

Portable EMPIRE-3.2.2 for Windows

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Topics:

1. Before porting EMPIRE to Windows
2. Porting EMPIRE to Windows
3. Content of the package
4. How to run portable Empire for Windows
5. Struggle for speed
6. Concluding remarks

EMPIRE: Nuclear Reaction Model Code System for Data Evaluation

Reference:

M.Herman, R.Capote, B.V.Carlson, P.Oblozinsky, M.Sin, A.Trkov, H.Wienke, V.Zerkin, "EMPIRE: Nuclear Reaction Model Code System for Data Evaluation", Nuclear Data Sheets, 108 (2007) 2655-2715.

Before porting EMPIRE to Windows

1. What do we have now?

- 1) System of Fortran and C codes called from interactive Tcl/Tk GUI via system of bash and python scripts using files-parameters.
- 2) Complete package works on Linux and Mac-OSX.
Part of the package works on Windows (without GUI).
- 3) The package requires installation including system components (Fortran and Active-Tcl/Tk).

2. What we can try to achieve?

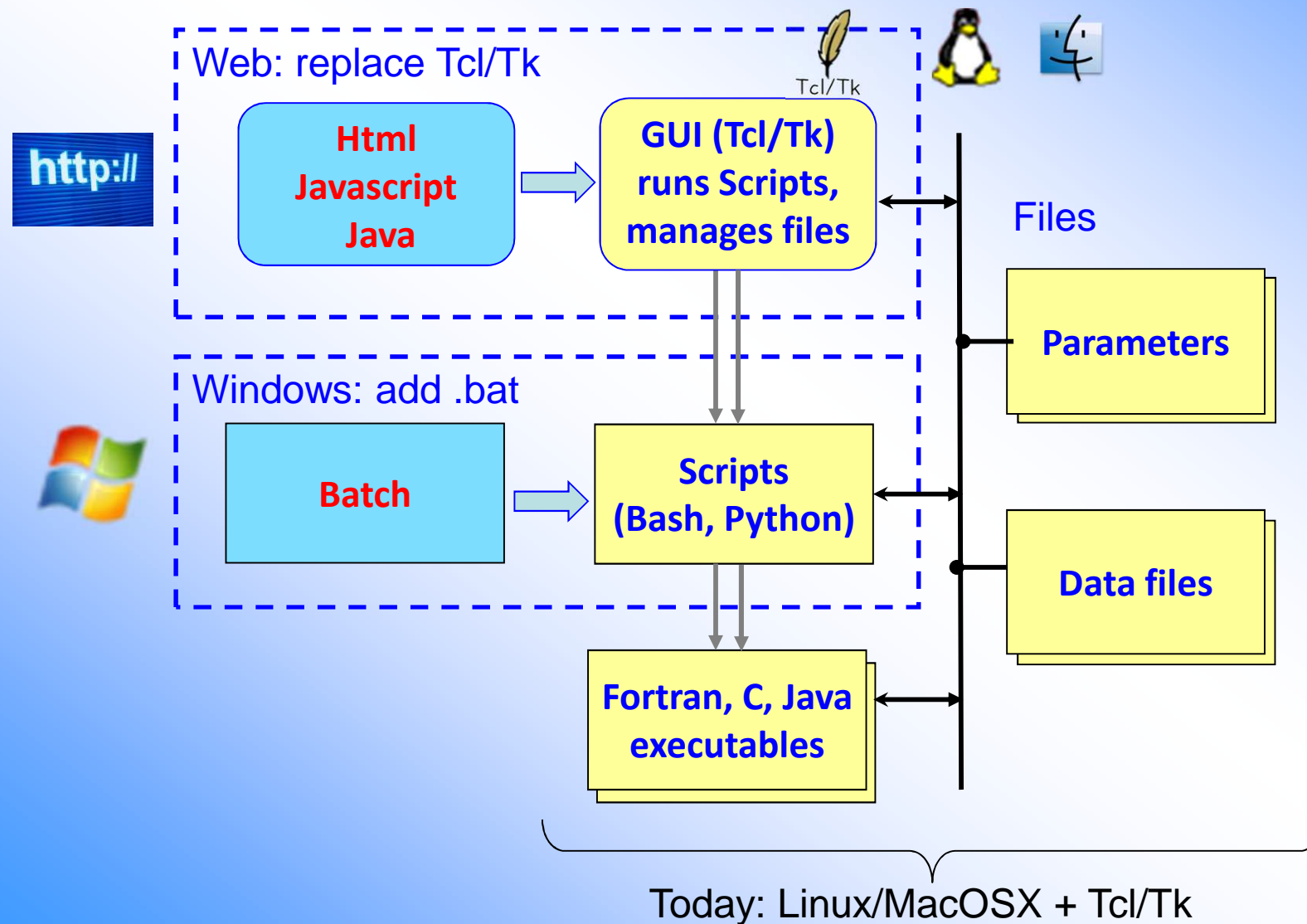
- 1) Internet (Web) version of the package
- 2) Complete package for Windows (identical to Linux)
- 3) Portable version without installation of system components

