Mono & Moonlight

.net et Silverlight, différemment

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Mono



Multi plateformes, Multi langages

C#

JavaScript

Visual Basic

Java

IronPython

IronRuby

Boo

F#









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APIs

Server

ASP.NET

Apache and **FastCGI**

System.Data **SQL** Server

Client

Gtk#

Windows.Forms

Gdk#

Cocoa#

Mono.Cairo

Pango#

Third Party

Postgress, MySQL Sqlite, Oracle,

Tao.Framework

C5

NDesk.DBus

Infrastructure

Mono.Cecil

Mono.ZeroConf

Mono.Nat

Mono.Addins

Novell.Ldap

Java/IKVM

Mono.RelaxNG

Mono.Fuse

Mono.Torrent

Mono.Nat

Gecko# (Mozilla)

Mono.Upnp

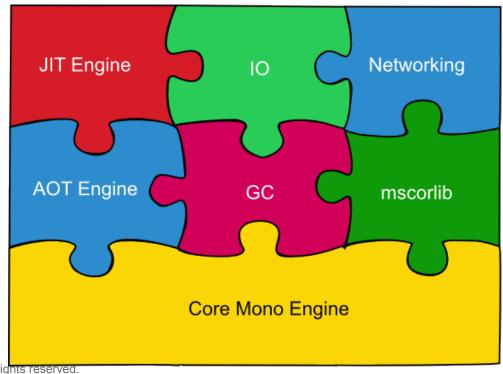
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Runtime Modulaire

· Complet: 100mo

· Minimal: 2mo





Développement

- · 35 personnes chez Novell
- Des centaines de contributeurs

Mono 2.2

- · .net 2.0
 - ADO.NET 2.0
 - ASP.NET 2.0
 - Windows.Forms 2.0
- · .net 3.5
 - C# 3.0
 - LINQ to Objects
 - LINQ expression trees
 - LINQ to XML



JIT

- · Linear IL: nouveau JIT
 - Nouvelle représentation intermédiaire du code
 - Simplifie l'écriture d'optimisations pour le JIT

Effets

- Taille du code natif généré entre 12 et 20% plus petit.
- Génère du code plus optimisé, entre 10 et 30% plus rapide.
- · Generic Sharing:
 - Réutilisation du code natif pour les types génériques compatibles (List<string> et List<object> par exemple).

Full AOT

- Ahead of Time compilation
 - L'équivalent de ngen
 - Pre-compile I'IL en code natif

Effets

- Reduit le temps de démarrage d'une application
- Produit du code légèrement plus lent que le JIT.

Full AOT

- Utilisé sur certains appareils qui n'autorisent pas les JIT.



Mono.Simd

- Simple Instruction Multiple Data
- Librairie managée
- Reconnue par le JIT, qui va remplacer les appels managés par du code natif optimisé.
- Support de SSEx sur x86
- Support d'Altivec pour PPC prévu pour plus tard.

Mono.Simd

```
void UpdatePos (Vector3f [] points, Vector3f delta)
{
   for (int i = 0; i < points.Length; i++)
        points [i] += delta;
}

Vector3f static operator + (Vector3f a, Vector3f b)
{
   return new Vector3f (a.x+b.x, a.y+b.y, a.z+b.z);
}</pre>
```

