

Aarhus Batch Inversion setup guide

Select Hosts for Inversion

Hosts (Available/Total CPUs)


- AGS07 1 / 2 CPUs
- AGS5 1 / 4 CPUs
- TokeRunner 4 / 4 CPUs

Running jobs

Name	User	CPUs	Inversion Type	Data Type	Queue Time	Host	Active Time	#Models
Toke_GCM_AE_I40_604040250	Toke	1	LCI	DTGCM	00:02:54	AGS5	00:02:48	15359
Toke_GCM_AE_I41_604066828	Toke	1	LCI	DTGCM	00:02:27	AGS5	00:02:21	15359
Toke_GCM_AE_I42_604090312	Toke	1	LCI	DTGCM	00:02:04	AGS07	00:01:58	15359
Toke_GCM_AE_I43_604112093	Toke	1	LCI	DTGCM	00:01:42	AGS5	00:01:36	15359

1 Number of processors

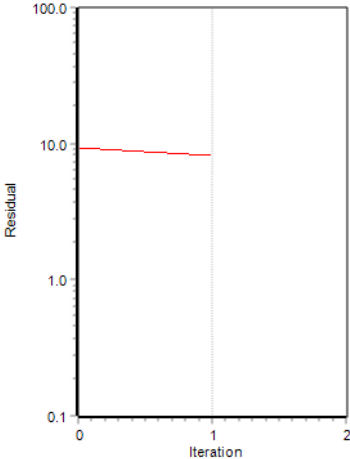
Aarhus Batch Inversion (AGS5 with 1 CPUs)



Aarhus Batch Inversion

Iteration Time: 00:00:07
Total Inversion Time: 00:04:00

Inversion job 1/1 accepted by AGS5



```

Datum : WGS84
UTM zone : 32
EPSG : 32632
User Name : Toke
Level2 Name : GCM_AE_I40
Level3 Name :
Inversion Name : GCM_AE_I40
Reference distance : 1.00
Section length : 100000
Max sounding gap : 100000
Power law dependency : 0.75
Max number of iterations : 50
Number of processors : 2
AarhusInv confile path : \
\AGS5\AarhusRunnerAGS5\Toke_GCM_AE_I40_604040250\GCM_AE_
I40.con
Minimum number of datapoints : 2
Model number : 5
Sharp inversion: false
Altitude correction: false
Use sparse formats : 0

Waiting for slave..
Inversion Job applied for..
Inversion job 1/1 accepted by AGS5 with 1 CPUs.
CPU status of AGS5: 1 in use of 4
                    
```

Contents

Introduction.....	3
Nomenclature (Terms used in this document).....	3
AarhusRunner.....	3
Aarhus Batch Inversion.....	4
Guide to setup the Shared Directory	5
Guide to setup a new host	8
Change Shared Directory or Host properties	12
Appendix A: Supporting files and directories.....	12
The shared directory	12
The hosts directory.....	12
The ini files.....	12

Aarhus Batch Inversion Distributed

Introduction

The system is a cooperation between a client application (Aarhus Batch Inversion (ABI)) and a number of AarhusRunner services that distribute inversion jobs. The purpose of the system is to distribute and perform computation-intensive tasks in a network of servers, to better exploit the computational resources of all servers.

Note: Aarhus GeoSoftware doesn't take any responsibility for the setup and changes in Windows to make ABI work.

Nomenclature (Terms used in this document)

- Shared Directory
 - o The Shared Directory is specified in the AarhusRunner.ini and ABI.ini files. The purpose of the directory is to convey messages between AarhusRunner and ABI and to ensure access to relevant information, i.e. inversion data files for the AarhusRunner services. The server where the shared directory is located must always be running to use the distributed mode.
- Distributed mode
 - o Set in preferences in Workbench or in the ABI.ini file in the workbench installation directory. This determines whether the Aarhus Batch Inversion should look for a network of hosts or run the inversions locally.
- Host
 - o A Host is a machine running AarhusRunner somewhere in the network and can be used for inversions.
- Server
 - o A Server is either a server setup on the network or a normal desktop PC. It can also be a laptop, but the term covers the machine wanted to be used as a host.

AarhusRunner

AarhusRunner is the worker service of the system. It runs as a hidden service on any number of servers and its purpose is to perform inversions, using the computational resources of its host.

The service periodically checks if any inversion jobs are available. If a job is available and the service has the specified number of CPU's available, it will leave an application for the job, wait a bit and then decide if it should take the job or leave it be.

