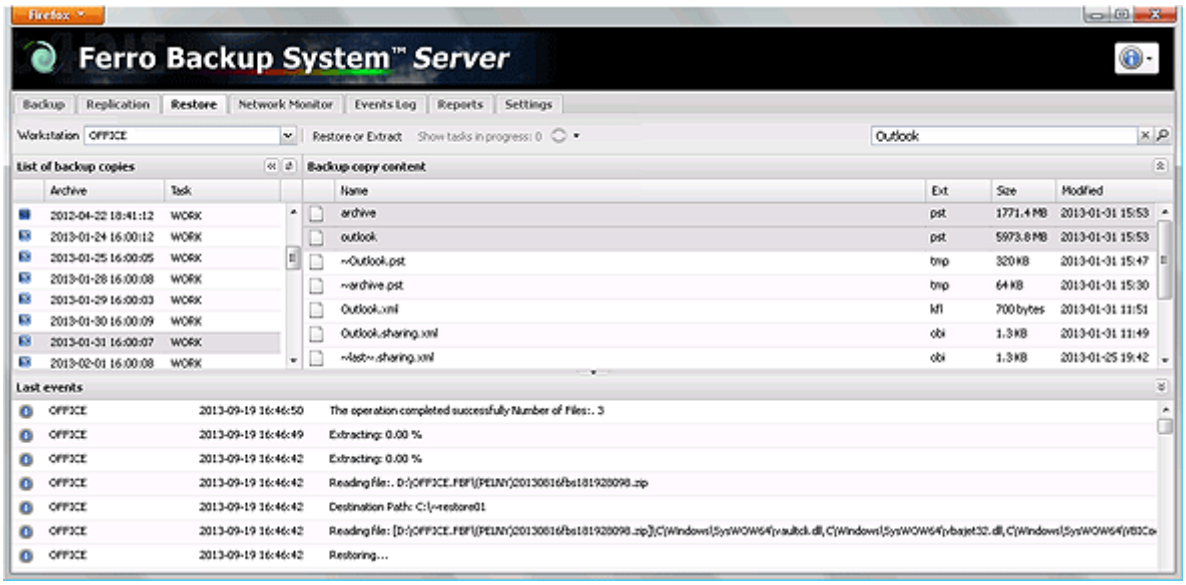


Fig. 3.1 FBS Server - Data restore.

- Workstation – a drop-down list where you can select the computer to view or unpack backup files from. The name of the workstation can be selected from the list or entered by typing. The list includes the names of computers which are defined in the System (they are displayed in the Backup tab) or were defined (have been removed and no longer appear in the Backup tab) but their FBF directory containing ZIP files are on the server. You can thus restore data from currently defined workstations and from workstations which are no longer connected to the System. After selecting a workstation a list of available backup files will be displayed in a field below.
- Backup files list – this shows a list of available backup files for a selected workstation. Each item specifies date and time of file creation. The number of items in this field corresponds to the number of backup files currently stored on the server. If no backups have been performed for a workstation, the field will be empty. Here you can choose, by selecting only one item, which data (from which day) is to be viewed or restored. It is thus possible to restore data not only from the last backup copy but also data from a specific date. After selecting an item from the list, a directory tree will appear in the right-hand window showing a list of backup files.
- Backup copy content – a list specifying file names, extensions, sizes and backup dates. After selecting a directory or a file, the Restore or Unpack button above becomes active. Please note that if a large number of differential backup files from your workstation are stored on the server, building a directory tree might take a while.
- Restore or unpack – use this to unpack (extract) selected files or directories from ZIP archives. In full tasks, only files from a selected full backup are restored. For differential tasks, the selected differential task is restored as well as all previous backup archives linked to it.

  After clicking on Unpack a window will pop up in which you need to enter a destination path for the selected files or directories.

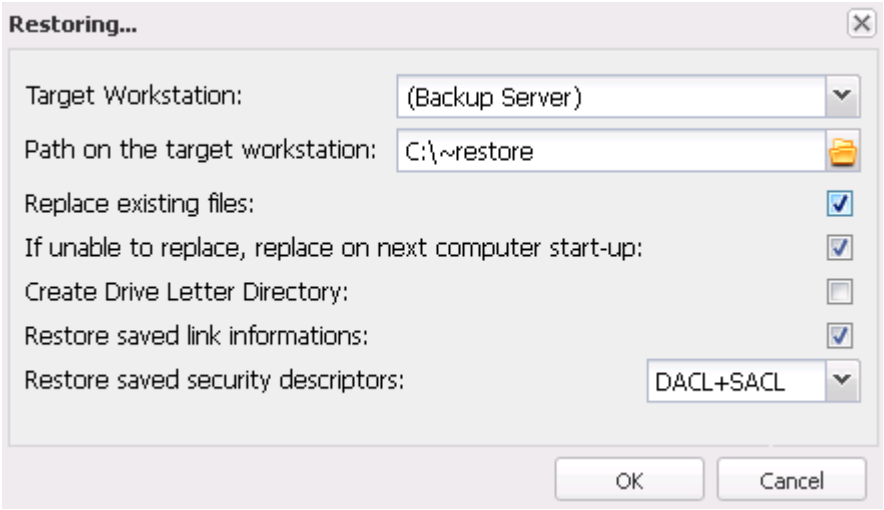


Fig. 3.2 FBS Server - Data restore - options

  - Destination Path – use this to define a location where to unpack files. Where network location is selected (Original Location or Selected Workstation) files are unpacked to a temporary directory located on backup server and then sent to the workstation. FBS Worker receives files at the workstation's end and saves them in a target directory.
    - Original Location – use this to restore files to their original location
    - Selected Workstation – use this to restore files to a selected workstation
    - (Backup server) – use this to unpack files to a local backup server directory

- Create drive letter directory – use this to add a drive letter directory to the original path. Example:

Original path	Destination path with “Create drive letter directory” on	Destination path with “Create drive letter directory” off
C:\Program Files\	F:\C\Program Files\	F:\Program Files\