Mono.Simd, sans

```
00000000 < X UpdatePos>:
                                                69: 89 0c 24
                                                                       %ecx,(%esp)
 0: 55
               push %ebp
                                                6c: 8b 4d d8
                                                                       -0x28(%ebp),%ecx
 1: 8b ec
                     %esp,%ebp
                                                6f: 89 4c 24 04
                                                                        %ecx,0x4(%esp)
 3: 53
               push %ebx
                                               73: 8b 4d dc
                                                                       -0x24(%ebp),%ecx
 4: 57
               push %edi
                                               76: 89 4c 24 08
                                                                        %ecx,0x8(%esp)
                                                                       -0x20(%ebp),%ecx
 5:
    56
               push %esi
                                                   8b 4d e0
 6: 83 ec 38
                       $0x38,%esp
                                               7d: 89 4c 24 0c
                                                                       %ecx,0xc(%esp)
    8b 75 08
                       0x8(%ebp),%esi
                                               81: 83 ec 10
                                                                      $0x10,%esp
 c: 8b 7d 0c
                       0xc(%ebp),%edi
                                               84: 8b 4d c4
                                                                      -0x3c(%ebp),%ecx
 f: 33 db
                xor %ebx,%ebx
                                              87: 89 0c 24
                                                                      %ecx,(%esp)
 11: e9 ad 00 00 00
                    jmp c3 <X_UpdatePos+0xc3>
                                                 8a: 8b 4d c8
                                                                   mov -0x38(%ebp),%ecx
 16: 8b c0
                       %eax,%eax
                                               8d: 89 4c 24 04
                                                                       %ecx,0x4(%esp)
 18:
     39 5e 0c
                       %ebx,0xc(%esi)
                                               91: 8b 4d cc
                                                                       -0x34(%ebp),%ecx
 1b: 0f 86 b5 00 00 00 jbe d6 <X_UpdatePos+0xd6>
                                                 94: 89 4c 24 08
                                                                     mov %ecx,0x8(%esp)
                                                                      -0x30(%ebp),%ecx
 21: 8b cb
                       %ebx,%ecx
                                              98: 8b 4d d0
 23: c1 e1 04
                      $0x4,%ecx
                                              9b: 89 4c 24 0c
                                                                 mov
                                                                       %ecx,0xc(%esp)
                       %esi,%eax
 26:
     8b c6
                                                             push
                                                                   %eax
                 mov
                                                 e8 43 00 00 00
 28: 03 c1
                      %ecx,%eax
                                                                      op Addition
    05 10 00 00 00
                         $0x10,%eax
                                                 83 c4 20
                                                                     $0x20,%esp
 2f: 89 45 bc
                        %eax,-0x44(%ebp)
                                              a8: 8b 45 bc
                                                               mov
                                                                     -0x44(%ebp),%eax
 32: 8b 08
                       (%eax),%ecx
                                                 8b 4d e4
                                                                      -0x1c(%ebp),%ecx
 34: 89 4d c4
                        %ecx,-0x3c(%ebp)
                                              ae: 89 08
                                                                    %ecx,(%eax)
                                                              mov
 37: 8b 48 04
                        0x4(%eax),%ecx
                                                 8b 4d e8
                                                                     -0x18(%ebp),%ecx
                                                               mov
     89 4d c8
                        %ecx,-0x38(%ebp)
                                              b3: 89 48 04
                                                                     %ecx,0x4(%eax)
 3d: 8b 48 08
                        0x8(%eax),%ecx
                                              b6: 8b 4d ec
                                                                      -0x14(%ebp),%ecx
                        %ecx,-0x34(%ebp)
                                                                     %ecx,0x8(%eax)
 40: 89 4d cc
                                              b9: 89 48 08
 43: 8b 40 0c
                        0xc(%eax),%eax
                                              bc: 8b 4d f0
                                                                     -0x10(%ebp),%ecx
                                                               mov
     89 45 d0
                        %eax,-0x30(%ebp)
                                              bf: 89 48 0c
                                                                     %ecx,0xc(%eax)
                                                               mov
 49: 8b 07
                       (%edi),%eax
                                              c2: 43
                                                             inc %ebx
     89 45 d4
                        %eax,-0x2c(%ebp)
                                              c3: 8b 46 0c
                                                                    0xc(%esi),%eax
 4b:
                                                               mov
 4e: 8b 47 04
                        0x4(%edi),%eax
                                              c6: 3b d8
                                                                   %eax,%ebx
 51: 89 45 d8
                        %eax,-0x28(%ebp)
                                                                  18 < X UpdatePos+0x18>
                                                 0f 8c 4a ff ff ff il
 54: 8b 47 08
                        0x8(%edi),%eax
                                              ce: 8d 65 f4
                                                                   -0xc(%ebp),%esp
 57: 89 45 dc
                        %eax,-0x24(%ebp)
                                              d1: 5e
                                                             pop
                                                                  %esi
 5a: 8b 47 0c
                        0xc(%edi),%eax
                                              d2: 5f
                                                            pop
                                                                 %edi
 5d: 89 45 e0
                        %eax,-0x20(%ebp)
                                              d3: 5b
                                                                  %ebx
                                                             pop
 60: 8d 45 e4
                       -0x1c(%ebp),%eax
                                              d4: c9
                                                             leave
 63: 83 ec 10
                        $0x10,%esp
                                             d5: c3
                                                            ret
 66: 8b 4d d4
                        -0x2c(%ebp),%ecx
```