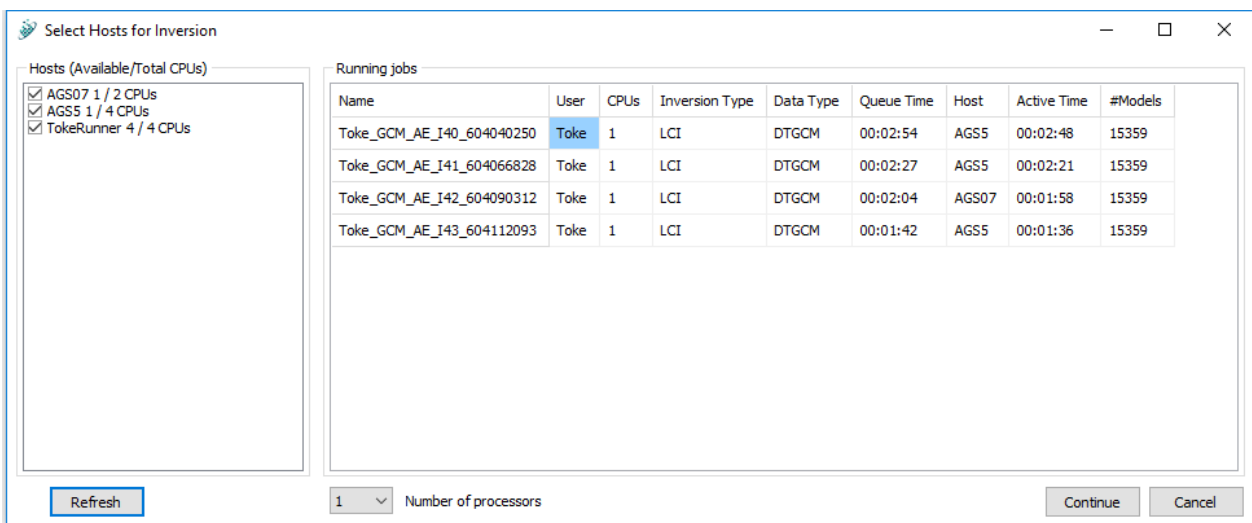
Once the service has accepted a job, it starts up the inversion, monitors the progress and puts up a notification for the client application when finished. Jobs can be stopped from Aarhus Batch Inversion.

The AarhusRunner service is associated to a user on the servers to access network directory locations. The communication between servers and clients is done through ASCII files written to a location specified in the AarhusRunner.ini file located with the service executable on each server. The shared directory should be accessible for the user associated to the service.

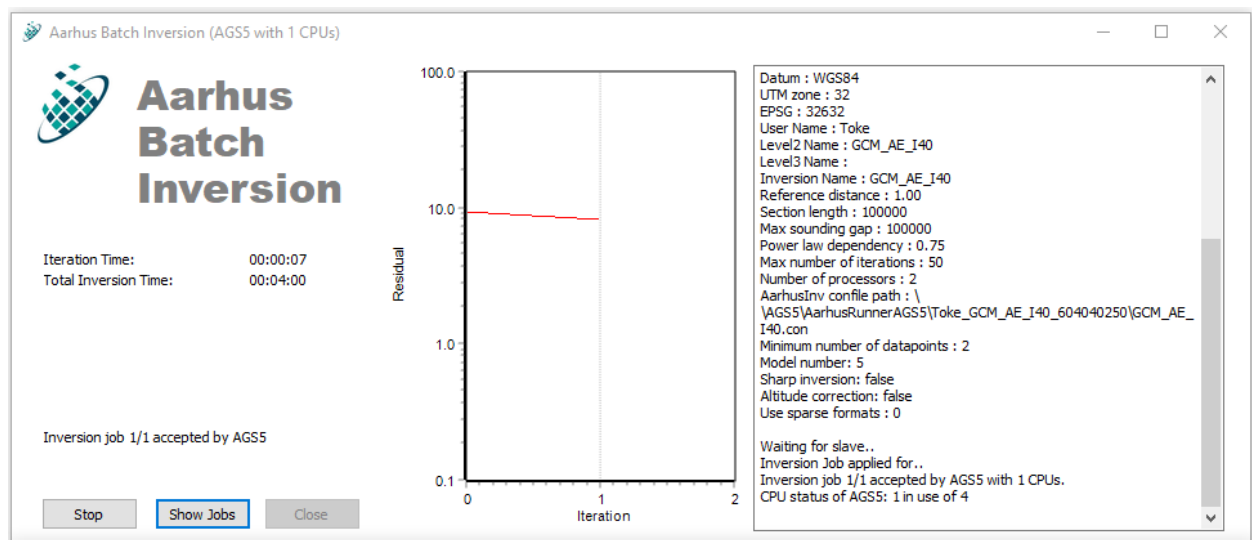
Aarhus Batch Inversion

Aarhus Batch Inversion is a client application of the inversion system. It is started from Workbench when running an inversion and is responsible for setting up the inversion job, and for processing the finished result. Each inversion job is associated to its own instance of Aarhus Batch Inversion.

Aarhus Batch Inversion can run in distributed and non-distributed mode (locally on PC). The essential operations are the same, but in non-distributed mode it will run as Workbench usually does without the queuing system. In distributed mode, the application will prompt the user at startup to choose from a list of hosts which are allowed to run the job. At the same time, an overview of the current active jobs is provided.



The application has a graphical user interface:



This interface provides the user with the progress of the inversion. The user can also get an overview of all jobs running in the system, or stop the job associated to the application.

When a job is finished, the application is notified and imports the result to the Workbench database.

