

FUNCTIONAL ARCHITECTURE

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Trayport

INTERNATIONAL
SOFTWARE DEVELOPMENT
CONFERENCE

gotocon.com

About Me



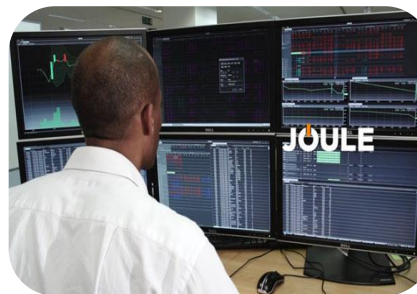
Family Values



Retail



Halo 3



Trade

Programming Languages

Assemblers

- 6502
- Z80
- 680x0
- 80x86
- 65c816
- SH-2
- R3000
- C

C with Classes

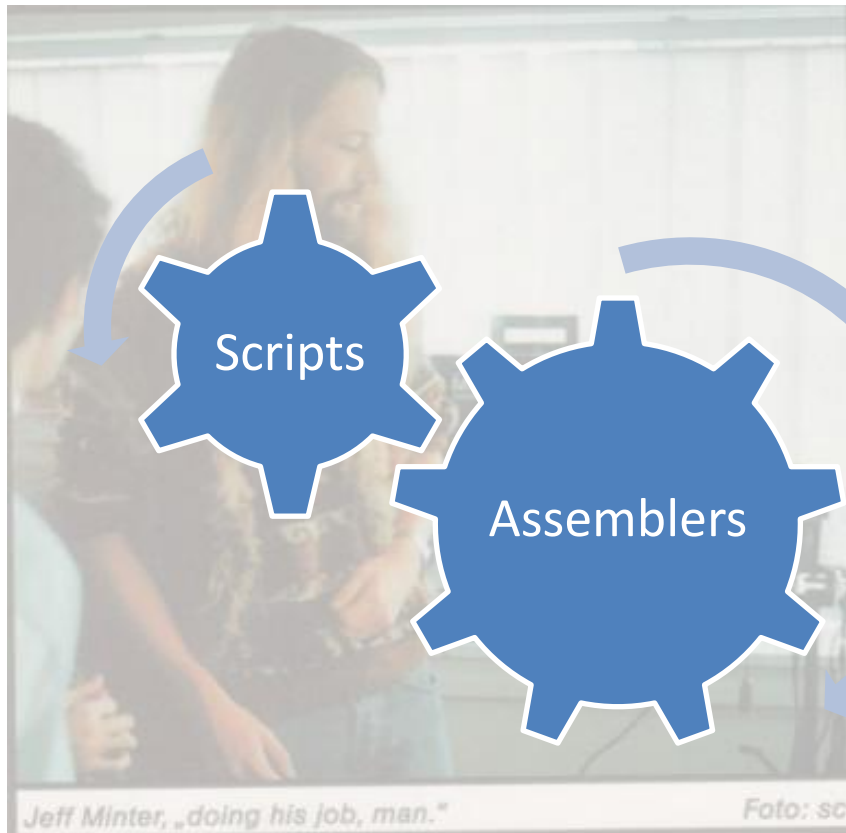
- C++
- Java
- C#

Functional

- JavaScript
- F#
- Lua

Video Game Decades

1980s/1990s



2000s/2010s



Coroutine Zombies

Pseudo Code

random_pause 10

while not dead

 wait_until_in_range 50.0

 home_in_on_target 10

Coroutine Zombies

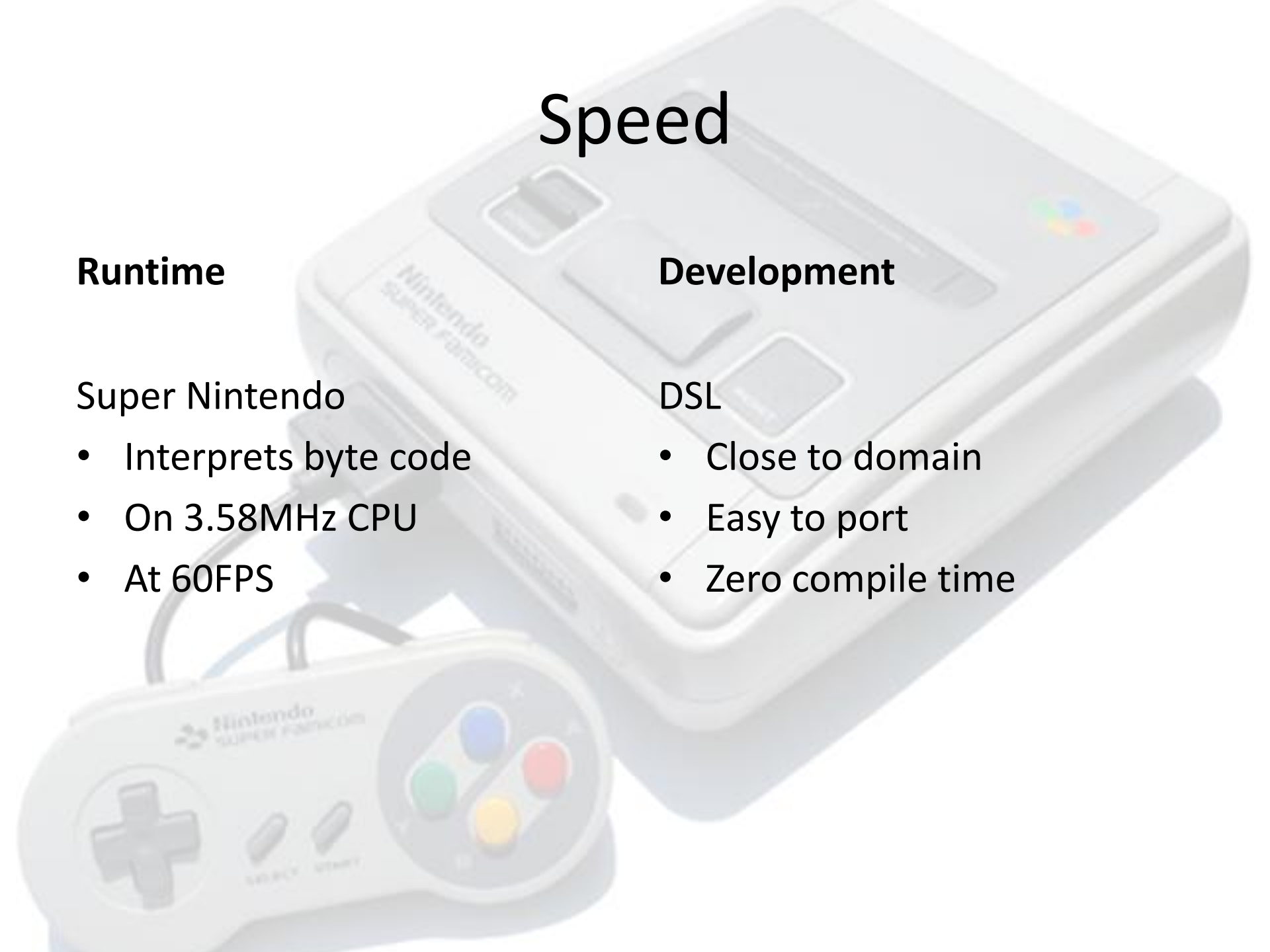
Pseudo Code

```
random_pause 10  
while not dead  
    wait_until_in_range 50.0  
    home_in_on_target 10
```

F#

```
yield! random_pause 10  
while true do  
    yield! wait_range 50  
    yield! home_in 10
```

Speed

A faded background image of a Super Nintendo Entertainment System (SNES) console and its controller. The console is light gray with a dark gray top panel. It has a cartridge slot, a power button, and a reset button. The controller is also light gray with a dark gray top panel, featuring a directional pad, two buttons labeled 'SELECT' and 'START', and four colored buttons (blue, red, yellow, green). The text 'Nintendo SUPER NINTENDO' is visible on both the console and the controller.