Mono.Simd, avec

```
00000000 < X UpdatePos>:
 0: 55
                 push %ebp
 1: 8b ec
                  mov %esp,%ebp
 3: 53
                 push %ebx
 4: 57
                 push %edi
 5: 56
                 push %esi
 6: 83 ec 04
                   sub $0x4,%esp
 9: 8b 75 08
                   mov 0x8(%ebp),%esi
 c: 8b 7d 0c
                  mov 0xc(%ebp),%edi
 f: 33 db
                 xor %ebx,%ebx
11: eb 29
                  jmp 3c <X_UpdatePos+0x3c>
13: 8d 64 24 00
                     lea 0x0(%esp),%esp
17: 90
                 nop
18: 39 5e 0c
                   cmp %ebx,0xc(%esi)
1b: 0f 86 2a 00 00 00
                      jbe 4b <X_UpdatePos+0x4b>
21: 8b cb
                  mov %ebx,%ecx
23: c1 e1 04
                   shl $0x4,%ecx
26: 8b c6
                  mov %esi,%eax
28: 03 c1
                  add %ecx,%eax
2a: 05 10 00 00 00
                      add $0x10,%eax
2f: 0f 10 00
                   movups (%eax),%xmm0
32: Of 10 Of
                   movups (%edi),%xmm1
35: 0f 58 c1
                   addps %xmm1,%xmm0
38: 0f 11 00
                   movups %xmm0,(%eax)
3b: 43
                 inc %ebx
3c: 8b 46 0c
                   mov 0xc(%esi),%eax
                  cmp %eax,%ebx
3f: 3b d8
41: 7c d5
                  jl 18 <X_UpdatePos+0x18>
43: 8d 65 f4
                   lea -0xc(%ebp),%esp
                      %esi
46: 5e
                 pop
47: 5f
                 pop
                      %edi
48: 5b
                 pop
                      %ebx
49: c9
                 leave
4a: c3
                 ret
```



Compiler Service

- Compilateur C# écrit en C#
- Mono.CSharp.Evaluator
 - Evaluation C# dynamique



Mono.CSharp

- · REPL
- Scripting
- Prototypage

Demo - csharp



Mono.Management

- Mono.Attach.VirtualMachine
 - Connection à un processus Mono,
 - Dans l'AppDomain racine,
 - Dans un nouveau thread.
- Permet d'obtenir des informations sur l'état d'un programme.
- · Automation de programmes qui n'ont pas été pensés pour à la base.

Demo - gsharp



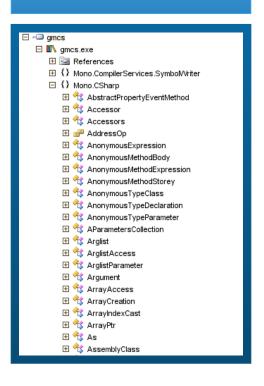
Mono Linker, Mono Tuner

- · Outils d'optimisation et de manipulation d'assemblies
- Le Linker enlève tout ce qui n'est pas nécessaire à une application
- · Le Tuner applique des transformations



Mono Linker, Mono Tuner, example

Complete C# Compiler



Mono Linker

- Mono.CecilModifie le codeGarde le nécessaire
- Mono Tuner
- □ Ajuste l'api

link.xml

Mono.CSharp



MonoDevelop 2.0

- IDE complet
- · Compatibilité Visual Studio sln, .csproj
- Code Completion
- Refactoring
- Addins
 - SGBDR
 - Boo, Java, Python, Nemerle, F#, ...
- Debugger



mdb

- · Mono a enfin un debugger.
- · Interface en ligne de commande.
- · Intégration MonoDevelop.
- · Intégration Visual Studio en développement.

Demo - MonoDevelop

Gendarme

- · Analyse statique à la FxCop
- Wizard Windows.
- · 210 règles
 - BadPractice
 - Concurrency
 - Correctness
 - Design
 - Interoperability
 - Maintainability
 - Naming
 - Performances
 - Portability
 - Security



MoMA

- · Outil d'aide à la portabilité
- Analyse statique des assemblies
- · Potentiels problèmes:
 - P/Invoke,
 - Méthode non existante,
 - MonoTODO,
 - NotImplementedException

Moonlight



Moonlight 1.0

- Implémente Silverlight 1.0
- N'utilise pas Mono
- http://go-mono.com/moonlight/





Accord Novell, Microsoft

- Microsoft doit fournir:
 - Les spécifications
 - Les tests
 - Les codecs
- Novell doit fournir:
 - Une implémentation qui passe les tests
 - Et qui fonctionne sur les plus grosses distributions Linux



Moonlight 2.0

- · Cible Silverlight 2.0
- · Utilise Mono pour exécuter le code managé.
- beta pour MIX/09
- · Intégration avec le desktop.

Conclusion



Liens

- http://www.mono-project.com
- http://www.mono-project.com/Start
- http://www.go-mono.com/monologue
- http://evain.net/blog/

Questions

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