Guide to setup the Shared Directory

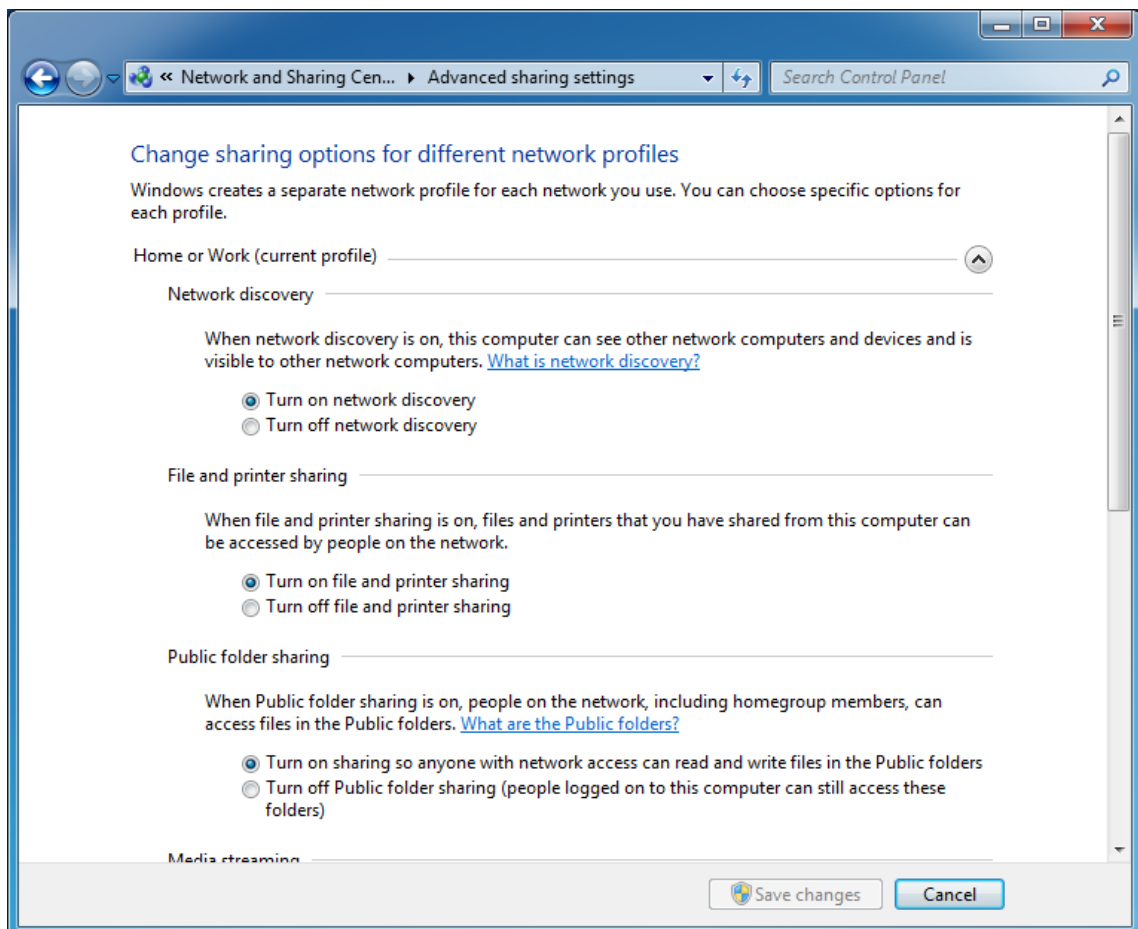
For Aarhus Batch Inversion Distributed to work in a local network, the server that holds the shared directory needs to be setup correctly so other PC's can access the shared directory without any restrictions or login.

If it is possible to access the shared directory directly in Windows Explorer (by typing e.g \\AGS07\AGS_AarhusRunner or \\192.168.0.110\AGS_AarhusRunner), then ABI will work.

Aarhus GeoSoftware can't help setting up your local network, but below is a guide to some of the properties in windows 7/10 that needs to be set.

