COMPUTER REQUIREMENTS, RECOMMENDATIONS AND ADVICES FOR METEODYN WT USERS

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meteodyn
meteorology & dynamics

SUMMARY

This brief guide will help you to configure your computer in order to better use meteo**dyn** ***WT***.

Three main parameters are considered: the RAM of the computer, the "bit" version and the number of cores.

It is recommended to have an adaptable computer configuration (add more RAM, new hard disk, etc.) in case of new options (Client/Server, cores number, etc.) and/or use of the software (bigger projects size, etc.)

1. RANDOM ACCESS MEMORY

1.1 Memory requirements

The number of cells to compute depends on the random access memory (RAM) available on your computer.

To compute one million cells, the solver needs approximately 1.2 GB of RAM. The mesh parameters (horizontal and vertical minimal resolution, coefficient of expansion) as well as the layout of the result points, have a great influence on the number of cells and have to be optimized in each case.

1.2 Some typical examples

DOMAIN SIZE	MAPPING	MAPPING SIZE / RESOLUTION	MINIMAL RESOLUTION	CELL NUMBER
12 X 12 Km	YES	1.8 Km / 50 m	50 m * 6 m	375 000
12 X 12 Km	YES	1.8 Km / 50 m	25 m * 4 m	1 000 000
12 X 12 Km	YES	4 Km / 50 m	25 m * 4 m	2 400 000

1.3 Recommendations

To compute accurately the domain size of a standard wind farm, we recommend the use of a computer with a minimum of 32 GB of RAM.

A higher specification would be having 64 GB of RAM which allows full use of Lidar, Atlas, multi-core and/or Client/Server options.

For instance, to run 4 directions simultaneously with 10 million cells per direction (which means 40 million cells to compute): 40*1.2 = 48 GB of RAM are needed. With 32 GB of RAM only 2 directions can be computed at the same time.

2. CPU REQUIREMENTS

2.1 Frequency requirements

There are no specific requirements about the frequency of the processor used. However, the faster the computer is, the less computation time it will take.

2.2 Some typical examples

Cases run with an Intel Core I7-4510U CPU 2.6 GHz and 8 GB RAM (meteo**dyn** ***WT*** 5.0.1 version):

DOMAIN SIZE	MINIMAL RESOLUTION	CELL NUMBER	COMPUTATION LAST
12 X 12 Km	50 m * 6 m	700 000	5 minutes
12 X 12 Km	40 m * 4 m	1 200 000	9 minutes
12 X 12 Km	25 m * 4 m	2 400 000	20 minutes

3. 32 AND 64-BIT VERSIONS

meteo**dyn** ***WT*** 32-bit and 64-bit versions are available in your customer area.

3.1 Processor

For 64-bit versions, please note that meteo**dyn** ***WT*****64** has been compiled for AMD64 and EM64T processors. It cannot be executed on a computer with an Itanium processor.

3.2 Operating system

meteo**dyn** ***WT*****64** must be installed on a 64-bit Microsoft Operating System. The software has been validated under Microsoft Windows VISTA 64-bit edition, Windows 7 64-bit edition and Windows 8 64-bit edition.

meteo**dyn** ***WT*****64** cannot be installed on a 32-bit Microsoft Operating System.

meteo**dyn** ***WT*** is no longer compatible with Windows XP Operating System.

3.3 Performances

A mesh with a number of cells greater than 1.6 million cannot be computed with a 32-bit OS. It has also to be noted that the verification and the synthesis processes of meteo**dyn** ***WT***, require RAM. With the 32-bit version, only 2 GB maximum can be used. The 64-bit Operating System allows this limitation to be surpassed.

4. GRAPHICAL CARD, HARD DRIVE AND REMOTE CONNECTION

We recommend a graphical card with a minimum of 256 MB (512 MB would be better) and a big volume of hard drive (500 GB minimum). There are no specific recommendations on the hard drive type.

When meteo**dyn** ***WT*** is used in a remote connection mode, the Virtual Reality module may not work properly.

5. MULTI CORE OPTION

5.1 Description

The multi core option is designed to run many directional computations at the same time. To use it, at least 1 physical CPU with 4 cores is needed.

