Flash Player Architecture

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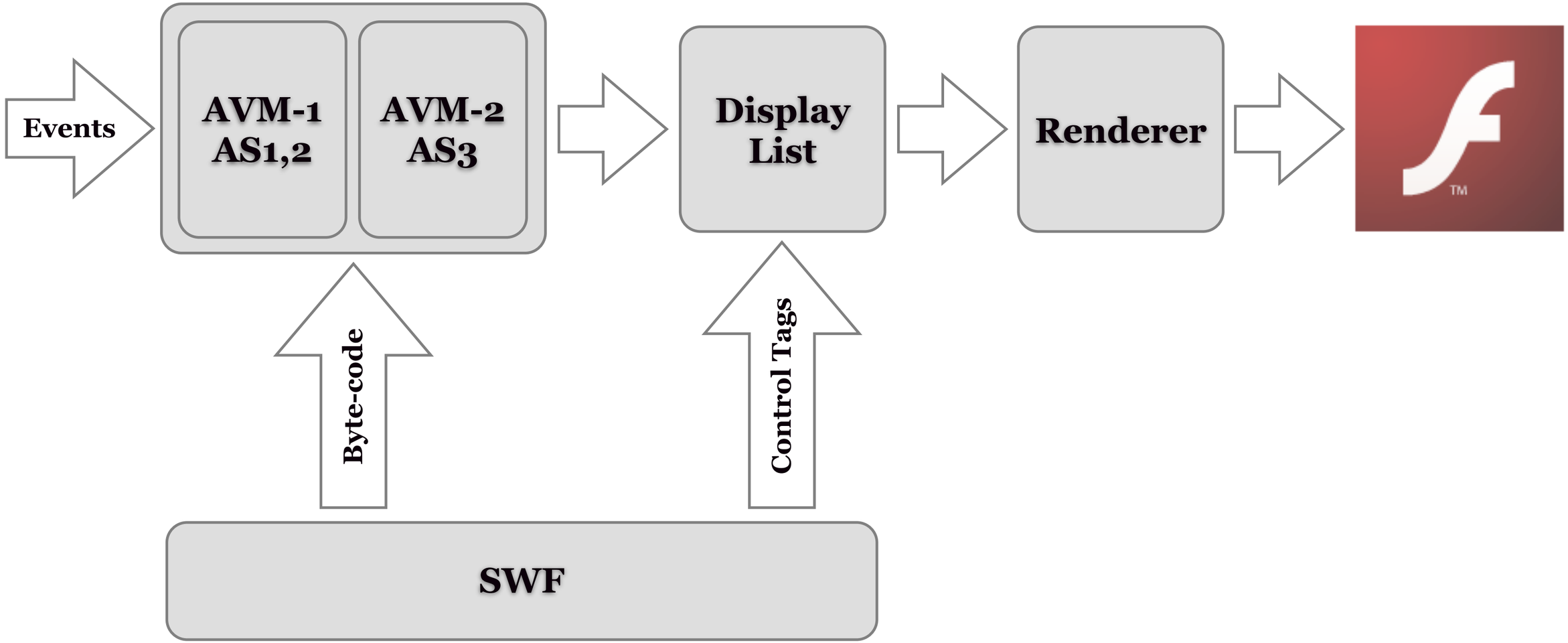

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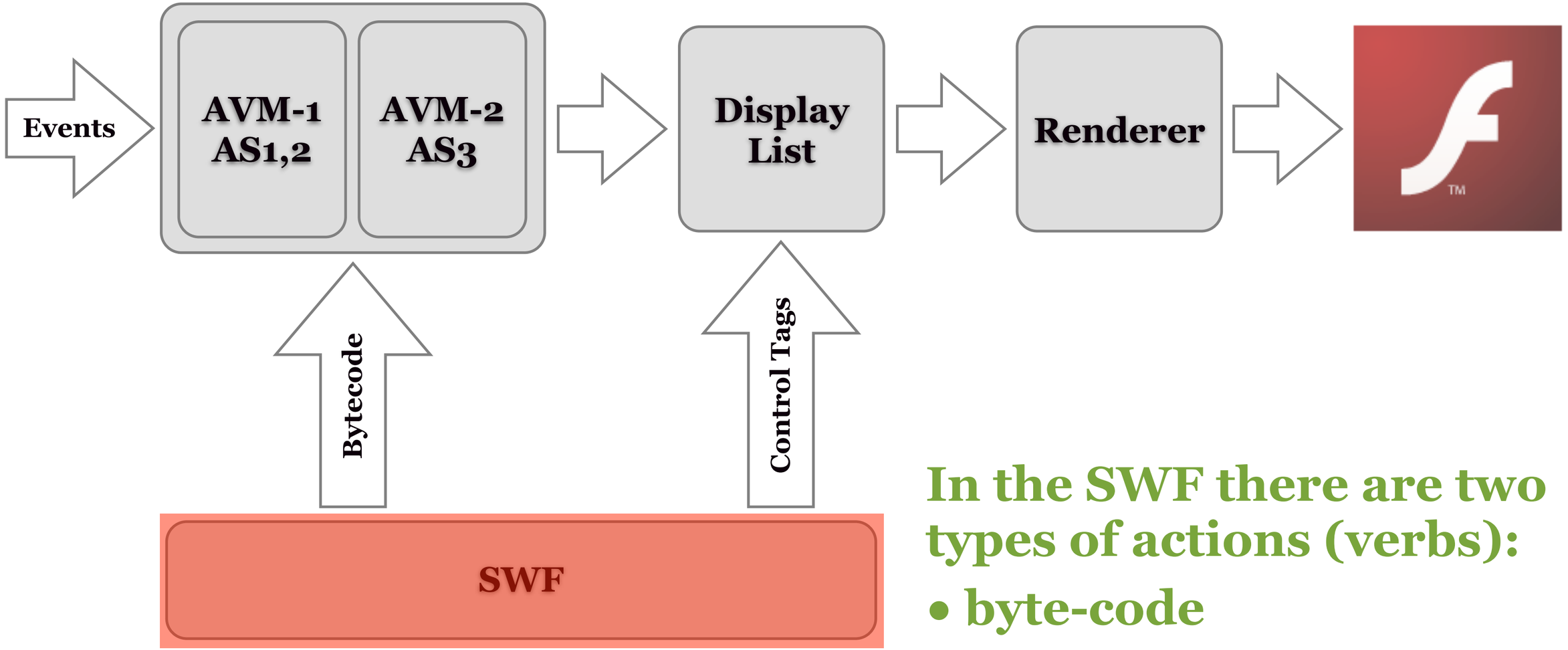

