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.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](http://www.mono-project.com)
Search Mono at [www.wikipedia.org](http://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
- 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
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

```csharp
[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#.
  - 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

RedHat Linux

395.245218 mA

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

336.710715 mA

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