As meteo**dyn** ***WT*** software takes into account the number of cores but not the number of processors, no need to have 4 physical CPUs to run the 4-core option. For instance, 2 physical CPUs with 4 cores each are considered as 8 cores by the software.

5.2 Workload management

Windows spreads the workload between the existing cores to fully use the processor capacity and avoids the saturation.

For example, with 1 CPU Quad Core:

- when running 4 computations, each core will compute 1 direction.
- when running 2 computations, the load will be equally split between the 4 cores of the CPU.

5.3 Multi core management

While directional computations are running, keeping free cores avoids the processor saturation and ensures the proper functioning of Windows.
For example, with 2 CPUs Quad-Core, you can run 8 computations at the same time, but we recommend running up to 6 directions only, keeping 2 cores for Windows.

5.4 RAM management

The total quantity of RAM needed to run several computations is the sum of RAM needed for each computation. For instance, 4 GB are needed to run 4 directions that needs 1 GB each *(650 thousands cells)*.

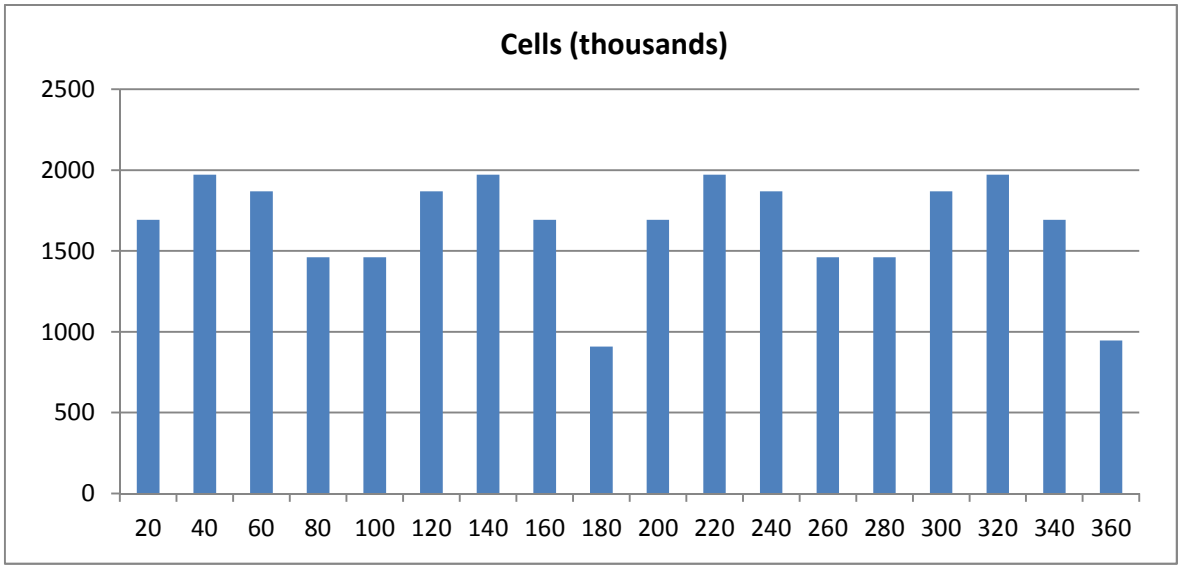
While directional computations are running, keeping free available RAM ensures the proper functioning of Windows.