Runtime

Super Nintendo

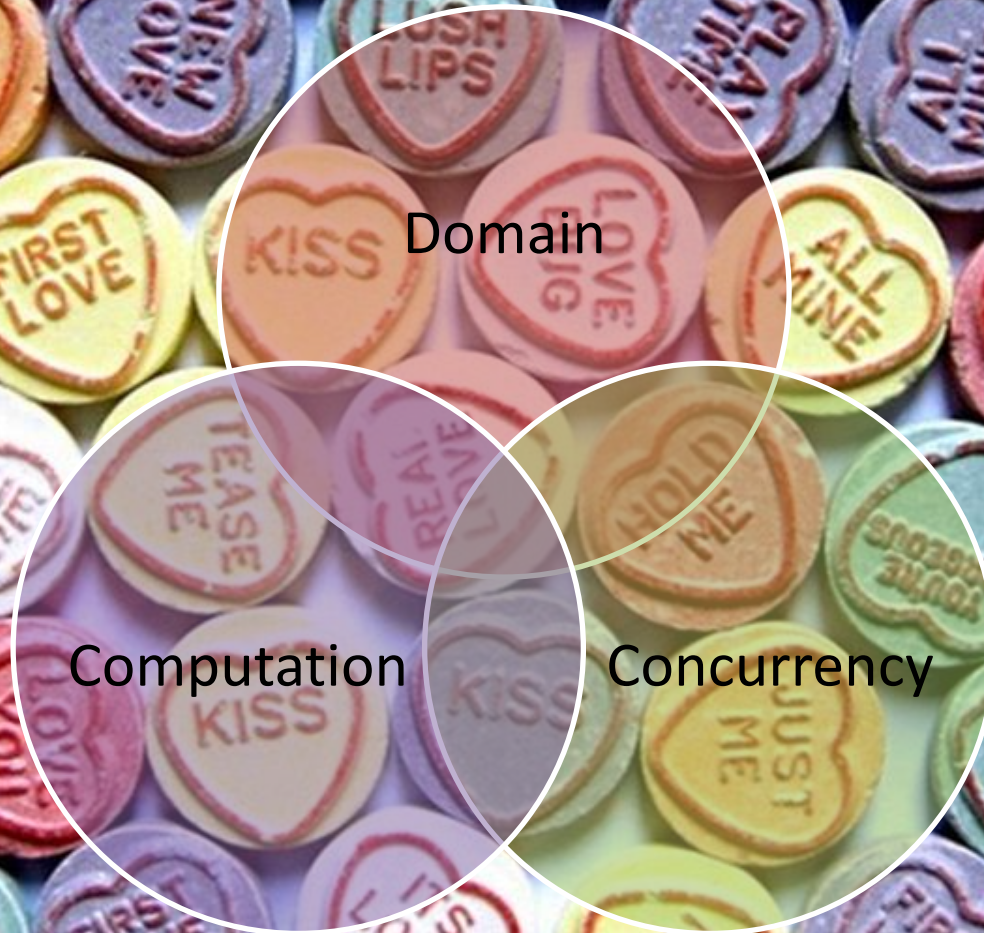
- Interprets byte code
- On 3.58MHz CPU
- At 60FPS