- Replace existing files – use this to overwrite existing files without asking for confirmation. If this option is not selected, existing files are skipped.
- If a file cannot be replaced, switch the file on reboot – if a given file is used during restore and cannot be overwritten, the program will copy the file to the target location with a temporary “.fbr” file extension and add a relevant entry in the system registry:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\
  Session Manager\PendingFileRenameOperations
```

  Based on this entry, the operating system will delete the locked file and replace it with an “.fbr” file on reboot. A list of files to be restored on reboot is saved in the Event Log.

- Restore link information - restores file and directory link information, if the option Process link information was enabled during backup.
- Restore security descriptors - restores file and directory security descriptors, if the option Process security descriptors was enabled during backup.
  - No - skips restoring of descriptors
  - DACL - restores the Discretionary Access Control List
  - SACL - restores the System Access Control List
  - DACL+SACL - restores both access control lists

  The selected items will be saved in a designated location, preserving the original directory tree layout, file modification date and file attributes.

- Show tasks in progress - shows the number of active tasks to restore. The list of tasks to restore is displayed after clicking the button. After selecting a task, it is stopped.
- Search – use this to search for files and directories with a particular name in a selected backup task. In full tasks only a full backup is searched. For differential tasks, the selected differential backup is searched as well as all previous backups linked to it. Wildcards may be used for search.

See also:
Restoring operating system or entire disk partition from backup copy

4. FBS Server - Network monitor

The Network Monitor tab is used to monitor the operation of the TCP server. It includes two information fields, buttons to stop and launch the TCP server and buttons to load a virtual command line on the backup server and workstations.

The Server Statistics window on the left-hand side displays the following information:

- Computer name (server) - NetBIOS or DNS of the computer on which the FBS Server is running (see: Backup server).
- System version - name and number of the version of the operating system installed on the backup server
- IP address - Internet Protocol (IP) address of the computer on which the FBS Server is running
- TCP port - number of the TCP port on which the FBS Server awaits for the connections from workstations (usually 4531)
- Server version - the version number of the software of the FBS Server launched on the backup server
- Client version - the version number of the software of the FBS Worker, available on the backup server
- Launch – date and time of TCP server launch
- Status – current status of TCP server
- Active connections - number of workstations connected with the server. The number of connections in progress (when the server and a workstation are still negotiating a connection) can be displayed in brackets.
- Inactive connections - number of workstations defined in the Backup tab which have not established connections with the server.
- Licensee - name of the user entitled to use the program
- Maximum number of connections – the maximum number of remote computers that can connect to the server. Maximum number of connections depends on the purchased license (number of stations). In the evaluation version it is 2, which means that only 2 workstations can connect to the server. Exceeding the connection limit by installing the FBS Worker on more workstations than permitted in the license will shut down the TCP server.
- Download rate - displays the current rate at which data is being downloaded from workstations

When you install the FBS Worker on workstations you need to state the name or address of the server. Those name and address details are displayed here (Computer name, IP address).

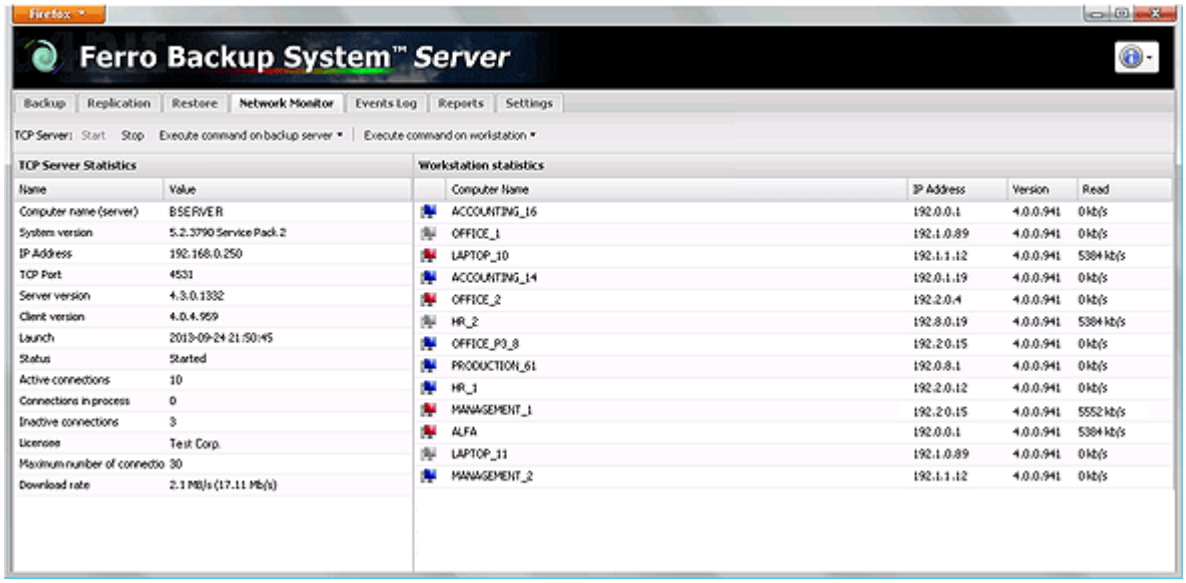


Fig. 4.1 FBS Server - Network monitor.

The window Active Workstations, located on the right-hand side, contains a list of workstations currently connected to the server and a handful of useful details such as:

- Name - NetBIOS or DNS of the workstation
- IP address - Internet Protocol (IP) address of the workstation
- Version – version of the FBS Worker software installed on the workstation.
- Read rate - displays the current rate at which data is being read from workstations

The following commands are available in the Network monitor tab:

- Start - Launching of the TCP server. The TCP server is launched and waits on port 4531 for incoming connections initiated automatically by the FBS Worker software installed on workstations. The Launch command is executed automatically when the FBS Server is run.
- Stop – this disconnects all workstations and shuts down the TCP server. This command is initiated automatically when the FBS Server software is stopped.
- Execute command on backup server - provides access to the virtual command line on the backup server. The Menu contains a list of most frequently used commands, including System Information, List of processes, Network Connections
- Execute command on workstation - provides access to the virtual command line on the workstation. The Menu contains a list of most frequently used commands, including System Information, List of processes, Network Connections

5. FBS Server - Event log

The Event log enables you to make sure the System is operating correctly and to search for the causes of any problems. The Log tab makes it possible to systematically monitor all generated events pertaining to the operation of the whole System(the server and workstations), such as errors, warnings and notifications. All recorded events can be filtered according to event type and computer name to which the notification referres.

The event list shows the following information:

- Event type (icon) – specifies the event type. Three types are available: error, warning, notification
- Station – name of the workstation or server component (marked with #)
- Time – date and time of event
- Task – backup task name (or empty)
- Event – event description (message)
- Operation - type of operation during which the event has been generated

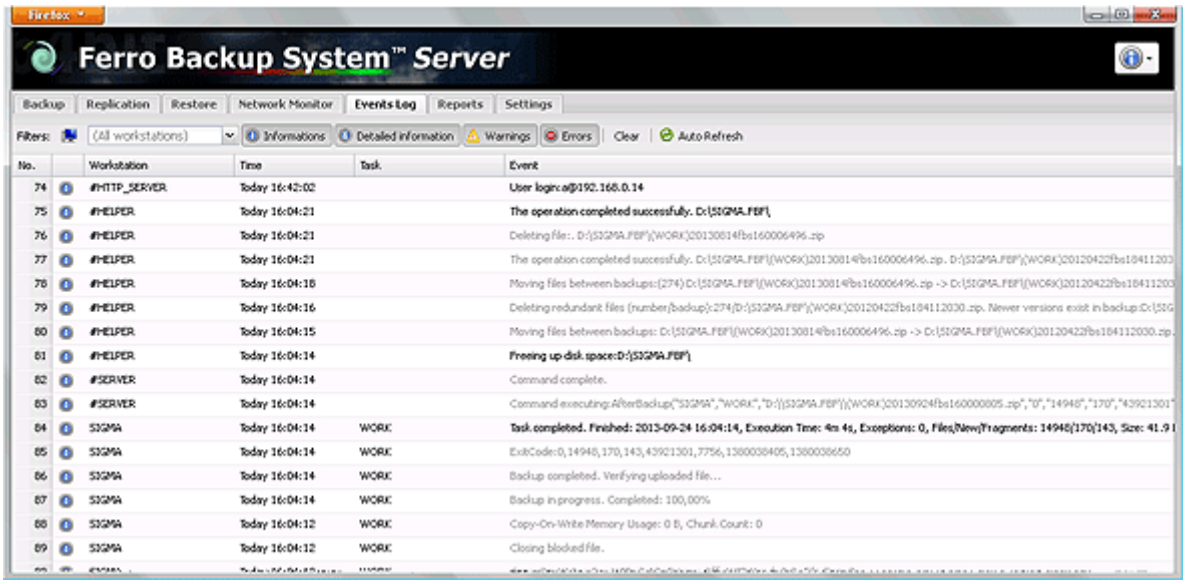


Fig. 5.1 FBS Server - Event Log.

The event list can be filtered according to event type and computer name. Events which do not meet the criteria defined in the filter(s) are not displayed. Regardless of filter settings, however, all events are always logged in the event log.

Available commands (from left):

- Filter - use this to enable or disable entry filtering.
- Show Details – use this to see detailed entries. By default, detailed information on backup and auxiliary operations progress is hidden (this is not applicable to errors and warnings, which are always shown). When this option is activated, all entries are shown.