In the SWF there are two types of actions (verbs):

- **byte-code**
- **control tags**

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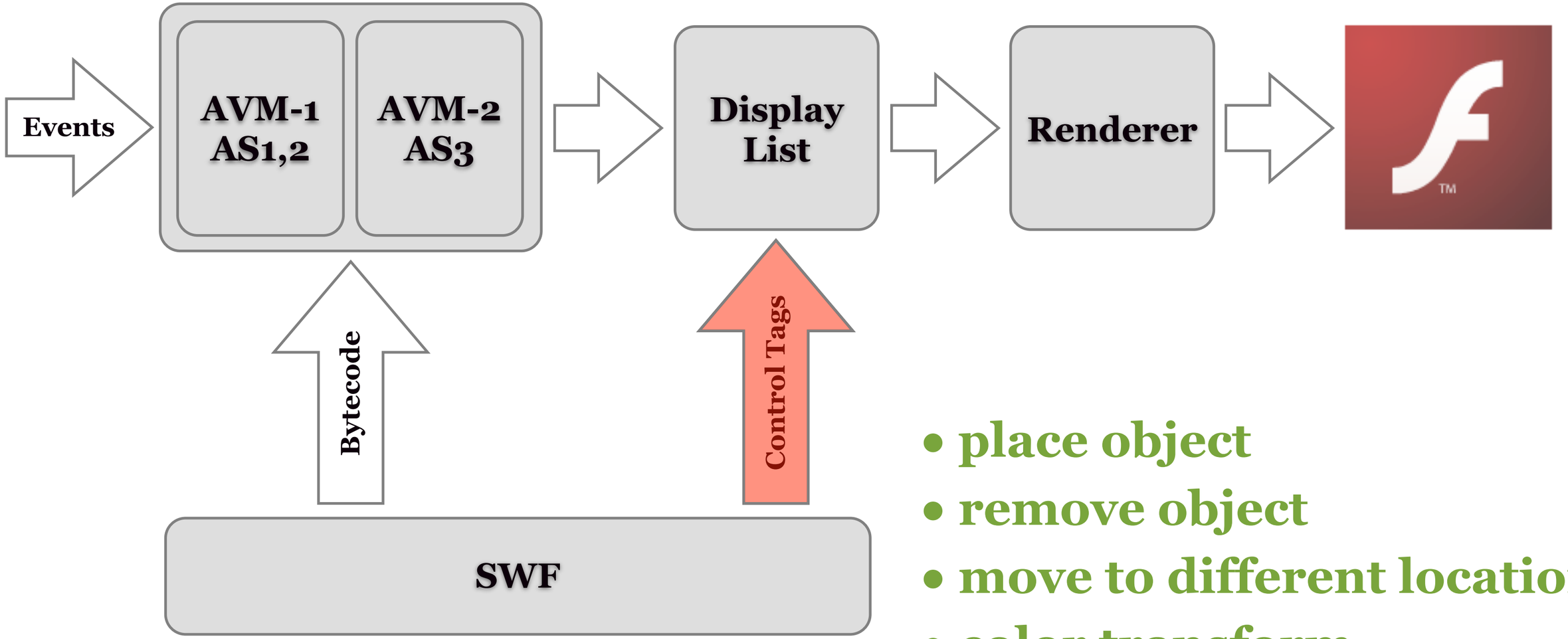

- place object
- remove object
- move to different location
- color transform
- ...