Development

DSL

- Close to domain
- Easy to port
- Zero compile time

FP Sweet Spots

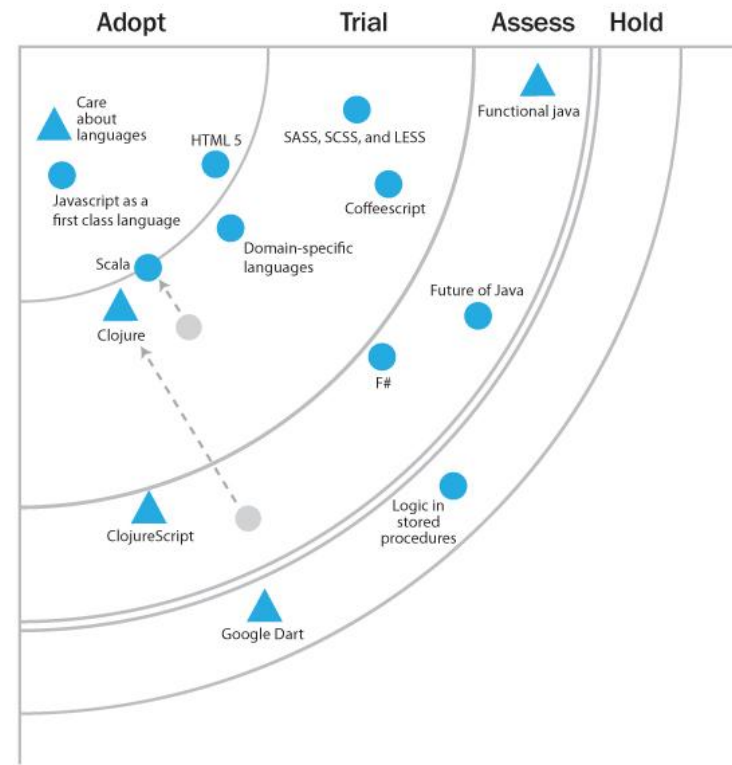


Thoughtworks Tech Radar 2012

F#

*“F# is excellent at **concisely** expressing business and **domain logic**.”*

Languages



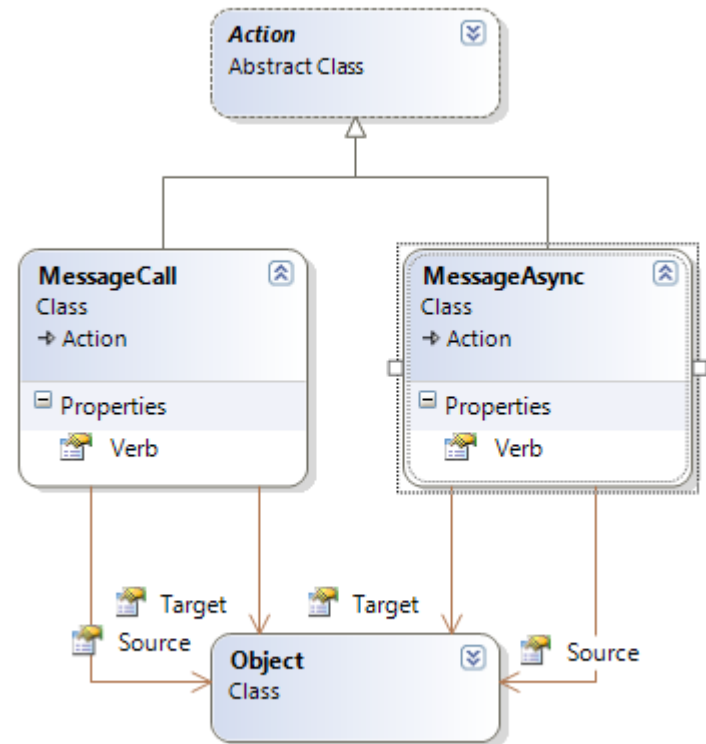
Types

F#

```
type Object(name) =  
    member this.Name = name
```

```
type Action =  
    | Call of Object * string * Object  
    | Async of Object * string * Object
```