- Clear - clears the whole event history saved in the database. Events will be removed when the FBS Server is launched again. It is recommended to clear the event log regularly to increase system performance.
- Auto Refresh – if you turn this on, the event list will be scrolled automatically to the last logged event. Turning it off will enable you to view the whole history of logged events. If you do not analyze the contents of the event log, it is recommended to switch this off to reduce server load.

6. FBS Server - Reports

Reports enable the System's activities to be analysed quickly and easily. With reports it is no longer necessary to constantly monitor the System and analyze the Event Log. Reports are generated in HTML format and then uploaded to the Internet Explorer window in FBS Server. Using Administrative alerts, reports can be automatically generated and sent to a designated email address or FTP/web server.

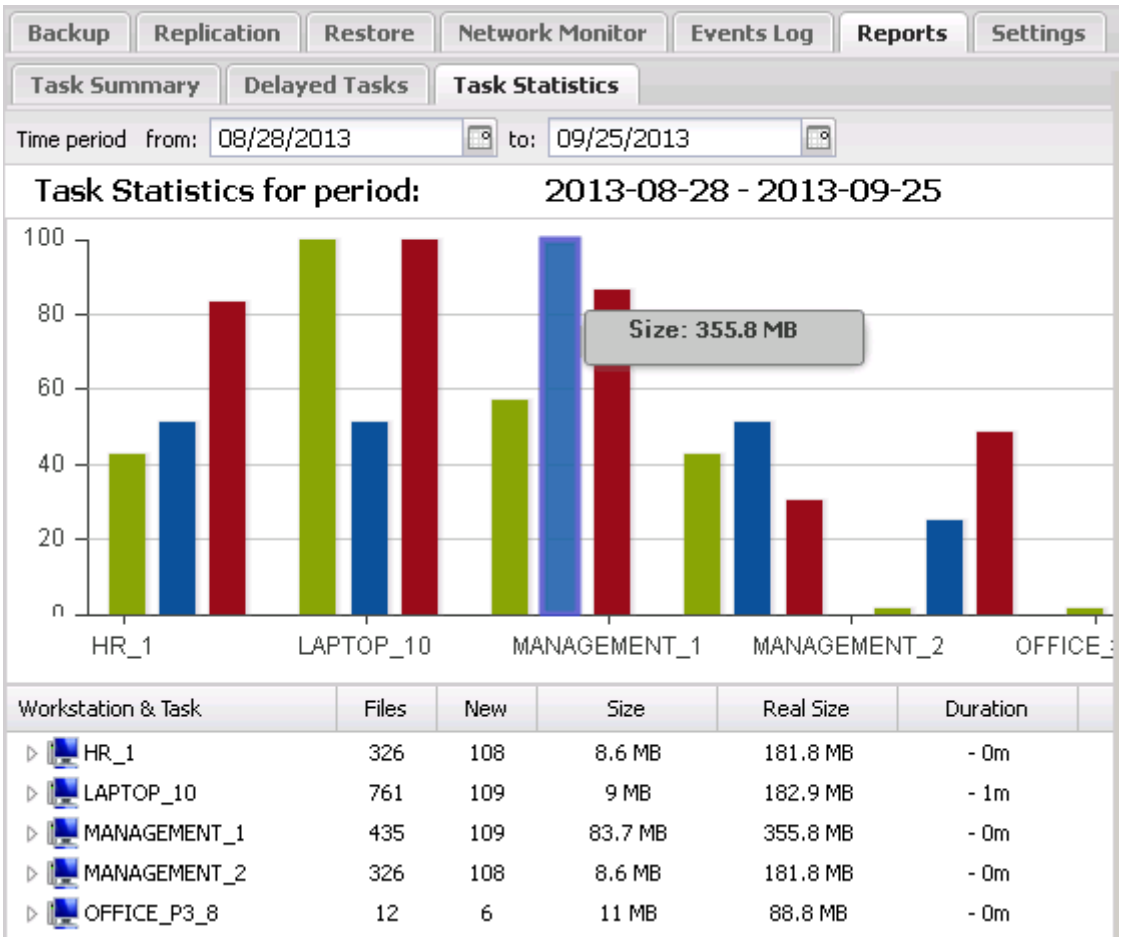


Fig. 6.1 FBS Server - Backup reports

Three types of reports are available. They are described in table 6.1.

Report name	Overview
Task summary	Displays the following details for every workstation and every task: number of scheduled tasks, number of tasks completed successfully, number of tasks failed, percentage of successful tasks, number of tasks “in progress”, number of warnings, and status. For backup tasks which yielded errors or warnings, additional records are displayed showing error or warning details. Only scheduled tasks – i.e. tasks which have been properly scheduled - are included in the report.
Delayed tasks	Displays information about scheduled backup tasks which have not been completed. For each delayed task the process shows the length of the delay and the number of failed attempts. Additional records explain causes of failure. Only scheduled tasks – i.e. tasks which have been properly scheduled - are included in the report.
Task statistics	This shows summary statistics for each workstation and each backup task and detailed statistics for a specified backup task. Each record shows the size of the completed backup archive, the number of files backed up, the number of new files in a differential archive, task duration and the average data transfer rate.

You can set time intervals for each report. For example, in the “Delayed tasks” report you can choose to display only tasks which have not been completed for a specified number of days, weeks or months. In the “Task summary” and “Task statistics” reports you can define a time interval for data analysis.

7. FBS Server - Backup server settings

The Settings tab enables you to configure the basic settings for backup server, define archive encryption passwords, set administrative alerts, map network resources and create scripts to extend the program's functionality.

7A) Basic

- Main Backup Location – this field should specify the full path of the backup copy (ZIP files) location. If the specified directory does not exist, it will be created automatically on the first reference to that directory. If the path is invalid (it points to a missing drive or contains invalid characters), an error message will be shown and the server will be stopped. The directory will include FBF subdirectories for all workstations.
  The main backup storage location can be changed in the Workstation Settings window, setting a different path for each backup task (different hard disk or disk array).
  ⚠ *In order to ensure adequate performance, the backup storage directory should be located on a local hard disk or an internal disk array (RAID). Using network disks is not recommended. A network disk can be used as an additional storage location. For details see: Replication..*

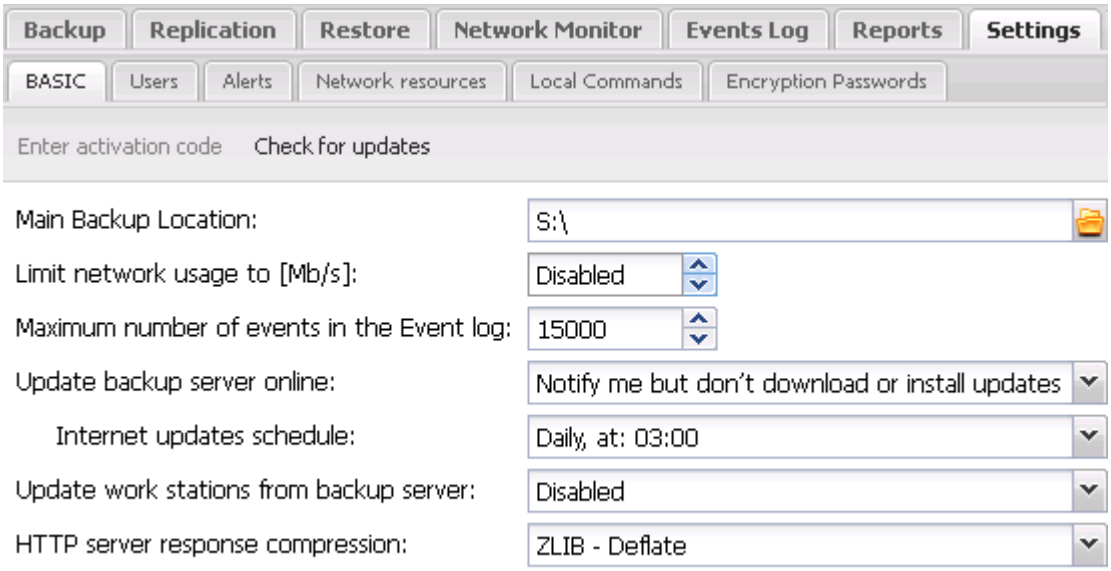


Fig. 7.1 FBS Server - Basic settings for backup server

- Limit network load – you can set the maximum computer network load here.
  See also: Limit connection speed for a selected workstation
- Maximum number of Event Log entries – use this option to limit the amount of information stored in the Event Log and so reduce the FBS Server launch time.
- Update backup server online *(see also: Program installation and update)*
  - Disable - deactivates backup server automatic updates
  - Notify me but don't download updates - the program will, at a given time, check if a newer program version is available online. If a newer version is available, a warning will be recorded in the Event Log, stating that the installed version is not up to date.
  - Automatically download and install updates - the program will, at a given time, check if a newer program version is available online. If a newer version is available, the program will automatically download and install the update. The program update process can be postponed if the program is performing other tasks or the user is working on the computer.
- Update work stations from backup server
  - Disable - deactivates work stations automatic updates
  - Enable - enables automatic software updates for work stations. The update is executed while connecting the work station to the backup server. After backup server (FBS Server) software installation (manual or automatic), the current work station software version (FBS Worker) is also stored on the server. The server sends a software copy to a work station while establishing a connection. The work station installs the new software version. While executing the update, the work station disconnects itself from the backup server for about 1 minute. The program update process can be postponed if the program is performing other tasks (backup).
- HTTP server response compression -turns on or off ZLIB-Deflate compression used by the HTTP server embedded in FBS Server. Enabling compression may increase the loading speed of the control console through an Internet browser.

- Enter activation code - displays a dialog that enables to enter the activation code to the licence key. When the correct key is entered, the program is registered and in the Network Monitor tab the licensee name and purchased number of hook ups will be displayed. If this option is inactive, it means that the program has already been registered.
- Check for the updates - FBS Server checks for the latest updates on the Internet. If an update is available, a new instruction will be displayed: Download and Install. When the update is finished, FBS Server will download a new version of the program

on the backup server, then it will install it and restart FBS Server service.
See also: Automatic updates and program installation and update

7B) Users

Here you can create user accounts for accessing FBS Server control console. If there is no account, the access to the console is not protected and everyone gets an administrator access.

- Account type - access account may have the following privileges:
  - Administrator - an account with full privileges for control console
  - Operator - an account with privileges for controlling data backup and restore but without privilege to change program settings