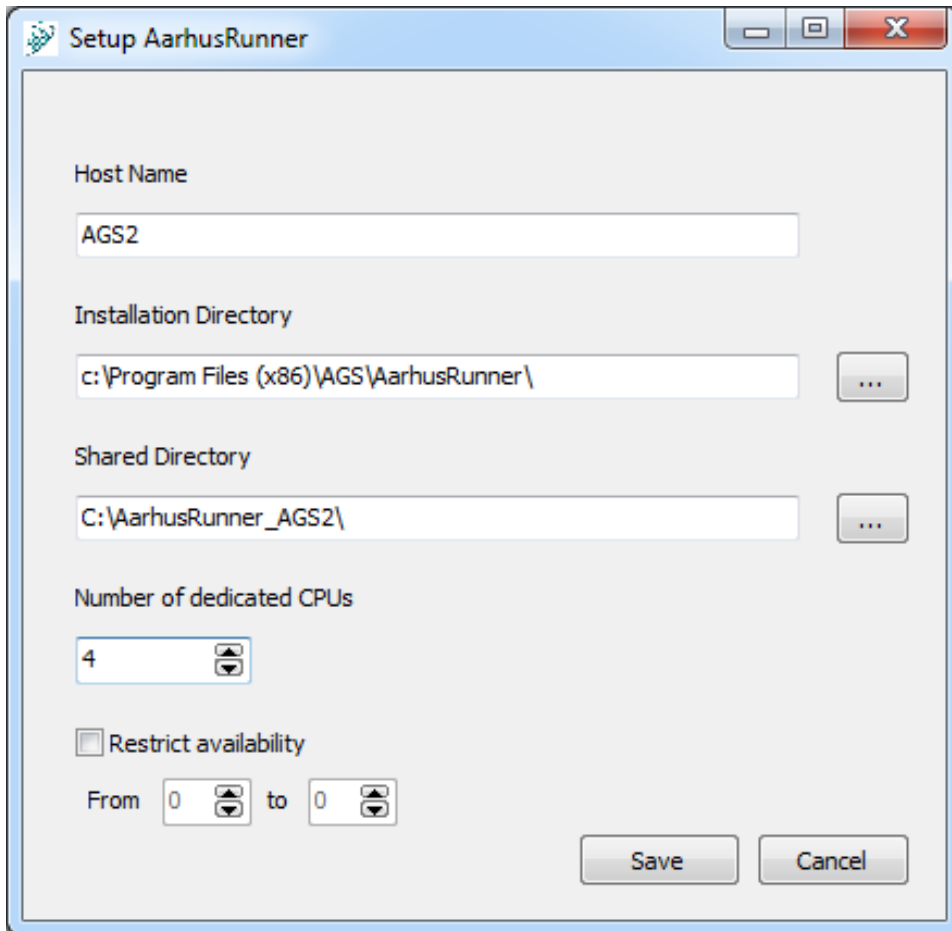
- 1) Log on to the admin user of the server.
- 2) Turn on network discovery and file sharing. This is done by opening "Control Panel" → "Network and Internet" → "Network and Sharing Center", click "Change advanced sharing settings" and enable
 - a. "Turn on network discovery"
 - b. "Turn on file and printer sharing"
 - c. "Turn on sharing so anyone with network access can read and write files in Public folders"

These must be enabled for the current profile (Home/Work if server is on a workgroup. Domain if the server is part of a domain).



- 3) Execute the AarhusRunner installer application. This can be downloaded from our [website](#).

- 4) After installation a setup window will open. Enter the following information:
- Host name (e.g. name of the server). This is only a display name and doesn't have to be the actual name of the machine.
 - Shared directory. Point to the location of the shared directory. It will be created if it does not already exist.
 - Number of dedicated CPU's. How many CPU's are allowed to be used for inversion jobs.
 - Restrict availability. Here it is possible to set if the server can only be used in certain time periods (24 hour). 0 to 0 is always. 11-18 is from 11 AM to 6 PM.
The server will still be on the list of available hosts, but it won't be used for inversions before it is within its active time period.



Setup AarhusRunner

Host Name
AGS2

Installation Directory
c:\Program Files (x86)\AGS\AarhusRunner\ ...

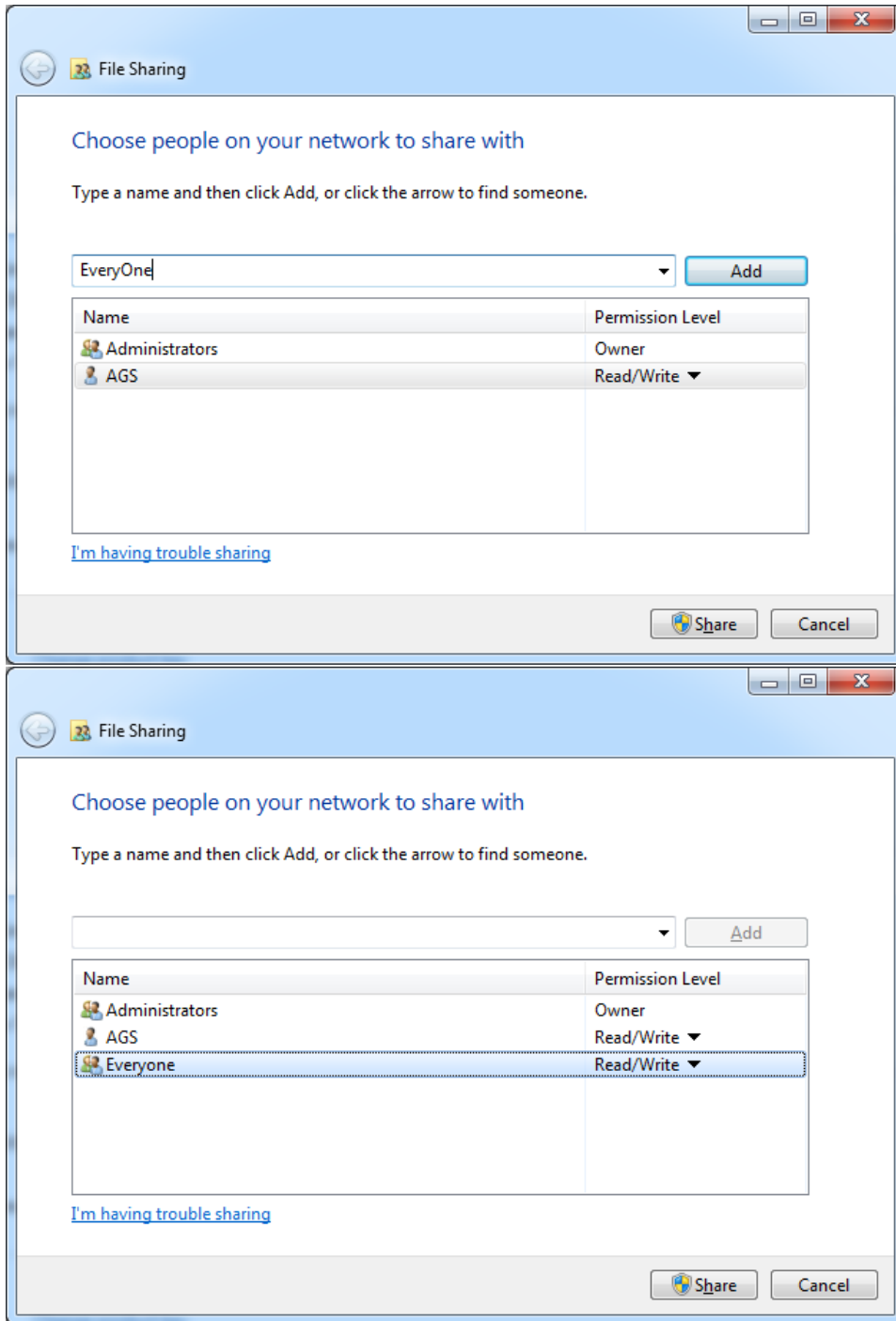
Shared Directory
C:\AarhusRunner_AGS2\ ...