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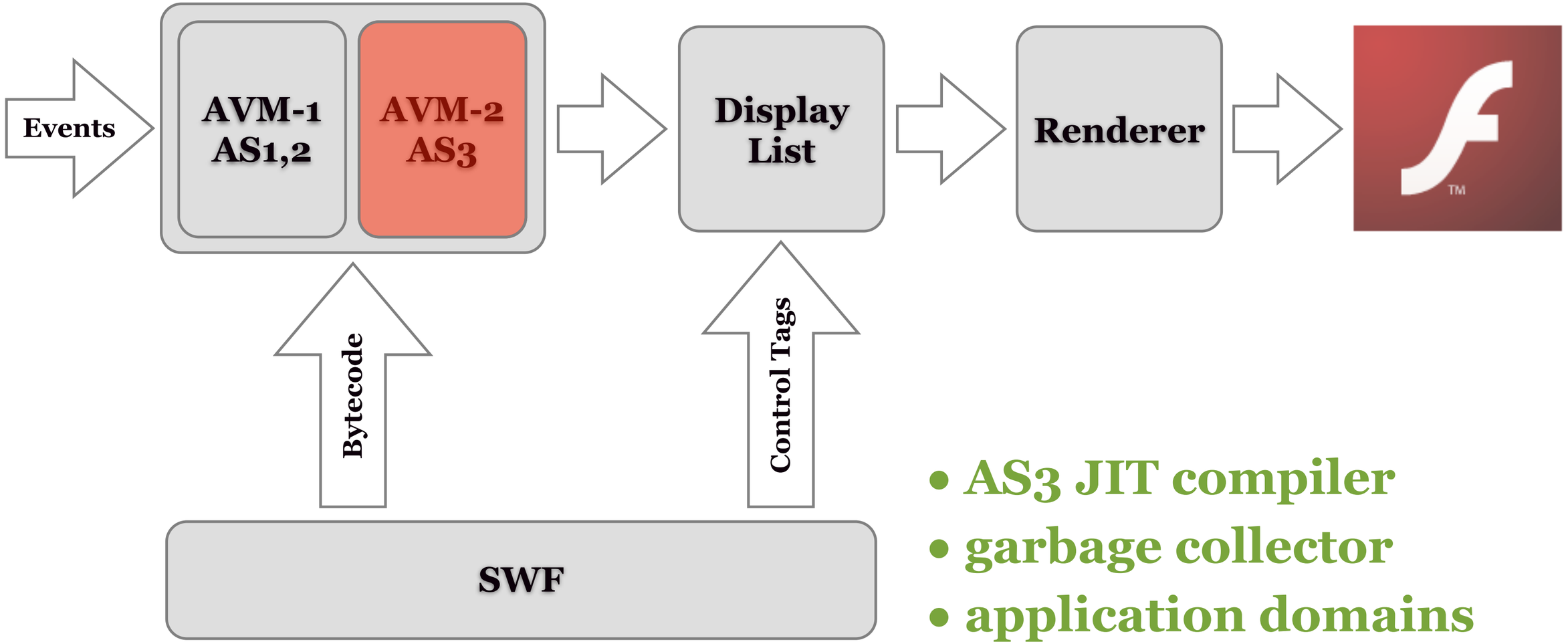

- AS3 JIT compiler
- garbage collector
- application domains
- feeds the *display list*

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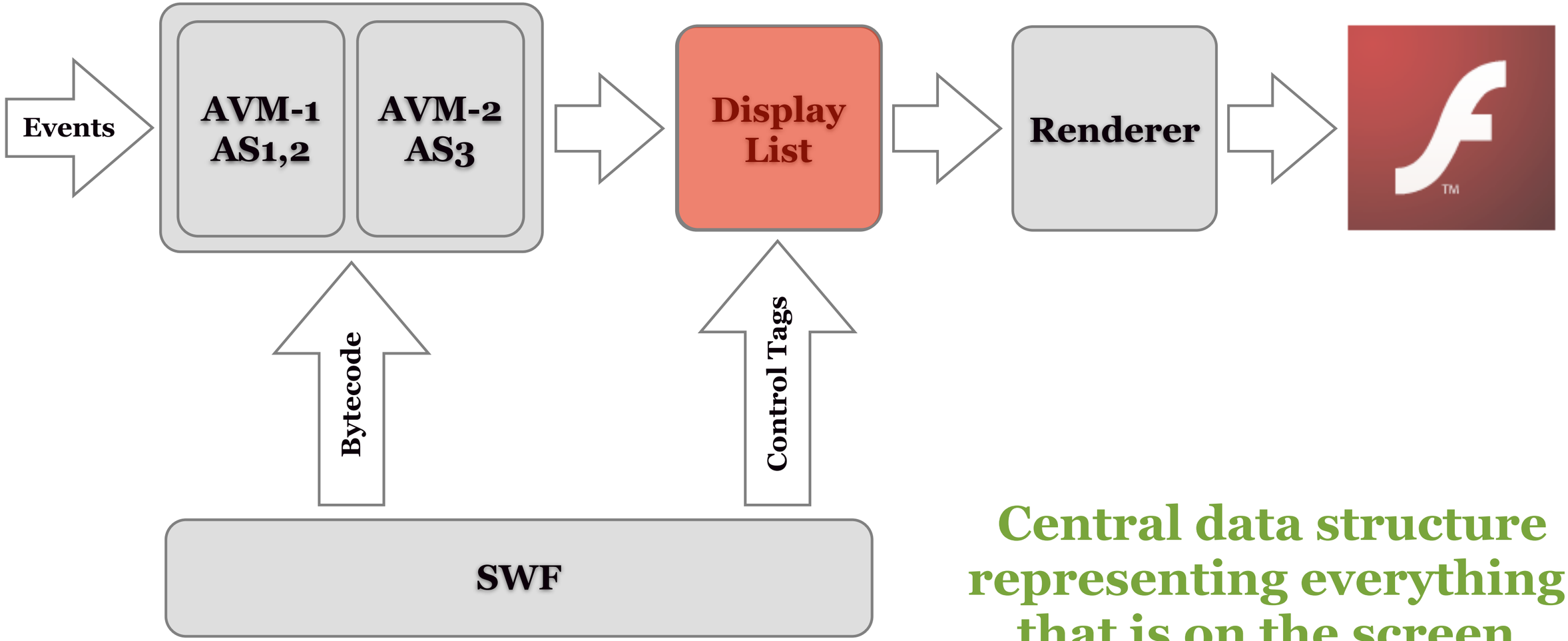
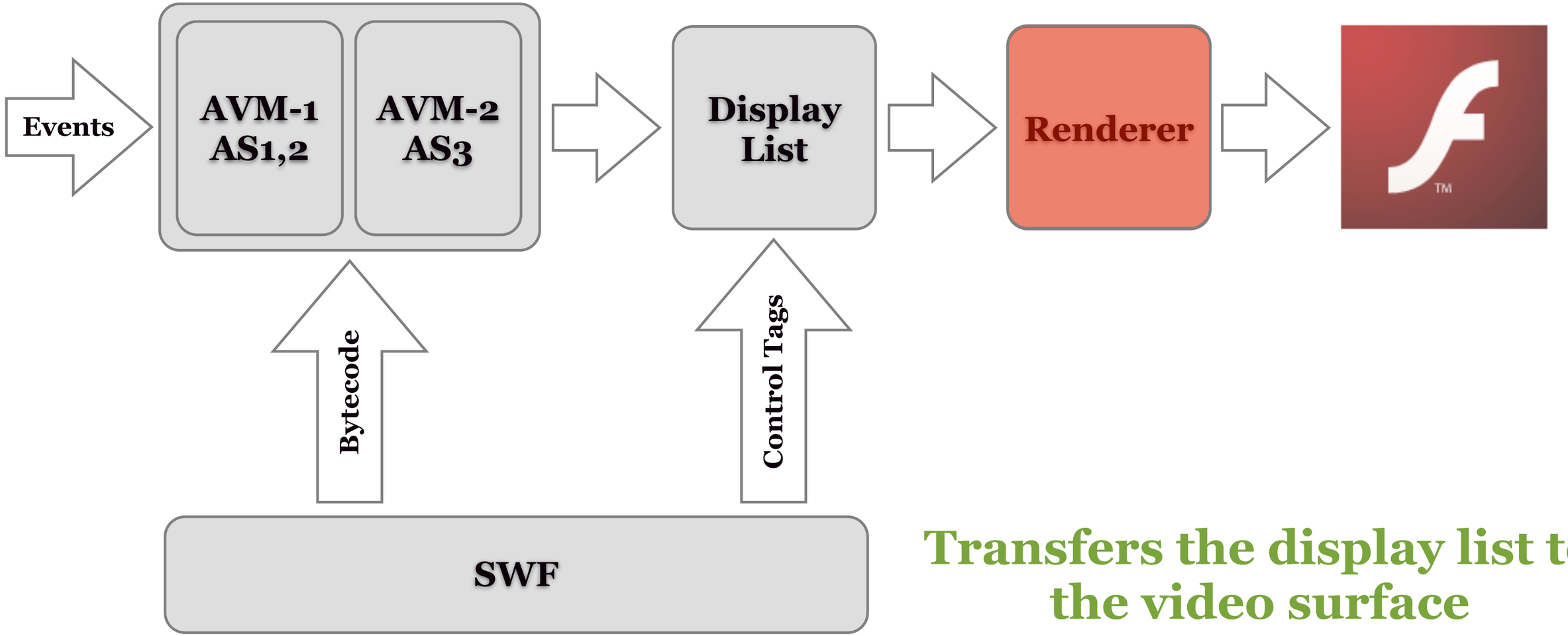