  - Observer - an account with backup and restore process supervision but without privileges to control them or change program settings.
  - Workstation user - an account with permissions to control backup and to recover data only for the workstation which the connection comes from. Logging in to this account is possible when:
    - the name of the workstation is the same as the username
    - the workstation is connected to the backup server
    - the computer IP, which logging in to the console is made from, is the same as the workstation IP
- User - any username. The field is not case sensitive
- Password - access password. The field is case sensitive
- Comment - account description

- Add - creates a new account
- Modify - enables to change the settings
- Delete – removes selected item from the list
- Logout - ends current session. This command is also available in the menu located in the upper right corner of the screen
  - Log everyone out - ends all sessions and releases HTTP server resources

7C) Administrative alerts

Administrative alerts are notifications including reports or chosen messages of the Event Log, which can be scheduled to be sent to designated email addresses or web servers (see: FTPUSE command).

- Enabled - it means alert generating is on
- Name - any alert name. It is used as subject in an e-mail message
- Type – alert type
  - Event Log entries
  - Report Summary of tasks
  - Report Delayed tasks
- Parameters - settings for chosen type of alert
- Schedule - how often the alert should be sent
- Next time limit - defines the time of the next alert to be sent
- Send empty - if this option is enabled, the alert is always sent at the same time. If this option is disabled, an alert is sent at a precise time only if it contains some data, e.g. for an alert Event Log entries with Error parameter, an alert will be sent only if since the last sending off, some events with Error status have been entered into the Event Log.
- Send to – email address or target directory (located, for example, on a web server)

- Add – creates new alert
- Modify - allows to change selected alert
- Delete – deletes selected alert
- Send now – a button to test current settings - test sending of alert

7D) Network Resources

In the Network Resources tab, define all UNC paths, mapped network disks and FTP server disks to be used by FBS Server in one of these locations:

- backup location
- target replication directory

- record path of administrative alerts

It is necessary to configure network resources directly in FBS Server, because drives and network connections put together in various login sessions are not available for system services, such as FBS Server, which operate in separate sessions. Adding network resources is necessary only when a resource is available through SMB protocol (Samba/ Network environment). If iSCSI is used, defining network resources in the program is not needed.
See also: Using NAS hard drive for data backup

- Add – adds a new network resource to the list. The following types of network resources can be added:
  - Mapped network disk – resource available in LAN, mapped to a local disk letter of backup server
  - Mapped FTP serve share– FTP server resource mapped to a local disk letter of backup server
  - Network share – network resource available through UNC path
- Modify - enables to change the settings
- Delete – removes selected network resource from the list
- Connect – connects the selected network resource
- Disconnect – disconnects the selected network resource
- Connection status - executes command NET USE on the backup server and returns a result in the virtual command line window.

Network resources are connected automatically when FBS Server is trying to access a given network resource – before backup, before replication, before sending an administrative alert or before opening a dialog for selecting the target directory. If a connection attempt is unsuccessful, the current operation that requires access to a given resource will be interrupted, and a relevant error will be entered in the Event Log. The minimum interval for reattempting to connect is 60 seconds. This limit is not used for manual connection (Connect button).

A local system account on which the FBS Server is installed by default and does not have access privileges to network resources. Therefore it is necessary to switch the FBS Server service to an account which has such privileges (e.g. an administrator account) or to set relevant privileges for the Local system account. This can be done from the MMC Services console (Control panel->Administrative tools->Services).

7E) Local commands

Local commands allow to extend functionalities of FBS Server. They enable automatic running of external programs, scripts or input files, perform operations on files, use ActiveX components, control Active Directory services etc.

Local commands are built on the basis of FBS Server infrastructure Windows Script. FBS Server, like Windows Script Host (WSH) or Internet Explorer, is a script host independent from the language. Local Command scripts have access to Microsoft ActiveX (COM) components, Application Programming Interfaces (API) for Windows Management Instrumentation (WMI) and ADSI as well as additional functions integrated in FBS Server.

Available commands:

- New – deletes the current script
  - A new script with event template – deletes the current script and loads a template for a selected language with definitions of all the events available
- Language – choose a script language
- Test – check the script syntax as a whole and run a procedure indicated in procedure launch edit field, on the right hand side. The code is executed on the backup server with account privileges on which FBS Worker runs.
- Stop – stop running the script
- Procedure launch edit field – used to provide the name of the procedure to be run (test run), along with all the parameters to be sent to the procedure. A syntax as per the script language chosen must be used in this field.
- Script to be executed on backup server - space for script code. The Local Commands code can be written in any (previously selected) script language installed in the operating system on the backup server. By default, two Active Script engines are available in Windows: JScript and VBScript. To use other script languages, first install an engine for a given language in the operating system. The most commonly used script languages are: JScript, VBScript, Perl, PHP, Python, Ruby, Object Pascal, Forth, Haskell, TCL.

Events
Local Commands use an events mechanism. FBS Server generates events in a given program operating status and runs a procedure to handle this event as defined by the administrator in Local Commands. For example: “BeforeBackup” event is generated before backup and control is transferred to “BeforeBackup” procedure. If the procedure to handle an event has not been defined, FBS Server will not generate the event.

A procedure to handle an event is a code fragment (procedure or function) defined in the chosen script language. Sample procedures to handle “BeforeBackup” event:

