



PCaPAC Workshop 2006 at Jefferson Lab

mono for cross-platform control system environment

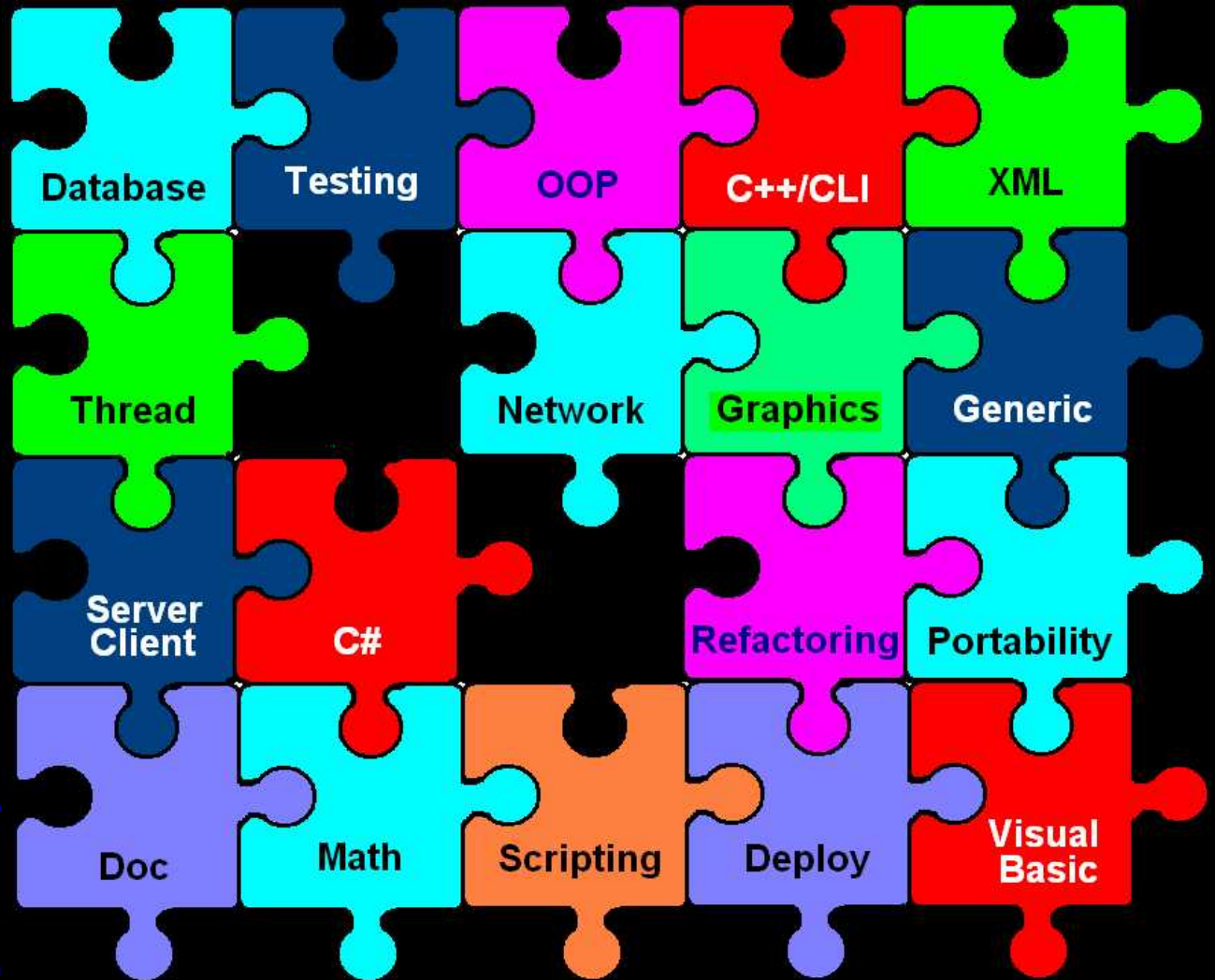
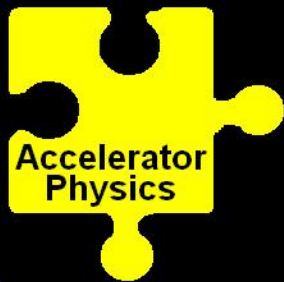
H. Nishimura and C. Timossi,
LBNL, Berkeley, CA 94720, U.S.A

Work supported by the U.S. Department of Energy under Contract
No. DE-AC03-76SF00098

.NET Framework

- Microsoft ↕ ECMA/ISO
 - 1.0 in 2002
 - 1.1 in 2003
 - 2.0 in 2005
 - 3.0 in 2006?
- Windows Vista is .NET-based.
- C# and many other languages.