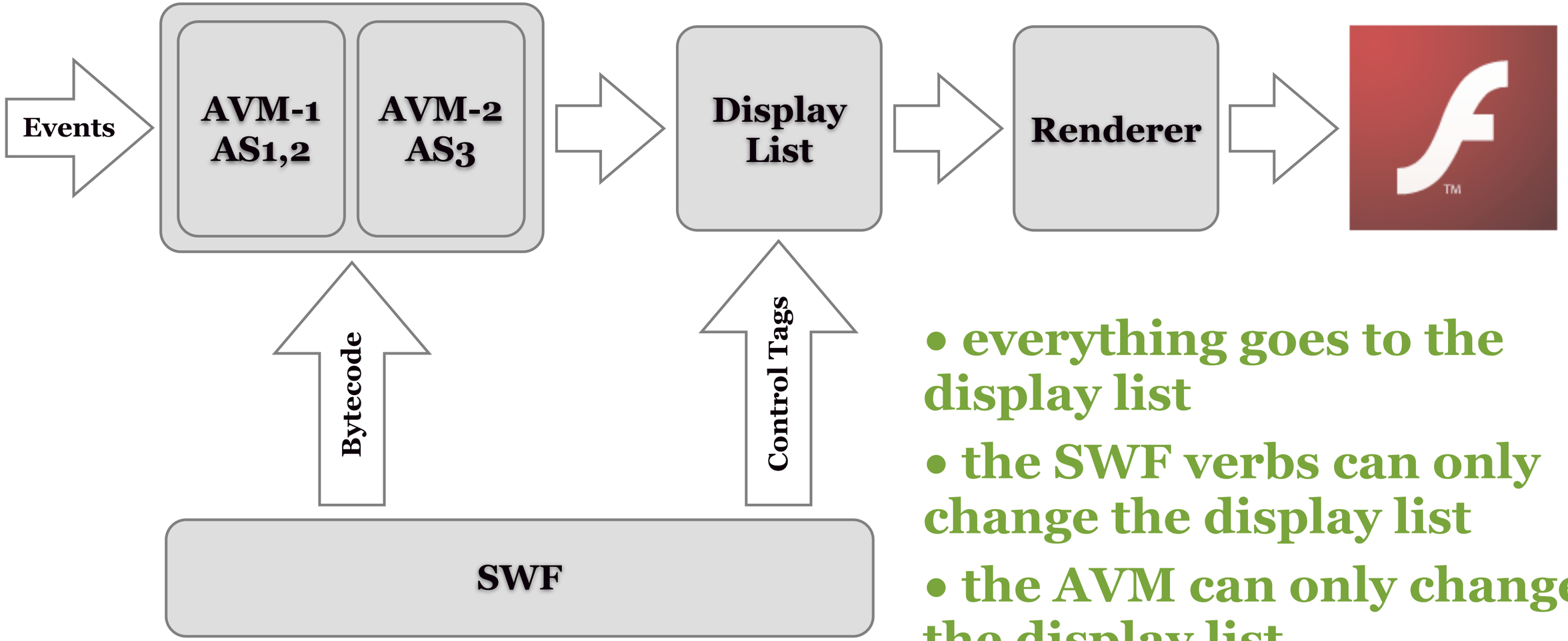
Central data structure representing everything that is on the screen