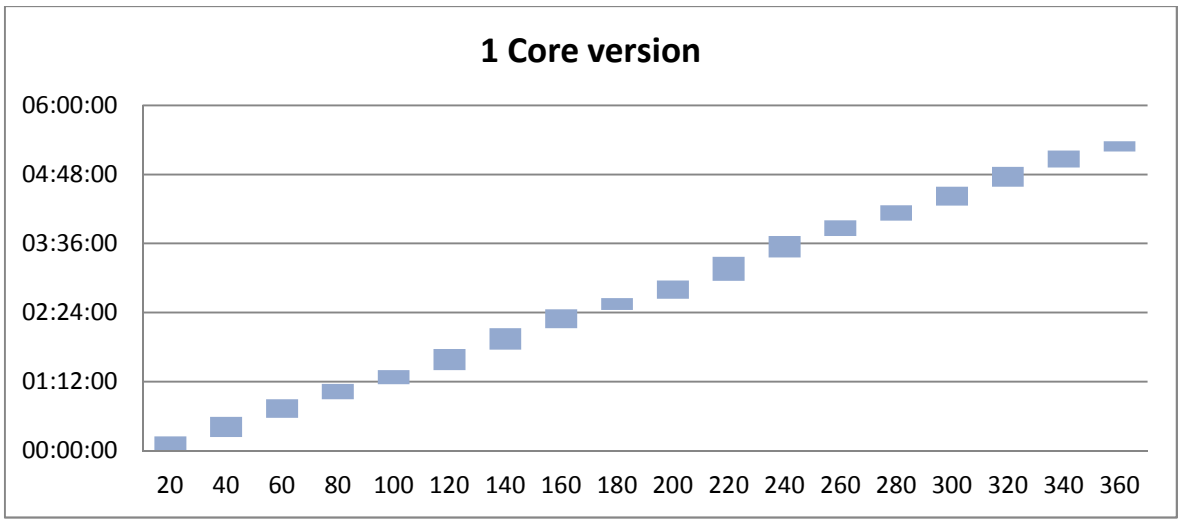
We recommend tuning your computer with 64 GB of RAM for a full use of meteodyn ***WT*** **Multi Core Version and/or Client-Server version.**

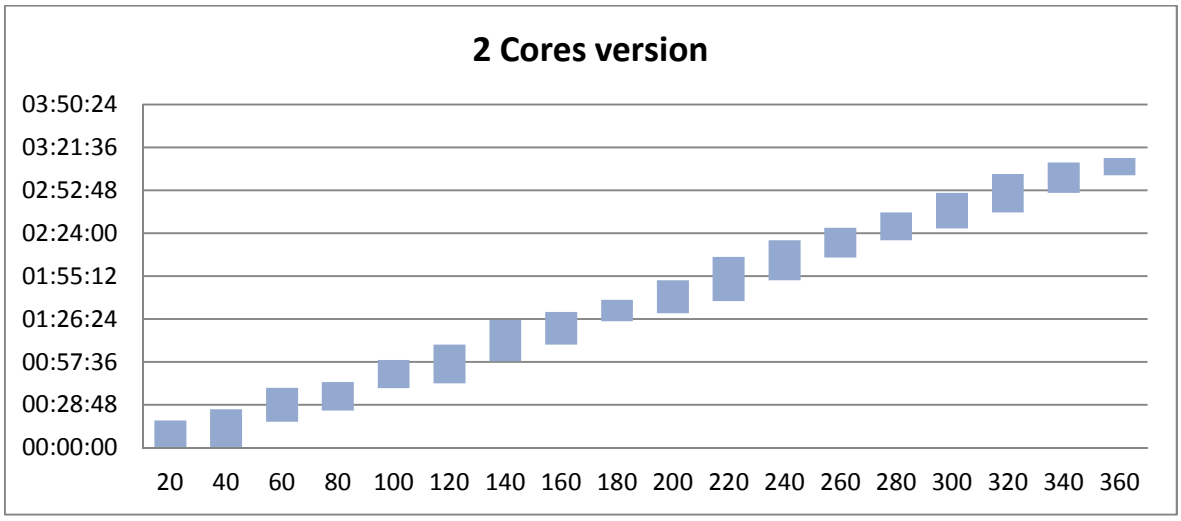
5.5 Multi Cores comparisons and performances (meteodyn *WT* 5.0.1 version)