.NET misses 2 pieces..



What is Mono?

- An independent implementation of .NET Framework by Ximian ↪ Novell.
- Linux, FreeBSD, UNIX, Mac OS X, Solaris and Windows
- s390/s390x, SPARC, PowerPC, x86, x86-64, IA64, ARM
- Dual Licensed by Novell

HP at www.mono-project.com

Search Mono at www.wikipedia.org

Who made Mono?

- Miguel de Icaza
 - Created Gnome with Federico Mena in 1997.
 - Created Mono in 2001 at Ximian.
- “Mono and GNOME. The long reply”
 - 06 Feb 2002
 - <http://mail.gnome.org/archives/gnome-hackers/2002-February/msg00031.html>
- Now under Novell.

Is Mono a Cross-Platform .NET?

- Definitely YES!
 - As .NET Runtime Environment
 - As .NET Development Environment
- A few years behind the “.NET on Windows”.
 - Non-graphical classes are basically OK.
 - WinForm is a little bit behind.

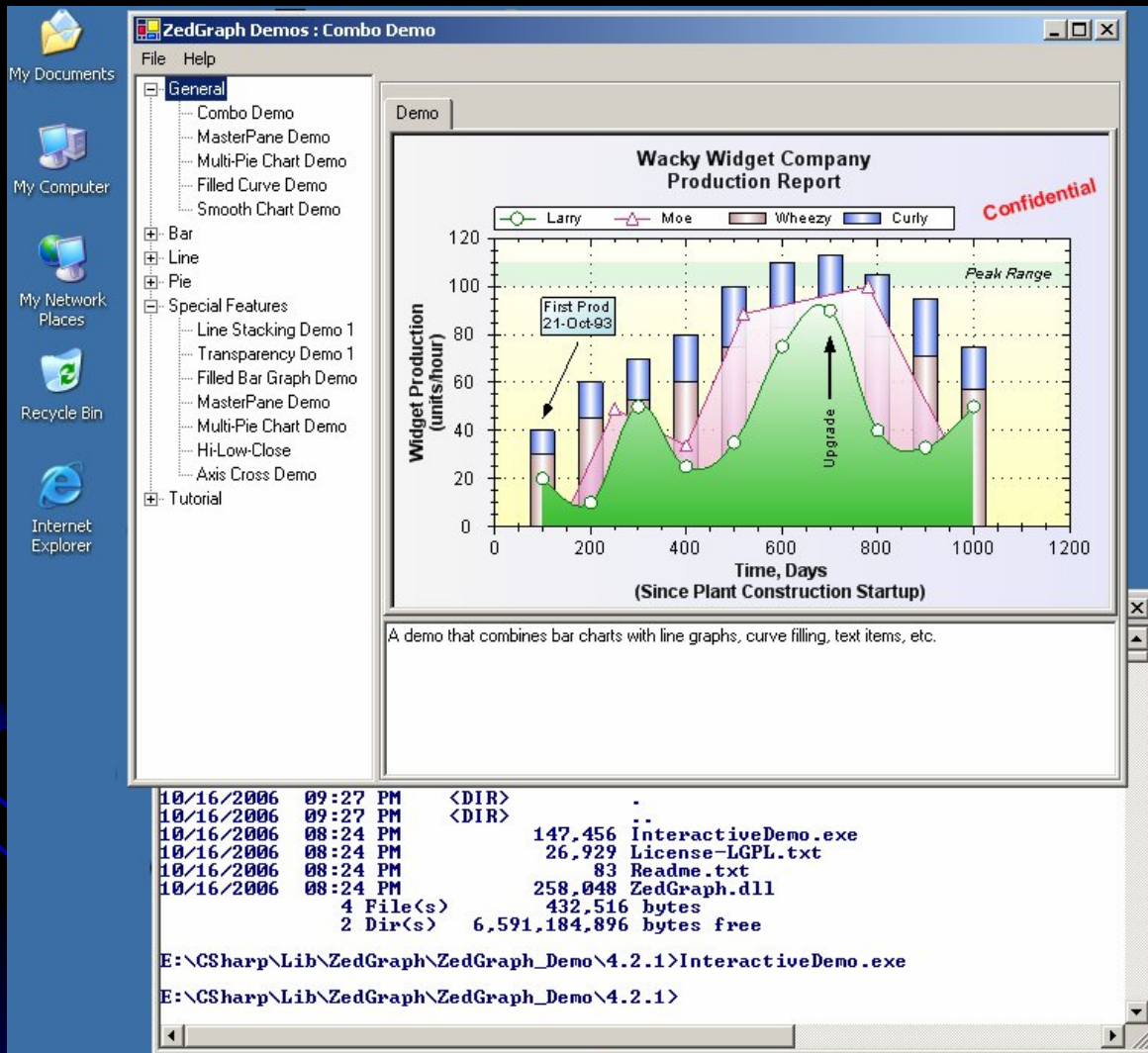
***Mono User and Developers Meeting
23-24 October 2006; Cambridge, MA, USA.***