Transfers the display list to the video surface

Rendering

- shapes are not drawn immediately
- the renderer works in a *retained mode* (a.k.a. double-buffer mode)
- so the renderer needs to hit a pixel only once (avoids flicker)
- the *display list* is the retaining buffer



- everything goes to the display list
- the SWF verbs can only change the display list
- the AVM can only change the display list
- the AVM have no notion of directly rendering to the screen

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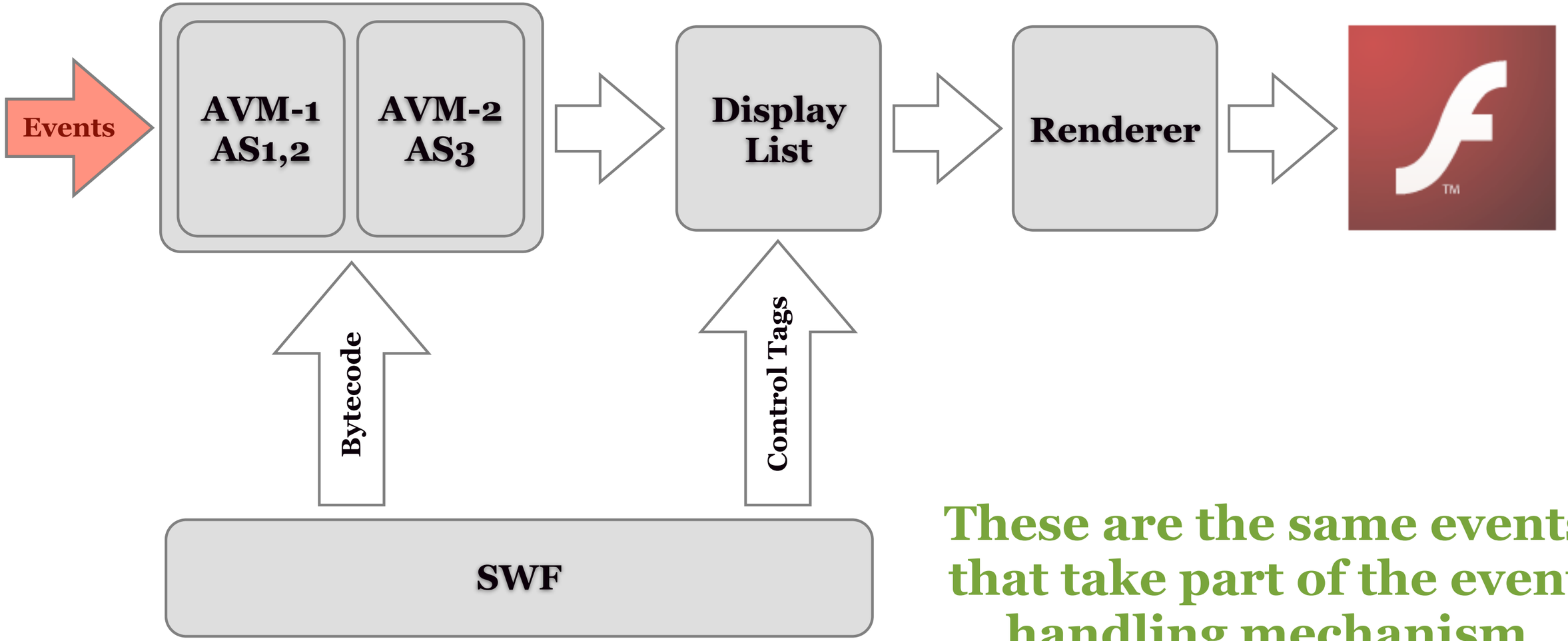
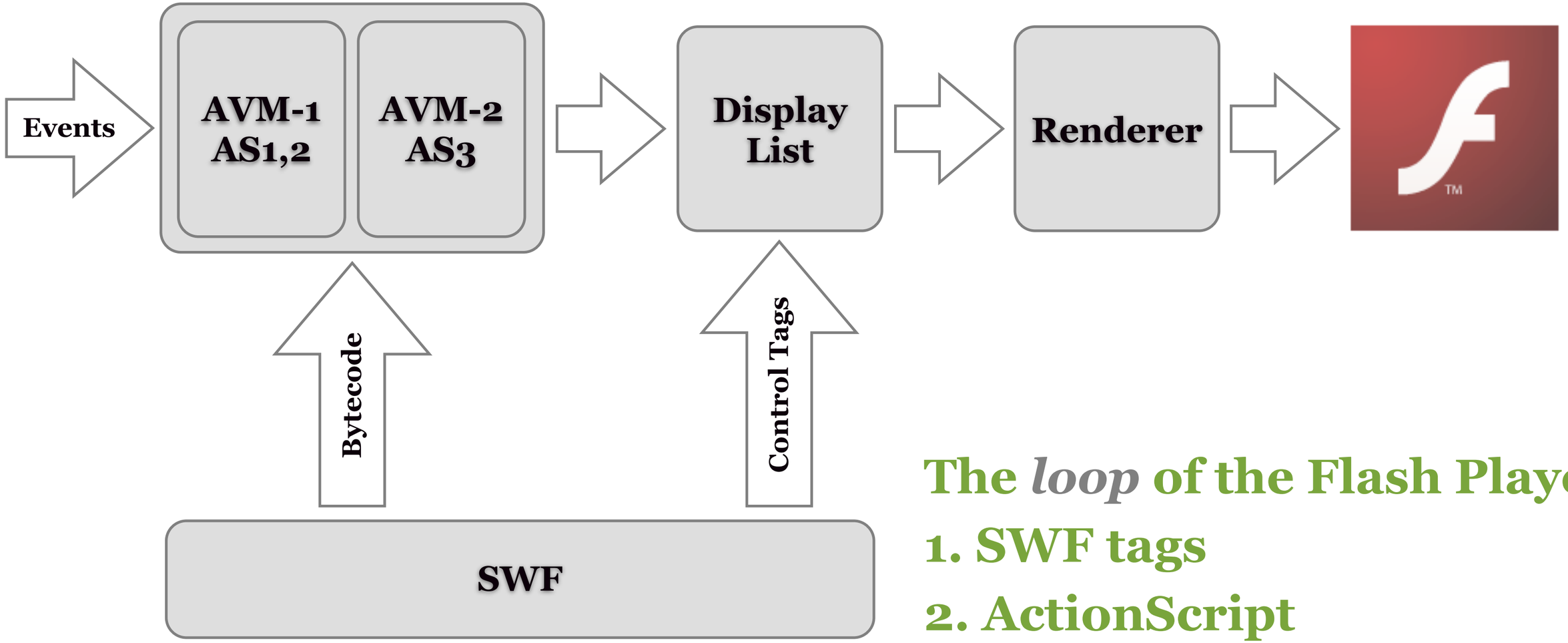