```
function BeforeBackup(Comp, Task, File) {
```

```
  if (Comp == 'SERVER_BB')
    SScript.Echo('Task name:' + Task);
}
```

All the available events along with declarations of procedures to handle events and parameters are described below in detail.

- **OnStart**
  An event generated when starting the program
  - Declaration
    OnStart(AppType)
  - Parameters
    AppType - a number that specifies the program running mode. This parameter may have the following values.
    - 0 – system service
    - 1 – user application
  - Example
    Copy a directory using a FileSystemObject

```
function OnStart(AppType) {
  var fso = new ActiveXObject("Scripting.FileSystemObject");
  fso.CopyFolder("c:\\wmpub", "d:\\");
}
```

- **OnStop**
- An event generated when shutting the program
  - Declaration
    OnStop(AppType)
  - Parameters
    AppType - a number that specifies the program running mode. This parameter may have the following values.
    - 0 – system service
    - 1 – user application

- **BeforeBackup**
  An event generated before backup
  - Declaration
    BeforeBackup(Comp, Task, File)
  - Parameters
    Comp - a string of characters that specifies the computer name
    Task - a string of characters that specifies the backup task name
    File - a string of characters that specifies the path and target file name (ZIP archive)
  - Example
    Shutting down the system service and completing the process

```
function BeforeBackup(Comp, Task, File) {
  SScript.Run('sc config srv_name start= disabled');
  SScript.Run('taskkill /im process_name /f');
}
```

- **AfterBackup**
  An event generated after backup
  - Declaration
    AfterBackup(Comp, Task, File, Error, Files, NewFiles, ArchiveSize, UncompressedSize)
  - Parameters
    Comp - a string of characters that specifies the computer name
    Task - a string of characters that specifies the backup task name
    File - a string of characters that specifies the path and target file name (ZIP archive)
    Error - a number that specifies the backup result. This parameter may have the following values.
    - 0 – backup successfully completed
    - different than 0 – backup error

    Files - number of files in the backup
    NewFiles - number of new or modified files in the backup. If the value of this parameter is equal to Files parameter value, it means that this copy is a full copy.
    ArchiveSize - ZIP file size
    UncompressedSize - overall size of all the files in the backup after decompression
  - Example
    Saving the list of files contained in a backup copy (ZIP archive) when using 7-Zip. 7-Zip is run from the command shell (CMD) to forward the standard output stream from the screen to the file.