Number of dedicated CPUs
4

Restrict availability
From 0 to 0

Save Cancel

- 5) Go to the shared directory, right click and select "properties"
- 6) Go to the "Sharing" tab and click "Share..."
- 7) Write "Everyone" and click "Add". Give "Everyone" Read/Write permission. Click "Share".



Done! The shared directory is now connected to the network and ready to run inversions. **This server is also setup as a host, so the guide to setup a new host is not needed for the server that holds the shared directory.**

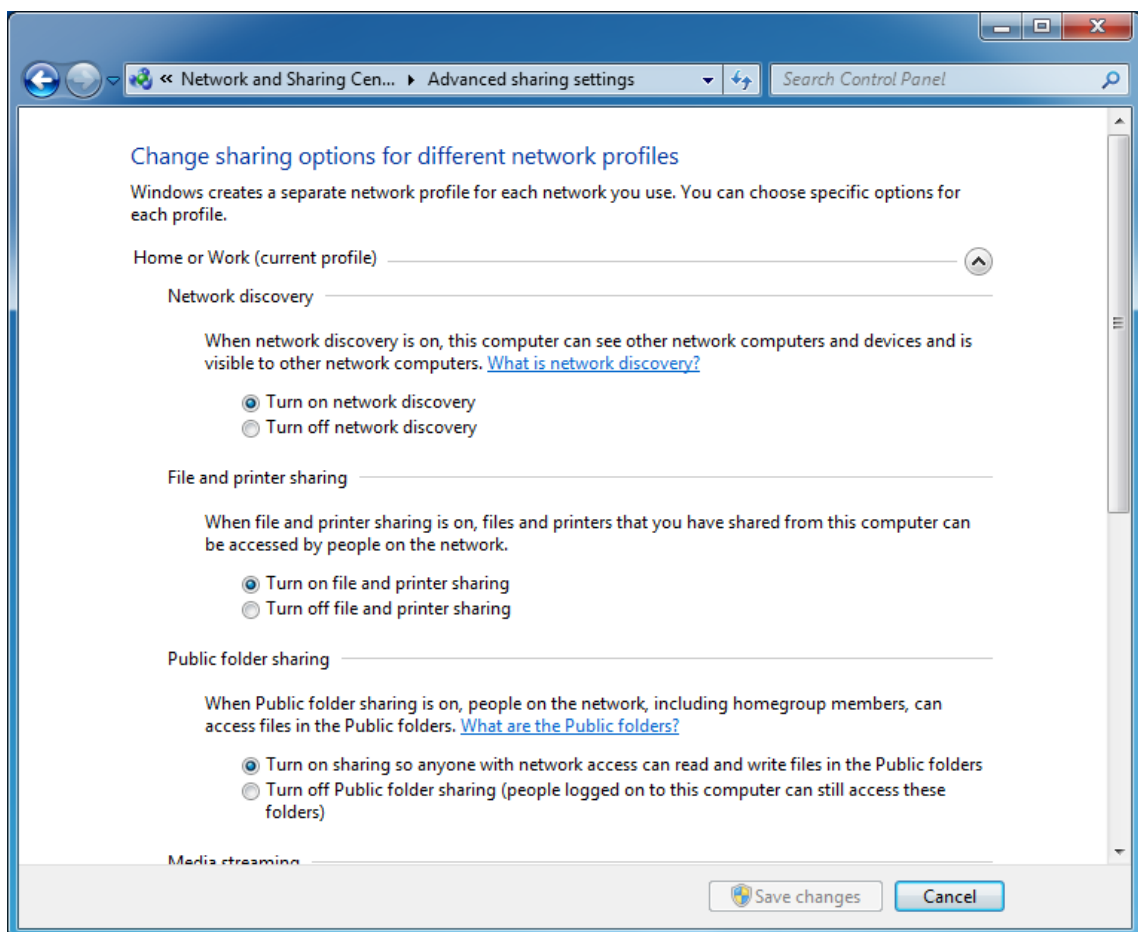
Guide to setup a new host

The following is a guide to introduce a new AarhusRunner host to the network.