These are the same events that take part of the event handling mechanism



The *loop* of the Flash Player

1. SWF tags
2. ActionScript
3. Render

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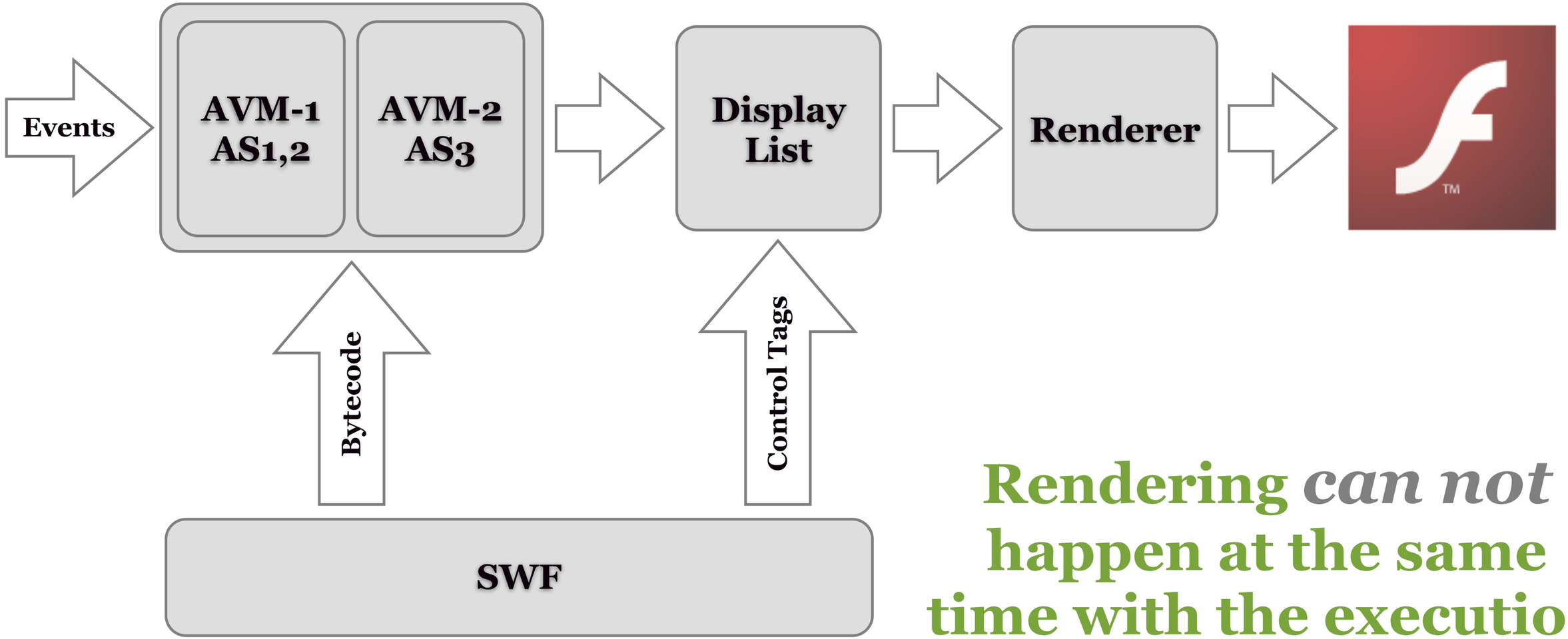