```
function AfterBackup(Comp, Task, File, Error, Files, NewFiles, ArchiveSize, UncompressedSize) {
  if (Error == 0)
    SScript.Run('cmd /c 7z l "' + File +'" >"' + File + '.txt"');
  if (Files == NewFiles)
    SScript.Echo('Full backup exectuted');
  else
    SScript.Echo('Differential backup executed');
}
```

- **BeforeReplication**
  An event generated before replication
  - Declaration
    BeforeReplication(Comp, Task, RepType, DestPath)
  - Parameters
  - Comp – a string of characters that specifies the computer name. An empty string means a replication for all computers
    Task - a string of characters that specifies the backup task name. An empty string means a replication of all backup tasks for a given computer
    RepType - a number that specifies the replication type. This parameter may have the following values.
    - 1 – replication into a disc medium
    - 2 - replication into an optical medium
    - 3 - replication into a tape medium

    DestPath - a string of characters that specifies the access path to the target directory (1) or the device name (2,3)
  - Example
    Change a medium in a tape drive using RSM command

```
function BeforeReplication(Comp, Task, RepType, DestPath) {
  if (RepType == 3) //MTD
    SScript.Run('RSM MOUNT ' +
      '/PF"MEDIA_NAME" /CF"CHANGER_NAME" /OREADWRITE');
}
```

- **AfterReplication**
  An event generated after replication
  - Declaration
    AfterReplication(Comp, Task, RepType, DestPath)
  - Parameters
    Comp – a string of characters that specifies the computer name. An empty string means a replication for all computers
    Task - a string of characters that specifies the backup task name. An empty string means a replication of all backup tasks for a given computer
    RepType - a number that specifies the replication type. This parameter may have the following values.
    - 1 – replication into a disc medium
    - 2 - replication into an optical medium
    - 3 - replication into a tape medium

    DestPath - a string of characters that specifies the access path to the target directory (1) or the device name (2,3)
  - Example
    Eject medium from a tape medium using RSM command

```
function AfterReplication(Comp, Task, RepType, DestPath) {
  if (RepType == 3) //MTD
    SScript.Run('RSM eject /pf"MEDIA_NAME" /astart');
}
```

- **OnReplicationError**
  An event generated after an error has occurred during replication
  - Declaration
    OnReplicationError(Comp, Task, RepType, DestPath, Error)
  - Parameters
    Comp – a string of characters that specifies the computer name. An empty string means a replication for all computers
    Task - a string of characters that specifies the backup task name. An empty string means a replication of all backup tasks for a given computer
    RepType - a number that specifies the replication type. This parameter may have the following values.
    - 1 – replication into a disc medium
    - 2 - replication into an optical medium
    - 3 - replication into a tape medium

    DestPath - a string of characters that specifies the access path to the target directory (1) or the device name (2,3) This parameter can have values of system error codes. Example:
    - 11 - (ERROR_BAD_FORMAT) a medium has not been formatted
    - 1100 - (ERROR_END_OF_MEDIA) no space on the medium
    - 1112 - (ERROR_NO_MEDIA_IN_DRIVE) no medium in drive

    A full list of error codes for Windows is available on page: System Error Codes
  - Overview
    If an error has been handled, the true (1) value must be returned. In that case, the last replication will be retried. If the same error occurs when the operation is retried, replication will be interrupted (OnReplicationError event will not be generated again). If the false (0) value is returned, replication will be interrupted.
  - Example
    Format the tape if it has not been formatted or if it is full

```
function OnReplicationError(Comp, Task, RepType, DestPath, Error) {
  if (Error == 11 | Error == 1100) {  //BAD FORMAT or END OF MEDIA
    SScript.TapeFormat(false, 'NEW_TAPE_NAME');
    return true;
  }
}
```

FBS Server (or more precisely: a thread that generated the event) is suspended until the script operation is completed. Script running duration is limited by default to 3 minutes. When this limit is exceeded, the script is interrupted and FBS Server is resumed. (The running time limit can be redefined within the script using SScript's Timeout property)

SScript (server script) is an object integrated in FBS Server. It is a global object, created automatically, available from any location within the script. SScript is an equivalent of WScript integrated in Windows Script Host. It provides access to several useful methods and properties which are described in detail below.

- **Echo**
  The method saves a given text in the Event Log
  - Definition
    Echo(EventText)
  - Parameters
    EventText - a string of characters to specify an event text
  - Example
    Information is saved in the Event Log

```
SScript.Echo('Text');
```

- **Log**
  The method saves a given text in the Event Log and marks the entry as information, warning or error
  - Definition
    Log(EventType, EventText)
  - Parameters
    EventType – a number to specify the event type. This parameter may have the following values.
    - 0 - information
    - 1 - warning
    - 2 - error

    EventText - a string of characters to specify an event text
  - Example
    Information is saved in the Event Log

```
SScript.Log(1, 'Text');
```

- **TapeFormat**
  The method formats a tape medium in FBTF
  - Definition
    TapeFormat(Full, MediaLabel)
  - Parameters
    Full – a logical value to specify the formatting type. This parameter may have the following values.
    - 0 (false) – fast formatting
    - 1 (true) – full formatting

    MediaLabel – a string of characters to specify the media label
  - Example
    Fast tape formatting

```
SScript.TapeFormat(false, 'NEW_TAPE_LABEL');
```

- **Sleep**
  It suspends script operation for a given time
  - Definition
    Sleep(intTime)
  - Parameters
    intTime – an Integer number to specify a period expressed in milliseconds during which a script is to be suspended.
  - Example
    Script operation suspended for two seconds

```
SScript.Sleep(2000);
```

- **Run**
  It runs a given program
  - Definition
    Run(Command, WindowStyle, WaitOnReturn)
  - Parameters
    Command – a string of characters to specify the command line to be executed. It may contain a full access path or just the program name. The program name may be followed by additional characters, which will be sent to the program as parameters. If the path is not specified, the program must be located in a path stored in PATH environmental system variable. WindowStyle – an Integer number to specify the way in which to display the window of the program being run.

This parameter may have the following values.
- 0 (SW_HIDE) - hidden
- 1 (SW_NORMAL) - default
- 2 (SW_SHOWMINIMIZED) - minimized
- 3 (SW_SHOWMAXIMIZED) - maximized

WaitOnReturn – a logical value to specify script behavior after starting the program. This parameter may have the following values.
- 0 (false) – starts the program and continues script operation
- 1 (true) - starts the program and waits until its shutdown before it continues to run the script

- Example
  A program is run in the maximized mode without waiting until an operation is finished