3. How useful it can be? What would be the price?

- 1) Portable version for Windows can expand usability.
- 2) Web version can be useful only if powerful server will be assigned
- 3) Price? Till now – 0. All was done for “academic interest”.

First version for Windows and Web are ready and tested by developers.

Porting EMPIRE to Windows and Web



Full Empire package for Windows*

Tasks and requirements

- 1) To make main Tcl/Tk program Xrun.tcl executing MS-DOS commands running in popup terminal Window
- 2) Implement all basic GUI functions (including multiple selection) via MS-DOS scripts
- 3) Universal solution for call scripts either on Windows or Linux/Mac depending of platform (automatically detected)
- 4) The final system should not require any installation (only copying), i.e. to be fully portable

* *This project has appeared as “side-effect” during implementation of “Empire with Web interface”*

Content of the package

Portable version of EMPIRE for Windows

1. Empire with static executable 842Mb
2. Portable versions of:
 - 1) GNU Fortran (GCC) 8.4.0 199Mb
 - 2) Portable Python 2.7.5.1 591Mb
 - 3) Active Tcl/Tk 8.4.20 71Mb
 - 4) Postscript viewer 6Mb
 - 5) Text editor Notepad2 (LF, CR+LF) 1Mb
3. All directories are relative, .Xrunrc is in the working directory
4. No need for installation, no need for configuration.
All software is pre-configured and ready to run.
5. Start by [runme.bat](#) in working directory.
6. Size: ~3Gb
7. Works from USB and DVD-ROM (without copying to HD)
8. Available on NDS site for downloading (zip: 753Mb)

Download Portable Empire-3.2.2 for Windows

<https://www-nds.iaea.org/cdroms/#EMPIRE-3.2.2>

NDS-IAEA CD-ROM distribution - Mozilla Firefox

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https://www-nds.iaea.org/cdroms/#EMPIRE-3.2.2

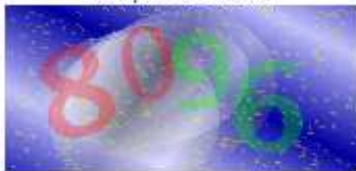
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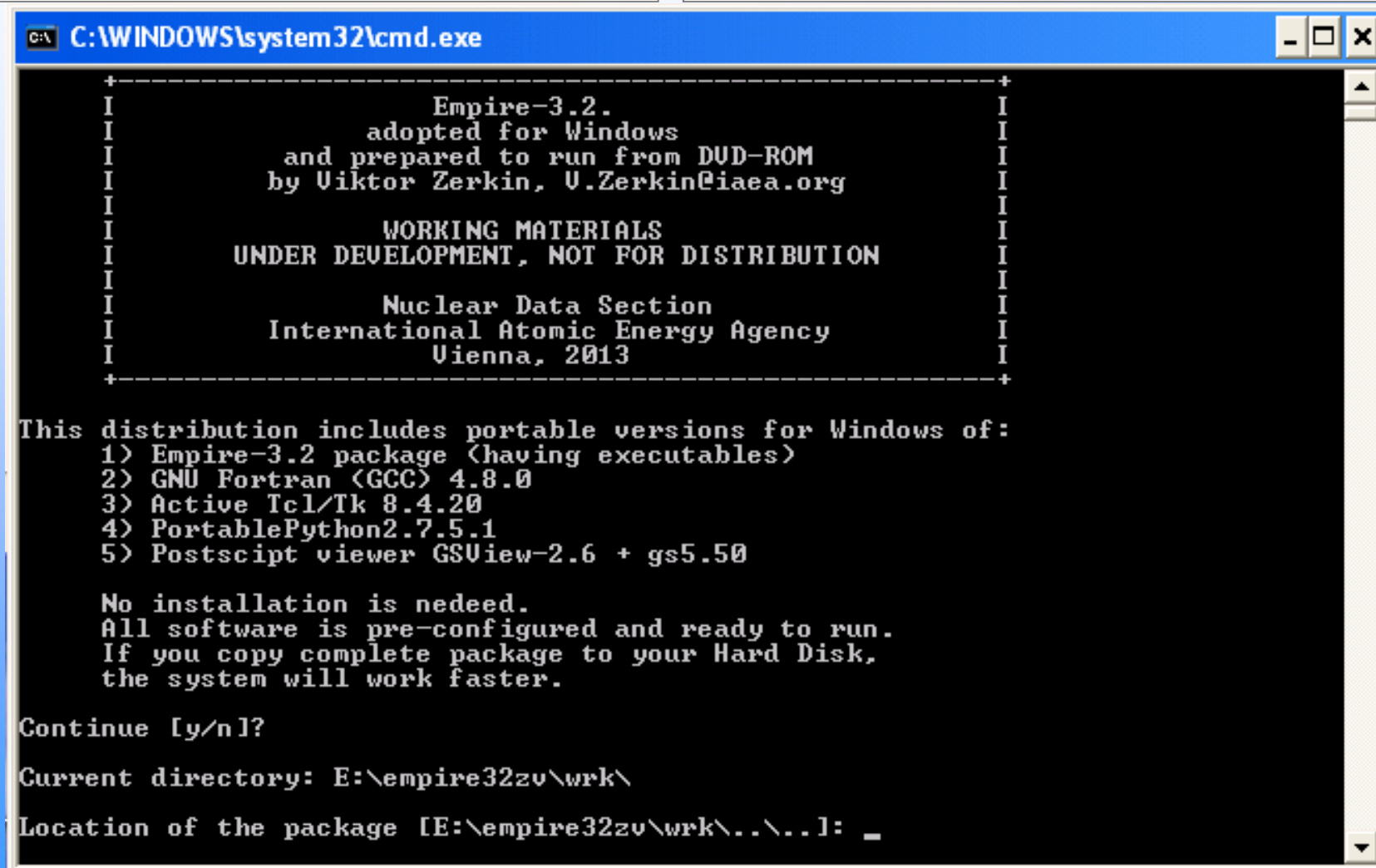
How to run portable Empire for Windows

