

Fan



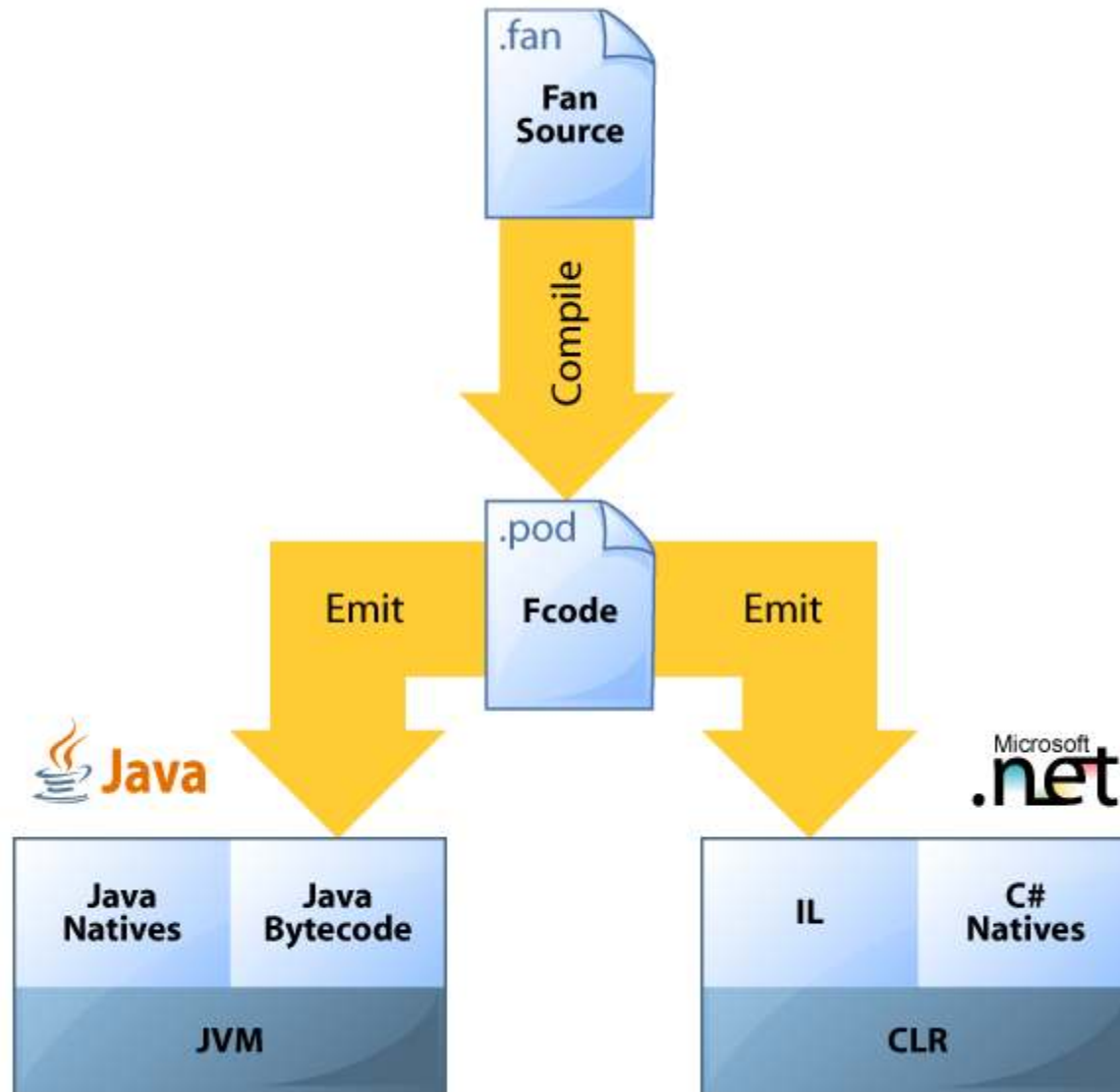
Fan: Java and .NET Portability

Brian Frank

- Bytecode Portability
 - Compile to fcode
 - Pods: modules of deployment
 - Emit fcode to Java bytecode and IL at runtime
- API Portability
 - sys: entirely implemented in Java and C#
 - inet, sql, fwt: native methods in Java and C#
 - everything else pure Fan

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Architecture



Fan	Java	.NET
LoadVar	aload_x	ldarg_x, ldloc_x
CallStatic	invokestatic	call
Cast	checkcast	castclass
Leave	goto	leave
JumpFinally	jsr	no op
FinallyEnd	ret	endfinally

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Locals

```
if (flag) { int i=9; }  
else { String s = "str"; }
```

```
0:   iload_0
```

```
1:   ifeq     10
```

```
4:   bipush  9
```

```
6:   istore_1
```

```
7:   goto     13
```

```
10:  ldc      #2; //String str
```

```
12:  astore_1
```

```
13:  return
```

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Locals

[Param 0] flag -> sys::Bool

[Local 1] i -> sys::Int

[Local 2] s -> sys::Str

[Code]

0: LoadVar 0

3: JumpFalse 15

6: LoadInt 9

9: StoreVar 1

12: Jump 21

15: LoadStr str

18: StoreVar 2

21: ReturnVoid

```
return x = 5;
```

```
0:    aload_0
```

```
1:    iconst_5
```

```
2:    dup_x1
```

```
3:    putfield #2; //Field x:I
```

```
6:    ireturn
```

```
int temp = 5;
```

```
x = temp;
```

```
return temp;
```

- Protected Blocks:
 - Leave opcode
 - Language restrictions
 - Store return values in temp local
 - Fcode: Leave, JumpFinally, CatchErrStart, CatchEnd, FinallyStart, FinallyEnd
- Native exception clause
 - `sys::NullErr`, `NullPointerException`, `NullReferenceException`

- .NET built-in emit APIs
- PERWAPI (Ruby.NET)
- Emit granularity
 - Java: classfile
 - .NET: assembly
- Emit to disk to get line numbers (pdb file)
- Cache DLLs to disk

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Native Methods

```
native Int size()
```

```
// Java
```

```
public final Int size() {  
    return Int.make(val.length()); }  
}
```

```
// C#
```

```
public Int size() {  
    return Int.make(val.Length); }  
}
```

- Naming Conventions
 - Lower camel versus upper camel
 - trimEnd() → TrimEnd()
 - C# member cannot conflict with type (ie map)
- API semantics:
 - Custom DateTime, TimeZone
 - .NET has no API for zip files
- Test suite!

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The End

Questions?

(if time permits)