Mono for Runtime

- No need to rebuild .NET apps **in principle**
 - C:\> WinApp
 - \$ mono WinApp.exe
- If WinForm is used, it must be .NET 1.1.
 - ZedGraph Demo on Windows and Linux
 - Version 4.x is 1.1, 5.x is 2.0.
 - ZedGrpah.Demo.exe is unchanged.

See ZedGraph.Demo!

ZedGraph 4.2.1 Demo on Windows XP



ZedGraph 4.2.1 Demo on Knoppix 5.0.1

Wacky Widget Company Production Report *Confidential*

Widget Production (units/hour)

Time, Days (Since Plant Construction Startup)

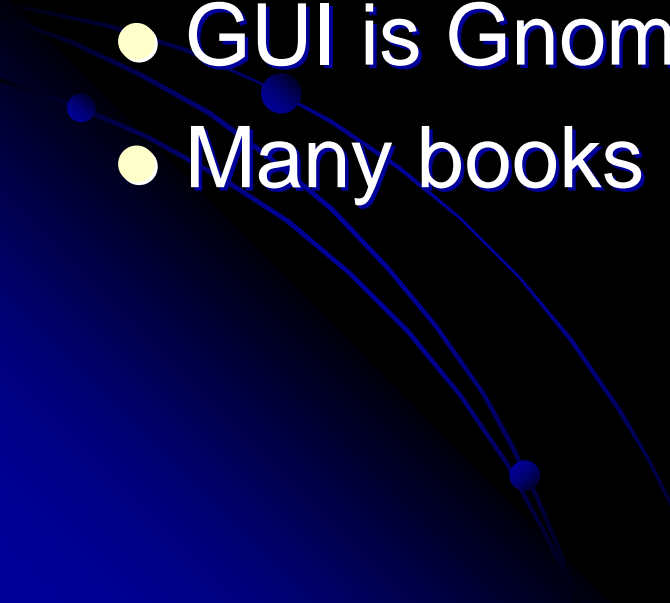
Legend: Larry (green line with circles), Moe (pink line with triangles), Wheezy (brown bars), Curly (blue bars)