```
SScript.Run('notepad.exe', 3, false);
```

- **Timeout**
  It specifies the maximum script completion time
  - Definition
    Timeout
  - Value of the properties
    It retrieves or sets the maximum script completion time expressed in milliseconds. The default is 180000 ms. If the limit is exceeded, an exception will be generated and script execution will be stopped.
  - Example
    Script completion time limit extended to 30 minutes

```
SScript.Timeout = 30 * 60 * 1000;
```

- **StdOut**
  It returns the contents of a standard output stream
  - Definition
    StdOut
  - Value of the properties
    A string of characters containing data of a console program's standard output stream
  - Example
    A file copied using copy command and a standard output stream entered in the Event Log

```
SScript.Run('cmd /c copy c:\\Log.txt D:\\', 0, true);
SScript.Echo(SScript.StdOut);
```

Additional automation objects
SScript is the only object integrated in FBS Server. However, any automation objects (OLE) can be used in Remote Commands. Access to other objects is made available in a manner specific to each script language. By example, for JScript language, you need to call ActiveXObject; for VBScript - CreateObject. Here follows a list of the most common used automation objects.

- FileSystemObject
  A group of objects for managing discs, directories and files
  - Automation server name: Scripting
  - Class name: FileSystemObject

- WshShell
  An object used to run programs, manage the system register, create shortcuts, etc.
  - Automation server name: WScript
  - Class name: Shell

- WshNetwork
  An object used to map network discs and printers, connect network resources and to read the computer name, domain name and user name
  - Automation server name: WScript
  - Class name: Network

Useful information:

- List of error codes
- JScript language details
- VBScript language details

See also: Remote Commands

7F) Encryption passwords

Here, you can enter passwords, used by the System to encrypt data during backup and decrypts them during data restore. If no password is defined, backup is not encrypted even if in an Encryption algorithm for the settings of backup has been chosen.

- Type of password - this field can contain the following:
  - Encryption and decryption - password is to encrypt and decrypt backup files
  - Decryption - password is to decrypt backup files only
- Password - password to encrypt or decrypt backup The fields are case sensitive
- Creation date - date of entering the password on the list
- Comment - any entry

- Add - creates a new password
- Delete – removes selected item from the list

  Note. Deleting a password used to encrypt an archive will make subsequent restoration of information from that archive impossible.
- Set as current encryption password - changes the allocation of the password from decrypting to encrypting and decrypting

Multiple decryption passwords and one encryption/decryption password can be defined.

See also: Workstation settings - File encryption method

8. FBS Server - startup, stop and diagnostics

The FBS Server can be launched as a system service or , in an emergency, in user application mode.

8A) Program startup in the system service mode

Working as a system service is the main operating mode configured for automatic execution of backup of FBS Server. The service is launched automatically at the system startup.

Manual launching and stopping of FBS Server can be executed by:

- MMC service console (Control panel -> Administrative tools > Services -> FBS Server)
- commands such as NET START, NET STOP with FBSServer, such as NET START FBSSERVER
- running the FBSServer.exe with a parameter /START or /STOP, e.g. FBSServer /START

Once started, the service works in the background, by default, on a local system account. FBS Server control console is available by an Internet browser.

If there are any problems running the service or the service shuts down, read: Launching program in the diagnostics mode.

8B) Launching program in the diagnostics mode

If there are any problems running the FBS Server service or the service shuts down, launch program in the diagnostics mode. To do that, on the backup server, run the command line, go to the directory where the device is installed and write the following command:

```
FBSServer /debug
```

If the program launches correctly in diagnostic mode, you should load control console and then, go to the Events Log and diagnose the problem with launching services, by searching for the last errors reported by the program.

If the program does not launch in diagnostic mode and reports an error related to the database, launch a program with a parameter /repairdb, in order to repair a damaged database: FBSServer /repairdb

```
FBSServer /repairdb
```

If the operation of repairing database fails or the program running in diagnostic mode reports another error, contact technical support.

8C) Solving control console access problems

If an Internet browser cannot load the control console page, do the following:

- check if IP address or computer name is written in the Internet browser bar, and the number of connection port (4530) is correct. Checking if the IP address or network name are correct can be made by a PING command:

  ```
  ping NAMEADDRESS_OR_ NAME OF THE BACKUP SERVER
  ```

- check whether the network firewall on the backup server does not block incoming connections to TCP 4530 port. TCP 4530 port is on the backup server and is open for incoming messages. For diagnostics, the firewall or an anti-virus application may be temporarily switched off.
- check whether the network firewall on the computer on which an Internet browser was launched, does not block outgoing connections on port TCP 4530. TCP 4530 on a remote computer must be open for outgoing connections. For diagnostics, the firewall or an anti-virus application may be temporarily switched off. check if the connection with a given computer on specified port is correct and may be done by TELNET command:

  ```
  telnet BACKUP_SERVER_NAME_OR_IP 4530
  ```

- check if the Internet browser is new and if security settings in the browser do not block JavaScript. In order to make the control console work properly, it may be necessary to add backup server address to the list of trusted sites.
- check whether FBS Server service is launched on the backup server

If all the above mentioned testing steps have successfully been executed and still there is no connection with the control console, please contact the technical support.

9. FBS Server – syntax and command shell parameters

Syntax:

FBSServer [/install | /uninstall] | [/start | /stop] | /repairdb | /debug

Parameters:

without parameters

runs FBS Server in the user application mode and opens a console used to configure and monitor the System

/install

installs FBS Server as a system service (automatic startup, SYSTEM account)

/uninstall

uninstalls FBS Server service

/start

runs the FBSServer service

/stop

stops the FBSServer service

/repairdb

repairs program database corruptions

/debug

starts the program in the diagnostics mode

User manual for the Ferro Backup System™ - Worker

FBS Worker is a small program (140 kB) which, when requested by the server, makes backups of files, folders or entire drives and sends the resulting backup copy to the server. The backed-up information may be compressed and encrypted. The compression process is carried out “on the fly” while the file is being sent (no temp files are created), which is why backups can be performed even when there is not enough space on the workstation’s disk. The encryption process is also performed locally on the workstation, which significantly improves the security of transmitted information.

FBS Worker is ready to use right after installation. The program is launched automatically during system startup. No additional configuration is needed. The remaining information in this text is for IT specialists only.

1. FBS Worker - description of available configuration file options

See below for a sample configuration file FBSWorker.ini, which the program uses to load its settings during startup. Changing default settings is not required to ensure correct System operation.