How to install it?

- 1) No installation is needed!
- 2) Just copy **empire32zv** to your disk

How to run it?

- 1) Go to working dir **empire32zv\wrk**
- 2) Start file **runme.bat**



```
C:\WINDOWS\system32\cmd.exe

+-----+
|               Empire-3.2.               |
|               adopted for Windows        |
|               and prepared to run from DUD-ROM |
|               by Viktor Zerkin, U.Zerkin@iaea.org |
|               WORKING MATERIALS          |
|               UNDER DEVELOPMENT, NOT FOR DISTRIBUTION |
|               Nuclear Data Section       |
|               International Atomic Energy Agency |
|               Vienna, 2013               |
+-----+

This distribution includes portable versions for Windows of:
1) Empire-3.2 package (having executables)
2) GNU Fortran (GCC) 4.8.0
3) Active Tcl/Tk 8.4.20
4) PortablePython2.7.5.1
5) Postscript viewer GSView-2.6 + gs5.50

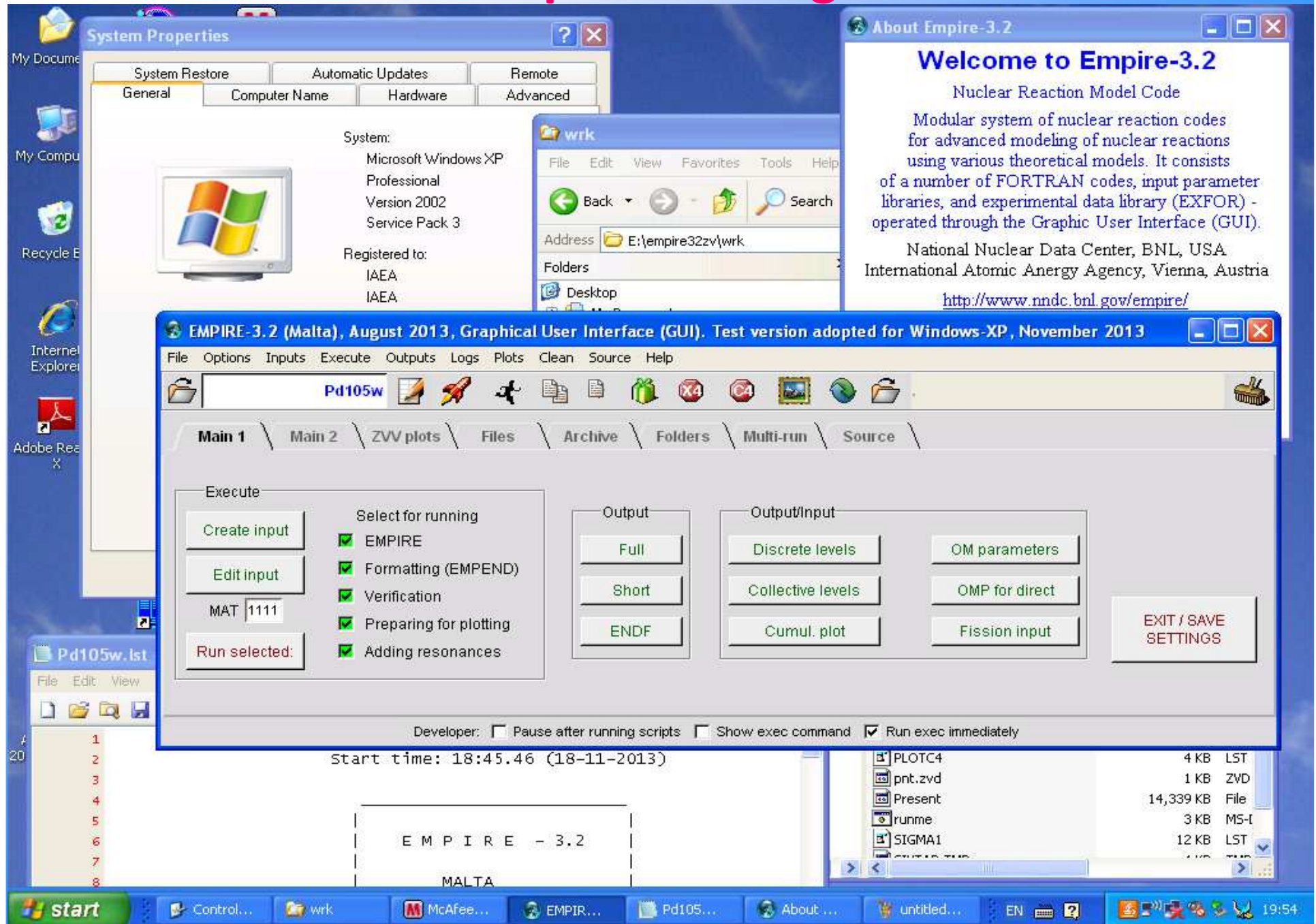
No installation is needed.
All software is pre-configured and ready to run.
If you copy complete package to your Hard Disk,
the system will work faster.

Continue [y/n]?

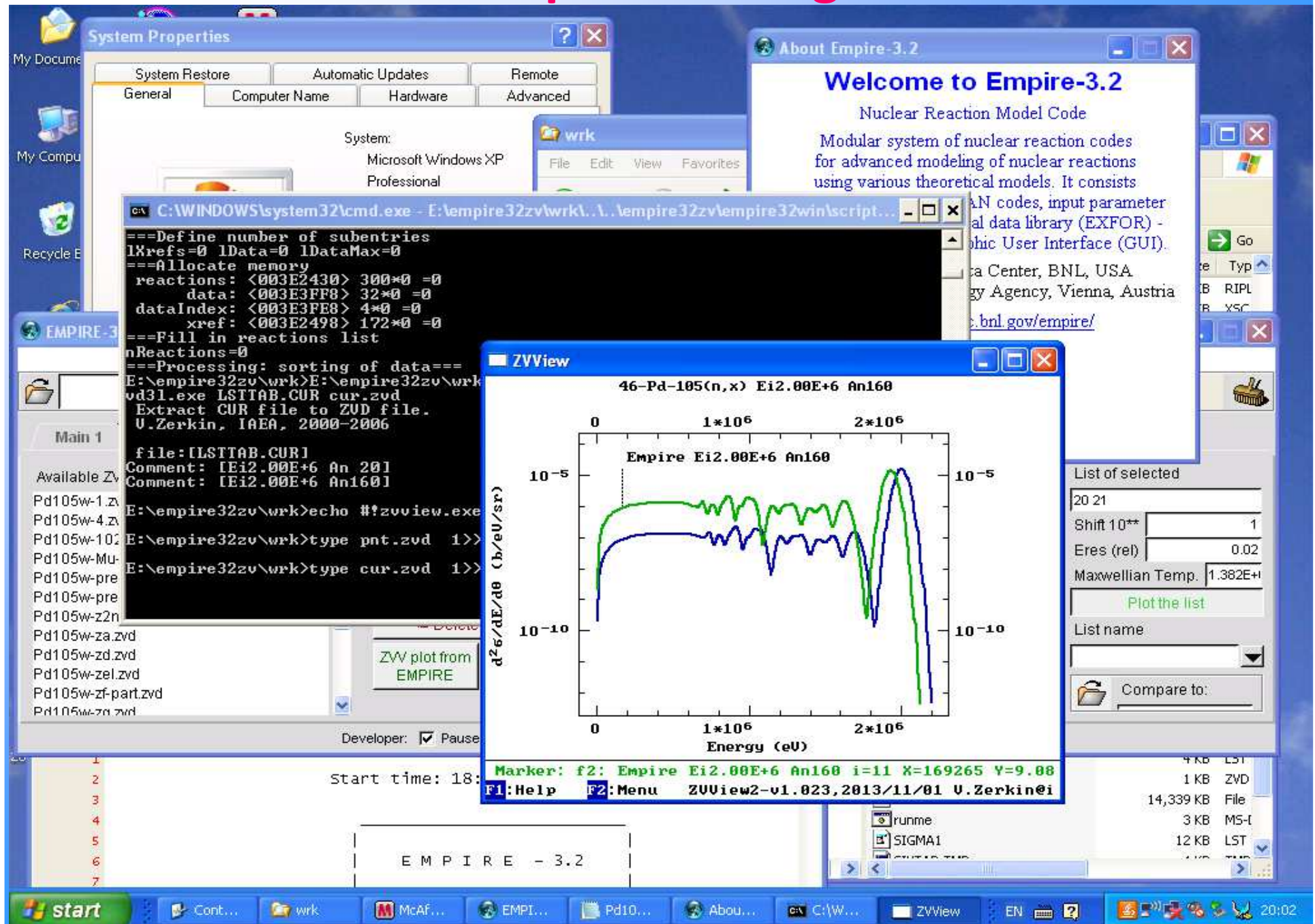
Current directory: E:\empire32zv\wrk\

Location of the package [E:\empire32zv\wrk\...\...]: _
```