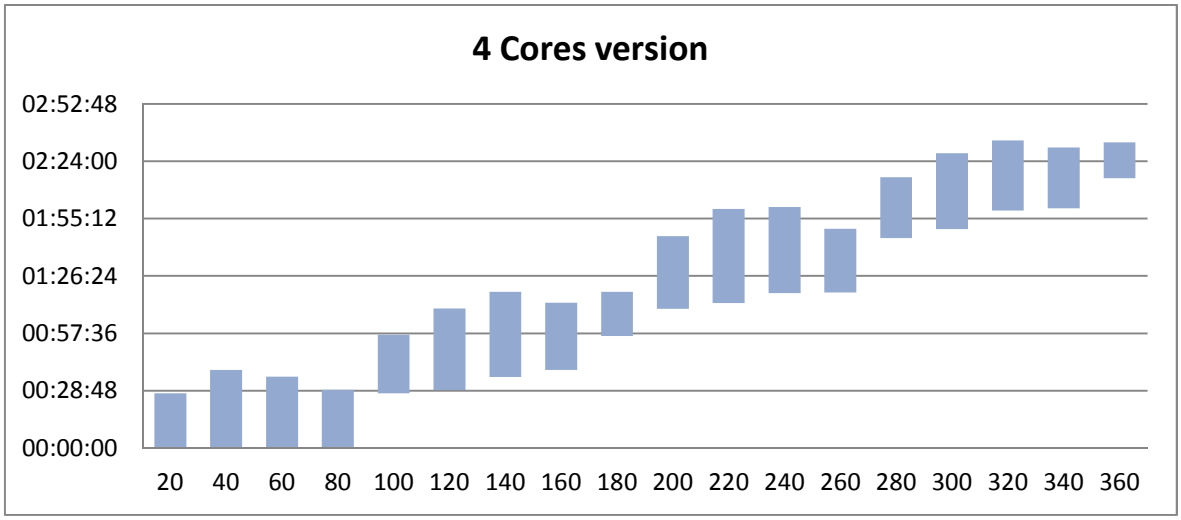
Computer used
Intel® Xeon® Processor W3540
22 GB of RAM
Windows 7 professional SP1

Direction	Cells	Start time	Time 1 Core	Start time	Time 2 Cores	Start time	Time 4 Cores
20	1 692 495.00	11:23:46	*00:14:53*	16:46:47	*00:18:14*	09:18:02	*00:27:31*
40	1 973 160.00	11:37:54	*00:21:01*	16:46:48	*00:25:42*	09:18:03	*00:39:11*
60	1 869 350.00	11:58:01	*00:19:16*	17:04:14	*00:22:47*	09:18:04	*00:35:45*
80	1 462 020.00	12:17:17	*00:16:01*	17:11:43	*00:19:05*	09:18:06	*00:29:11*
100	1 462 020.00	12:33:01	*00:14:51*	17:26:48	*00:18:52*	09:45:32	*00:29:20*
120	1 869 350.00	12:47:51	*00:22:05*	17:30:06	*00:25:55*	09:47:12	*00:40:54*
140	1 973 160.00	13:09:05	*00:22:24*	17:44:52	*00:27:44*	09:53:45	*00:42:47*
160	1 692 495.00	13:31:24	*00:19:38*	17:55:56	*00:22:03*	09:57:12	*00:33:50*
180	909 160.00	13:50:39	*00:12:16*	18:11:45	*00:14:19*	10:14:21	*00:22:09*
200	1 692 495.00	14:02:16	*00:18:52*	18:17:04	*00:22:06*	10:27:56	*00:36:31*
220	1 973 160.00	14:20:53	*00:25:07*	18:25:19	*00:29:29*	10:30:51	*00:47:14*
240	1 869 350.00	14:45:08	*00:22:28*	18:39:08	*00:27:01*	10:35:48	*00:43:20*
260	1 462 020.00	15:07:28	*00:16:28*	18:54:29	*00:19:59*	10:36:09	*00:31:56*
280	1 462 020.00	15:23:28	*00:16:13*	19:06:01	*00:18:50*	11:03:31	*00:30:33*
300	1 869 350.00	15:39:14	*00:19:52*	19:14:01	*00:23:47*	11:07:56	*00:38:06*
320	1 973 160.00	15:58:52	*00:20:54*	19:24:50	*00:25:38*	11:17:14	*00:35:13*
340	1 692 495.00	16:18:55	*00:17:41*	19:37:47	*00:20:23*	11:18:21	*00:30:41*
360	945 700.00	16:35:42	*00:10:38*	19:49:39	*00:11:40*	11:33:34	*00:17:58*
Global Duration		**05:25:00**		**03:15:00**		**02:15:00**	


Cells (thousands)
2500
2000
1500
1000
500
0
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360


1 Core version
06:00:00
04:48:00
03:36:00
02:24:00
01:12:00
00:00:00
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360


2 Cores version
03:50:24
03:21:36
02:52:48
02:24:00
01:55:12
01:26:24
00:57:36
00:28:48
00:00:00
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360


4 Cores version
02:52:48
02:24:00
01:55:12
01:26:24
00:57:36
00:28:48
00:00:00
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360