Before reading, please refer to the nomenclature section to ensure the terms are coherent.

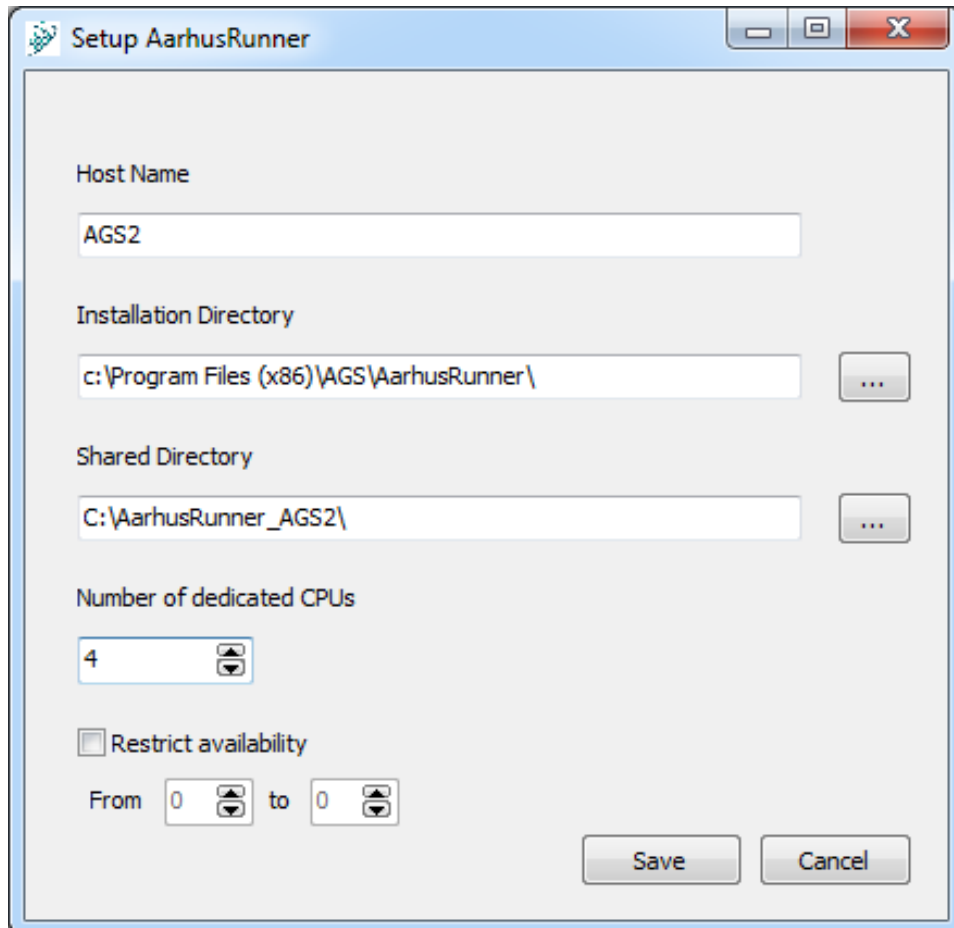
- 1) Log on to the admin user of the server.
- 2) Turn on network discovery and file sharing. This is done by opening “Control Panel” → “Network and Internet” → “Network and Sharing Center”, click “Change advanced sharing settings” and enable
 - a. “Turn on network discovery”
 - b. “Turn on file and printer sharing”
 - c. “Turn on sharing so anyone with network access can read and write files in Public folders”

These must be enabled for the current profile (Home/Work if server is on a workgroup. Domain if the server is part of a domain).