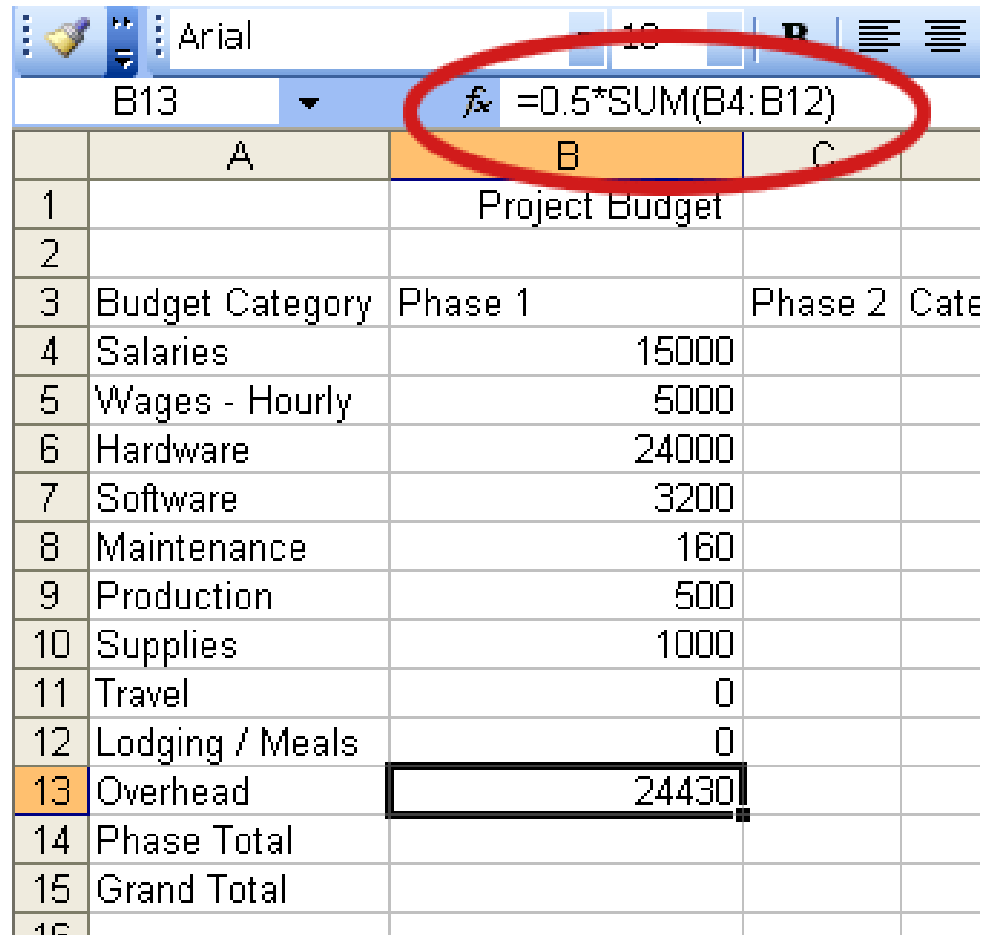
UML Class Diagram



Functions

ImPLY : Instrument[] -> Order[] -> Order[]

Computation



	A	B	C
1		Project Budget	
2			
3	Budget Category	Phase 1	Phase 2
4	Salaries	15000	
5	Wages - Hourly	5000	
6	Hardware	24000	
7	Software	3200	
8	Maintenance	160	
9	Production	500	
10	Supplies	1000	
11	Travel	0	
12	Lodging / Meals	0	
13	Overhead	24430	
14	Phase Total		
15	Grand Total		

Concurrency

```
async {  
  do! control.MouseLeftButtonDown  
    |> Async.AwaitEvent  
}
```

Joule Trading screen



Thoughtworks Tech Radar 2012

*“Developers trying to achieve explicit business logic within an application may opt to express their **domain in F#** with the majority of **plumbing code in C#.**”*

Applications



Erlang for Fault Tolerant Messaging

- Messaging in Chat, Gaming, Messaging, NoSQL
- Facebook, MMOG, RabbitMQ, Amazon, ...



F#/Scala

- Computation in Insurance, Finance, Gaming
- Credit Suisse, Jane Street, TrueSkill, Path of Go, ...



C#/Java/PHP/Python/Ruby...

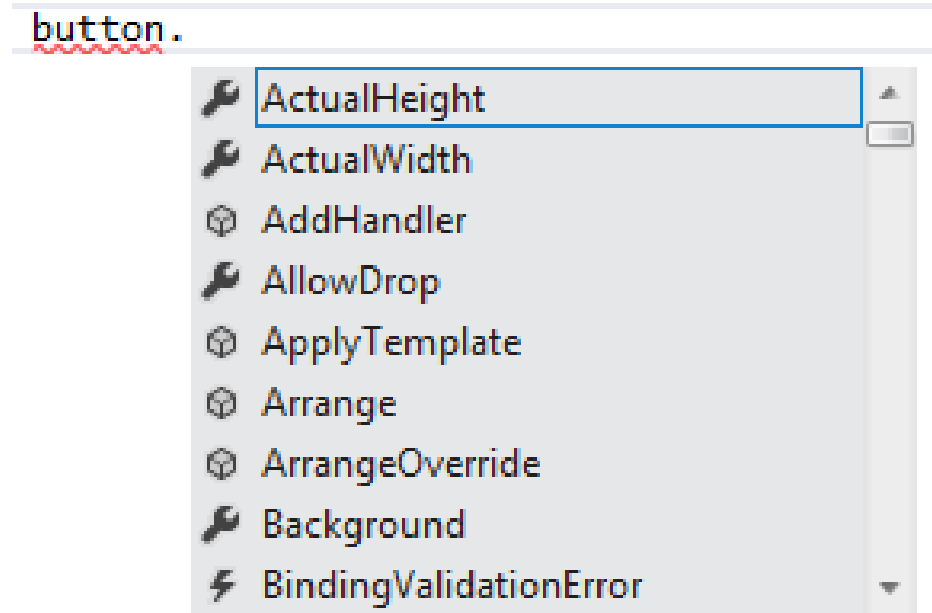
- CRUD in Line of Business Applications
- Everything else

Classes

reference.Member(argument, ...)

Member5(reference, argument, ...)

Dot Driven Development



Buttons

Methods	63
Properties	63
Events	35
Constructors	1
Total Members	162

Button Class

Silverlight | [Other Versions](#) ▾

Represents a button control.

▲ Inheritance Hierarchy

System.Object
System.Windows.DependencyObject
System.Windows.UIElement
System.Windows.FrameworkElement
System.Windows.Controls.Control
System.Windows.Controls.ContentControl
System.Windows.Controls.Primitives.ButtonBase
System.Windows.Controls.Button
[More...](#)

XBLA: Path to Go – F# AI



Q & A

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