Rendering *can not* happen at the same time with the execution of ActionScript

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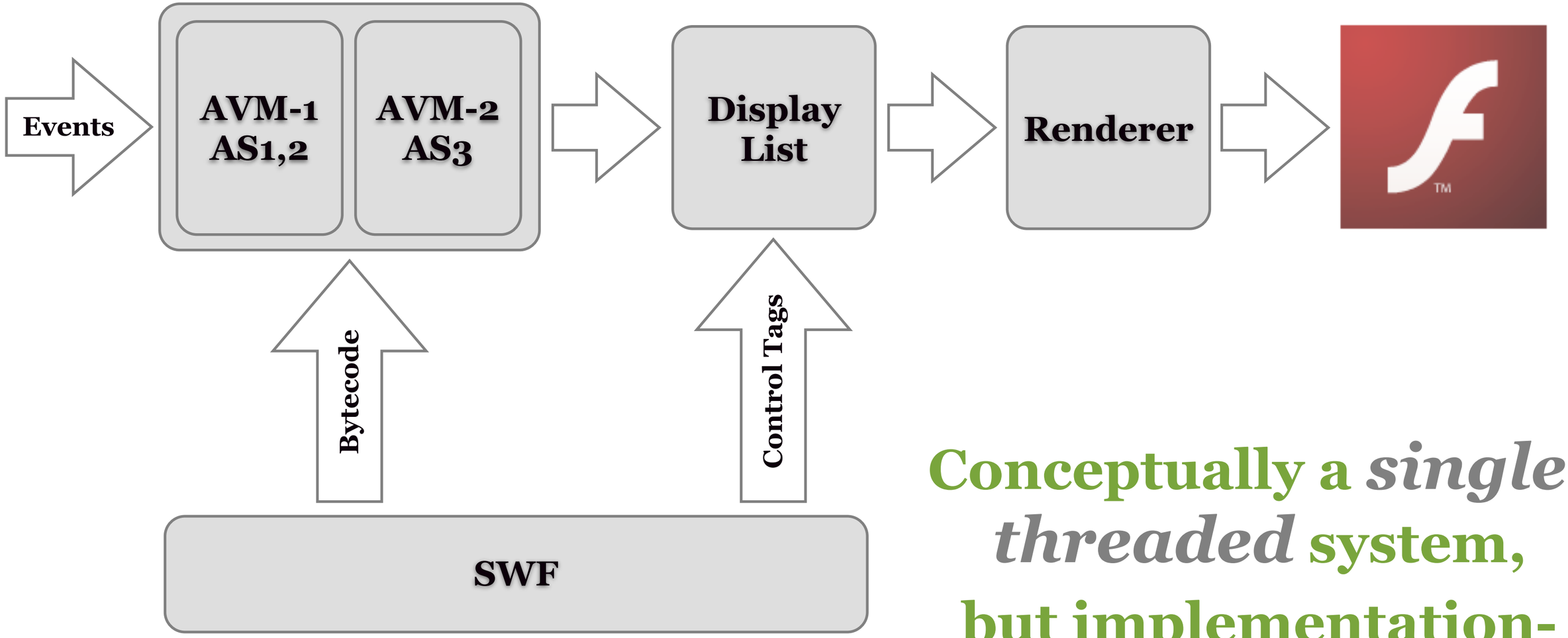

Conceptually a *single-threaded* system,

but implementation-wise it isn't

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The Elastic Racetrack

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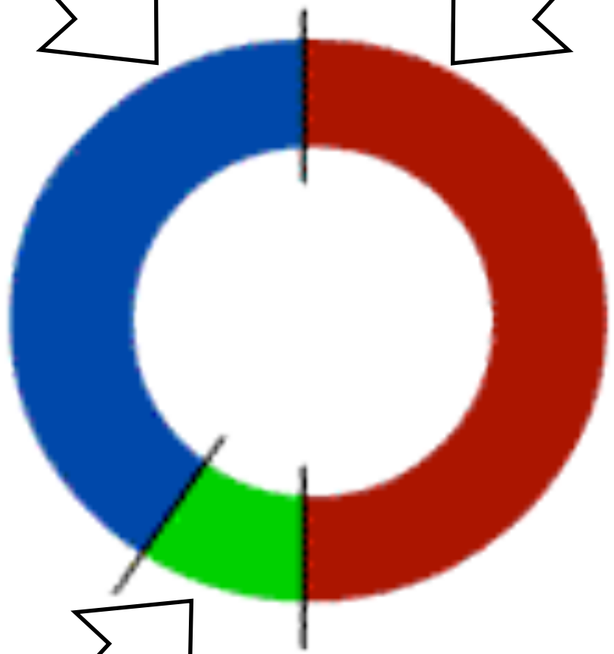
Code Execution
(AS byte-code)