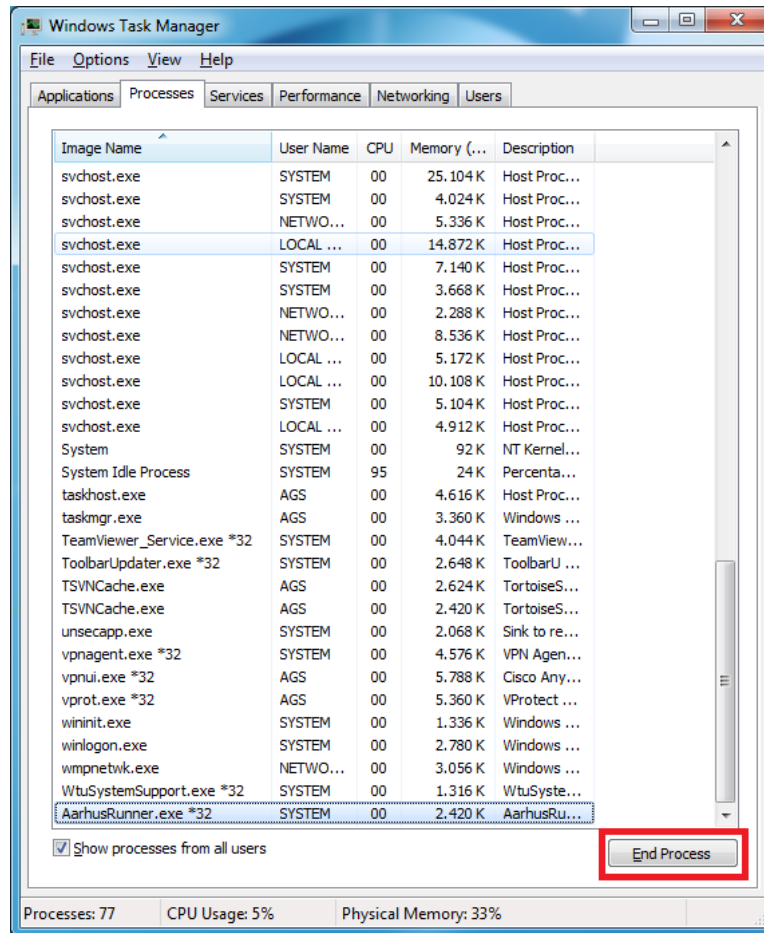


- 3) Execute the AarhusRunner installer application. This can be downloaded from our [website](#).
- 4) After installation a setup window will open. Enter the following information:
 - a. Host name (e.g. name of the server)
 - b. Shared directory. Point to the location of the shared directory.
 - c. Number of dedicated CPU's. How many CPU's are allowed to be used for inversion jobs.

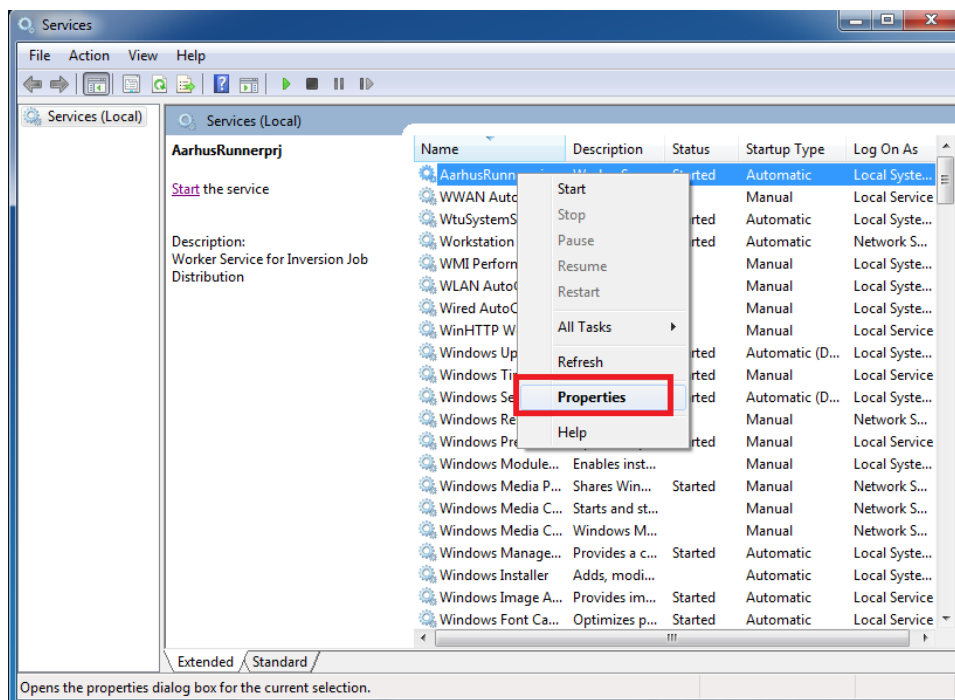
- d. Restrict availability. Here it is possible to set if the server can only be used in certain time periods (24 hour). 0 to 0 is always. 11-18 is from 11 AM to 6 PM. The server will still be on the list of available hosts, but it won't be used for inversions before it is within its active time period.



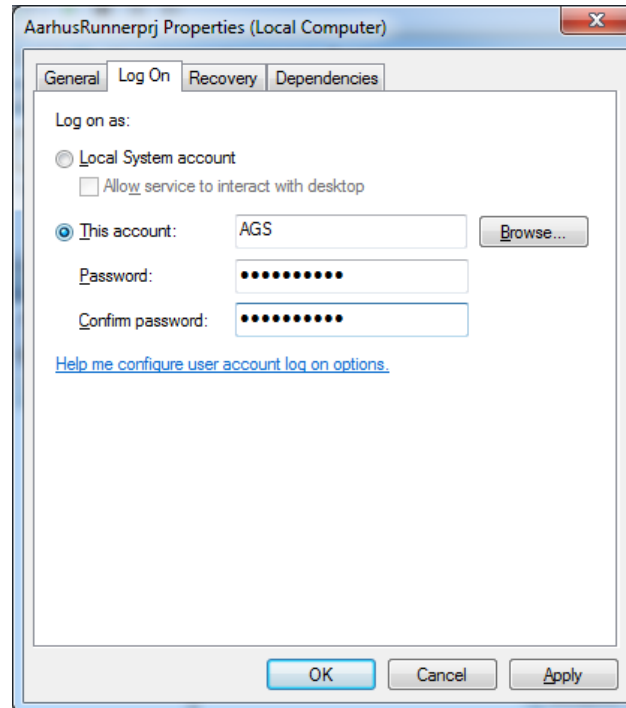
- 5) Open task manager, find the process “AarhusRunner.exe” and end the process