```
;FERRO Software Ferro Backup System - Worker
;Config file
;02-02-2007


[CONNECTION]
;Description: name or IP address of a computer running FBS Server
;Comments: empty string means the host name is assigned to a local host (127.0.0.1)
HOST=localhost



;Description: TCP port, used to connect to the server
;Range: 1 - -65535
;Default: 4531
;Comments: currently this must be set to 4531.
PORT=4531



;Description: interval between subsequent server reconnect attempts
;Unit: millsecond [ms], Range: 0 (no delay) - 16777216
;Default: 4000
RECONNECTINTERVAL=4000
```

In order to change the settings, open the FBSWorker.ini file in any text editor (Notepad, WordPad), and then save it as text. Changes made will only take effect after the program is launched again.

- CONNECTION - HOST
  This is where the name/IP address of the backup server is stored (of the computer on which the FBS Server is launched), as entered by the user during program installation. If during the use of the System the FBS Server is moved to another computer or if that computer’s name or IP address changes, the user can change the server location in this field to the correct one. Changing this field manually will have the same effect as launching the installer and reentering the name/IP address during the installation of the FBS Worker.

- CONNECTION - PORT
  Number of the TCP port used to connect to the server.

- CONNECTION - VIRTUALNAME
  Alternative name of the computer under which it will be available on the backup server. FBSServer uses names (rather than IP addresses) to identify workstations. If the local network is divided into two or more subnetworks with duplicate workstation names, only one workstation will be connected to the backup server; no subsequent workstations of the same name will be available in the FBS Server control console. In order to resolve this issue change the default name on computers with duplicate names: VIRTUALNAME=NEW_NAME

  Information. The computer name should not be longer than 15 characters.

Other FBS Worker module settings can be configured remotely from the FBS Server console (tab Workstation settings)

2. FBS Worker - startup

The FBSWorker.exe can be launched as a system service or user application.

System service
Working as a system service is the main operating mode configured for automatic FBS system backup.

The FBSWorker service can be launched and stopped by:

- going to the Services console (Control panel -> Administrative tools -> Services)
- running NET START, NET STOP commands using the FBSWorker parameter
- running the FBSWorker.exe using the /START or /STOP parameter

Once started, the service works in the background, by default on a local system account. If there are any problems running the service or the service shuts down, launch the FBSServer as an application and view the system Event Log.

Application mode
When run as an application, the program functions exactly the same as in system service mode, but is stopped when the user logs out of the system. In addition, if the program is working in this mode, the following text will be displayed in the FBSServer console: "FBS Worker operating in the emergency mode".

To run the program as an application, run FBSWorker.exe directly without any parameters.

3. FBS Worker - syntax and command shell parameters

Syntax:

FBSWorker [[/install [/force] | /uninstall] [/hostname:n] [/silent]], [/start|/stop]

Parameters:

without parameters

Runs the FBSWorker in the user application mode (emergency mode)

/install

Installs the FBSWorker as a system service (automatic startup, SYSTEM account)

/uninstall

Uninstalls the FBSWorker

/hostname:backup_server_name

During installation, a configuration file of the FBSWorker program will be created, which will contain the name (or IP address) of the backup server. During the uninstall operation using this parameter followed by an empty string (space) after the colon will delete the configuration file from the disk

/force

Used with the /install parameters, forces the installation of the FBSWorker service on a disk other than the local disk. This is for diagnostic purposes only

/silent

When used with the /install or /uninstall switch, the dialog showing FBSWorker install or uninstall progress will not be displayed

/start

runs the FBSWorker service

/stop

stops the FBSWorker service

4. FBS Worker - Solving connection problems

The FBS Worker application is launched automatically upon system startup and, at selected intervals (the RECONNECTINTERVAL option), attempts to reconnect to the selected computer (the HOST option) using the TCP 4531 port. When the connection is established, the computer's name and IP address are displayed on the list of active workstations in the FBS Server program in the Network Monitor tab.

If the FBS Worker fails to connect to the server:

- check if the FBS Worker is running in the Windows task manager (the FBSWorker.exe process)
- check that the HOST entry is correct in the FBSWorker.ini file
- check (for example using the PING command) that the computer on which the FBS Server is installed is available
- check that the TCP 4531 port is not blocked by any firewall software.

In order to diagnose why there is no connection between the workstation and the backup server, you can use the TCPCHK program available in the Download section.

4

Additional information

Contact and support

If you have any questions or suggestions, you can contact FERRO Software directly. We provided users of our products with comprehensive technical support on using our products by telephone and by email. All suggestions are read and considered.

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Glossary

Full backup
At all times, all files matching the selected masks are backed up

Differential backup
All files (matching the selected masks) are backed up for the first time. In each subsequent backup, only those files which have been created or modified since the last full or differential backup will be included.

File fragment differential backup
All files (matching the selected masks) are backed up for the first time. In each subsequent backup, only those files which have been created or modified since the last full or differential backup will be included. Files exceeding a certain size set by the user are divided into (virtual) fragments whose size is also defined by the user. Checksums (CRC) of file fragments are compared. If a given fragment has been modified since the last differential backup, it is included in the backup; otherwise it is skipped. This type of backup is recommended for large files (> 20 MB).

FBF directory
A folder whose name includes the name of the computer and the .FBF (Ferro Backup Folder) extension. It contains the archives (*.ZIP files) of a given workstation. Such folders are created automatically by the system in the archive directory set in FBS Server Settings tab.

Coherent (Integrity)
An integral file has a consistent structure for the software which uses it to store information. For database files integrity is ensured once all write transactions are completed.

File mask
name including wildcards used to refer to a group of files or folders.

Backup server
a computer with FBS Server installed

Workstation
any computer with FBS Worker installed, regardless of the function it has on the network (file server, office computer, portable computer, database server etc.).

Wildcard
a character entered using the keyboard, e.g. an asterisk (*) or a question mark (?) used to replace a character or a string of characters.

- Asterisk (*) - An asterisk replaces zero or more characters. If the expected file name is to begin with "word", type "word*". All files of all types beginning with the "word" string will be backed up or skipped, including Word.exe, Wordlist.txt and Wordy.doc. To back up (or skip) only selected file types, type: word*.doc. All files beginning with "word" and having a .doc extension will be backed up (or skipped), such as: Wordlist.doc and WordsAndSounds.doc.
- Question mark (?) - A question mark replaces one character in a file name. For example, typing "word?.doc" will back up (or skip) files like "words.doc" or "wordy.doc", but not "wordlist.doc".