Annotations: First Prod 21-Oct-93, Upgrade, Peak Range

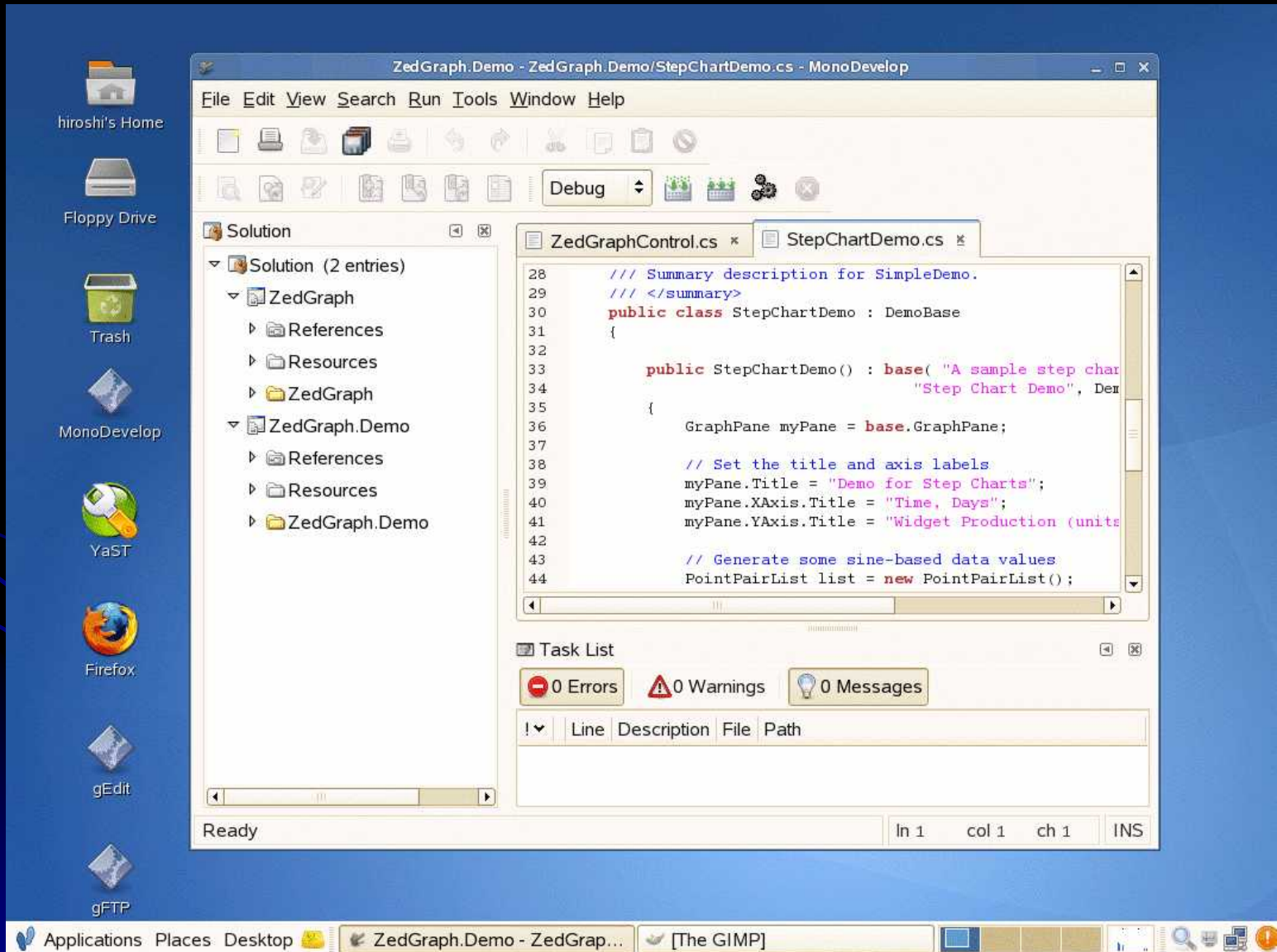
A demo that combines bar charts with line graphs, curve filling, text items, etc.

```
hiroshi@Knoppix501:~/ZedGraph/Demo/4.2.1$ mono InteractiveDemo.exe
Mono System.Windows.Forms.Assembly [$auto_build_revision$]
KDE colorscheme read
```


Mono for Development

- Tools are supported.
 - Recompiling is often required due to minor incompatibilities.
 - IDE : Mono Develop.
 - GUI is Gnome based.
 - Many books available.
- 

MonoDevelopment on SUSE 10.1



Mono and Linux Distributions

- Mono works even on DamnSmall Linux.
 - SUSE is the easiest for Mono.
 - Knoppix is as good as SUSE for Mono.
 - Redhat/Fedora is also OK.
 - Many other Linux distributions come with Mono.
- 

EPICS on .NET

- SCACOM ActiveX Control in 1998
- SCA.NET for x86 in 2005
- ***SCA.NET for x64 in 2006***

See our companion paper!

- **SCA.NET for Linux in 2006**
 - There was actually nothing to do
 - No need to rebuild SCA.NET

SCA.NET for Mono on Linux

- SCA.NET in C# itself is unchanged.
- “Any CPU” Option to Run Natively on Any CPU.
- DLL Import gets

CA.dll on Windows

CA.so on Linux

```
[DllImport("ca.dll")]
```

```
public static extern
```

```
short ca_field_type (IntPtr ChanID);
```

Portable EPICS Clinet

- Develop on Windows using WinForm and SCA.NET in C#.ul> - Stick to .NET Framework 1.1
 - Use only Portable Controls especially on WinForm.
- Configure Runtime Environment Properly.

Then, the Executable is Portable!

Example

← Windows XP

checker32.exe

WinForm in C# with SCA.NET

395.245218 mA

SR04S IBPM

X0	0.742236	Y0	0.253968
X1	0.808700	Y1	0.219131
X2	0.086225	Y2	-0.345277
X3	0.219161		

RedHat Linux →

Probe

Mono

WinForm in C# with SCA.NET

336.710715 mA

SR04S IBPM

X0	0.695912	Y0	0.197192
X1	0.982497	Y1	0.146642
X2	-0.568778	Y2	-0.384560
X3	-0.417909	Y3	-0.004054

Conclusion

- **Mono is the .NET on Linux.**
 - Mono is catching up with .NET on Windows.
- **SCA.NET for Portable EPICS Clients.**
 - Windows, Linux, *FreeBSD*, *Solaris*, *Mac*, ..
 - 32-bit and 64-bit
 - WinForm for GUI