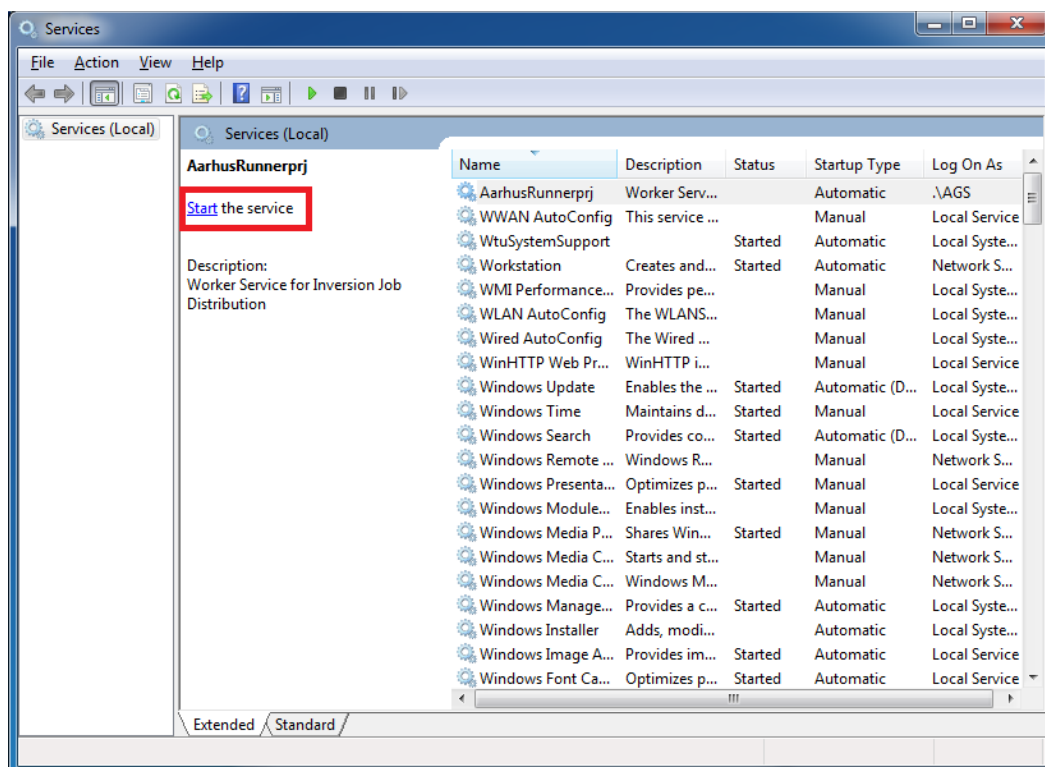
- 6) Go to services, find AarhusRunnerprj, right click and select properties.



- Go to the “Log On” tab and select “This Account”. Write the log on username and password for the windows user. Click OK



- Start the service



Done! The host is now connected to the network and ready to run inversions.

Change Shared Directory or Host properties

If you want to change the Shared Directory or settings for the host, run “AarhusRunnerSetup.exe” in the Aarhus Runner installation folder as admin (right-click and “Run as administrator”).

Appendix A: Supporting files and directories

The shared directory

The shared directory is specified in the AarhusRunner.ini and ABl.ini, each located with the associated application. In the shared directory, clients and services communicate through files:

- <InversionName> directory contains the inversion files.
- <InversionName>.submitted is a client’s message to the services that a job is available.
- <InversionName>.queued is a service’s message that the job has been applied for.
- <InversionName>.started is a service’s message that a job has been accepted.
- <InversionName>.finished is a service’s message to the client that the inversion has finished.
- <InversionName>.stopped is a client’s message to the service that the job has been manually cancelled.
- <InversionName>.log is the log of the inversion job.

The hosts directory

The hosts directory is a subdirectory to the shared directory that is automatically created. Here, the services publish their CPU status in .status files. This makes it easy for the Aarhus Batch Inversion to create a quick survey of the hosts’ loads.

The ini files

ABl.ini contains the following:

- SharedDir: points to the shared directory
- CleanUpOnError: lets Aarhus Batch Inversion know whether delete files after an error occurred
- RunDistributed=sets Aarhus Batch Inversion up to use the distributed host network, or just the local host

AarhusRunner.ini contains the following:

- Sleptime_ms: The number of milliseconds between each heartbeat
- SharedDir: points to the shared directory
- Hostname: the name of this host
- HostsIniPath: points to the Hosts.ini, a centralized .ini file where properties for each host are specified

The Hosts.ini is structured a little differently, here the name of each host is used as variable name in different sections that specify the nature of the variable

Hosts.ini contains the following:

- [Priority]: file section specifying the priority of each host. (e.g. Hamilton=7 in this section indicates that Hamilton server runs with priority 7). Priority is used to determine who gets the job in case two hosts apply for the same job.
- [DedicatedCPUs]: Section specifying the number of CPUs at the host disposal. (Hamilton=7 in this section indicates that Hamilton server has 7 CPUs for inversions)

- [Availability]: Section specifying the time interval in which the service is available for inversions (Hamilton=00-00 specifies full availability of the Hamilton instance. Hamilton=16-23 specifies that Hamilton will only work from 16.00 to 23.00 in the evening)