Screenshot: Empire running on Windows



Screenshot: Empire running on Windows



Who are users of Empire on Windows?

- 1) Beginners? Yes. 
- 2) Potential users who are not yet sure? Yes. 
- 3) Old generation of physicists? Probably... 
- 4) Today's experienced users? No. 
- 5) Participants of Empire Workshop-2013; students . Yes 

Struggle for speed

Task: to make first run much faster

Steps:

- 1) diagnosis: how much time is spent by each part of the system
- 2) define for how much time is spent for types of operations
- 3) find out bottle-necks (if any)
- 4) accelerate program without changing the logic
- 5) analyse logic of the program and find possible acceleration
- 6) find faster computer(s)

Starting point:

- 1) Example from Empire-3.1 distribution Pt105.inp
- 2) 1-st run on old Linux web server (NNDC): 55 min
- 3) 1-st run on new powerful web server (NNDC): 9 min 45 sec

Goal: to achieve elapsed time ~5 min on PC and Web server

Struggle for speed: results

<i>Platform</i>	<i>OS</i>	<i>Interface</i>	<i>Empire 3.1, original</i>	<i>Empire 3.1, modified</i>	<i>Ratio (modif./orig.)</i>
PC's					
Old PC	Win-7	Script .bat	37min 2sec	14min 2sec	38%
New PC	Win-7	Script .bat	21min 41sec	<u>6min 44sec</u>	31%
New PC	Win-7	Web		7min 48sec	
New PC	Win-7	Tcl/Tk		7min 11sec	
zlinux2	Linux	Script .sh	45min 57sec	23min 51sec	52%
Laptop					
Fujitsu-2006	Win-XP	Tcl/Tk		20min 36sec	
Fujitsu-2013	Win-7	Tcl/Tk		<u>7min 41sec</u>	
Servers					
dev-nds	Linux	Web		<u>6min 3sec</u>	
www-nds	Linux	Web		12min 6sec	
dev-nndc	Linux	Web	9min 47sec		

Achieved:

- 1) Windows: program runs 3 times faster (HP Compaq Elite 8300 PC: **22min→7min**)
- 2) Linux: program runs 2 times faster best result on Linux server: **~6min**

Conclusion. Goal (5min) was not achieved.

Further acceleration need deep analysis of the program's logic (if possible at all)

Concluding remarks

- 1) Struggle for speed was successful; results were accepted by Empire developers team
- 2) Portable Empire for Windows “survived” and now distributed to end-users



Thank you.