Graphics
Rendering



Events

normal racetrack

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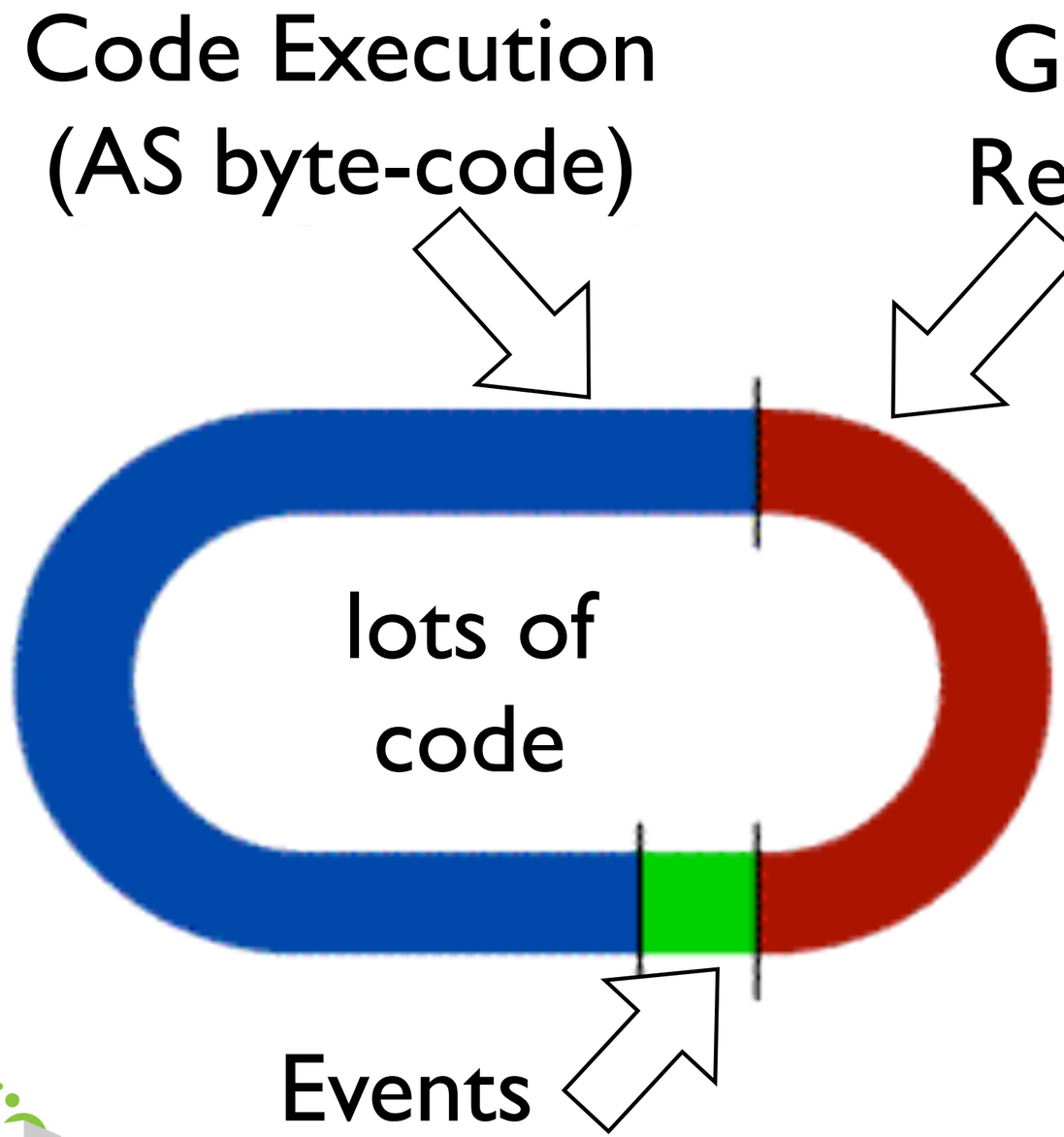

ActionScript heavy

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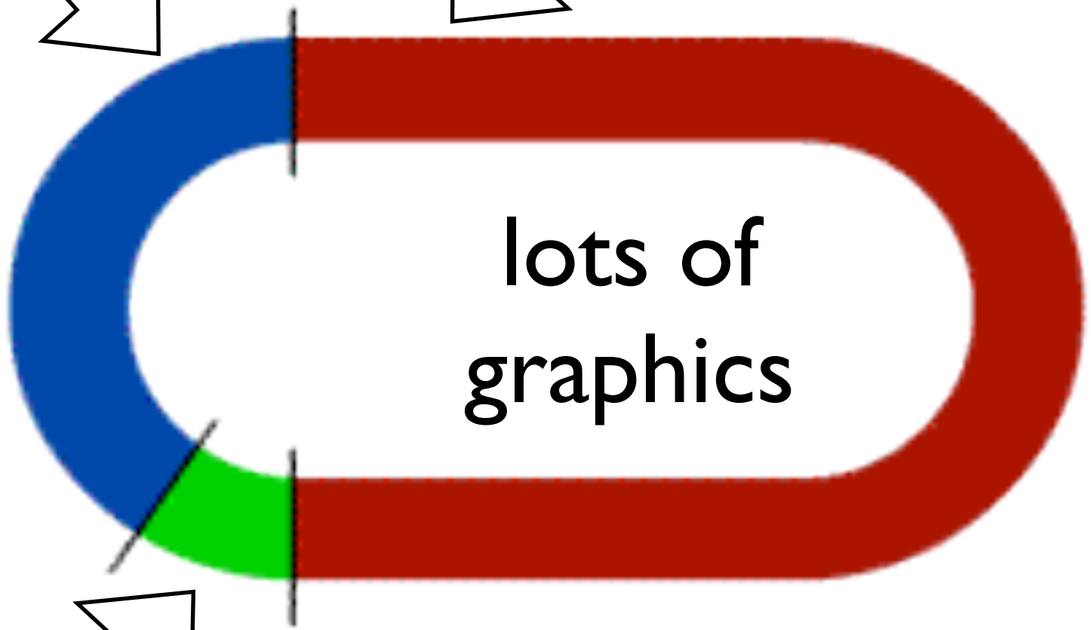
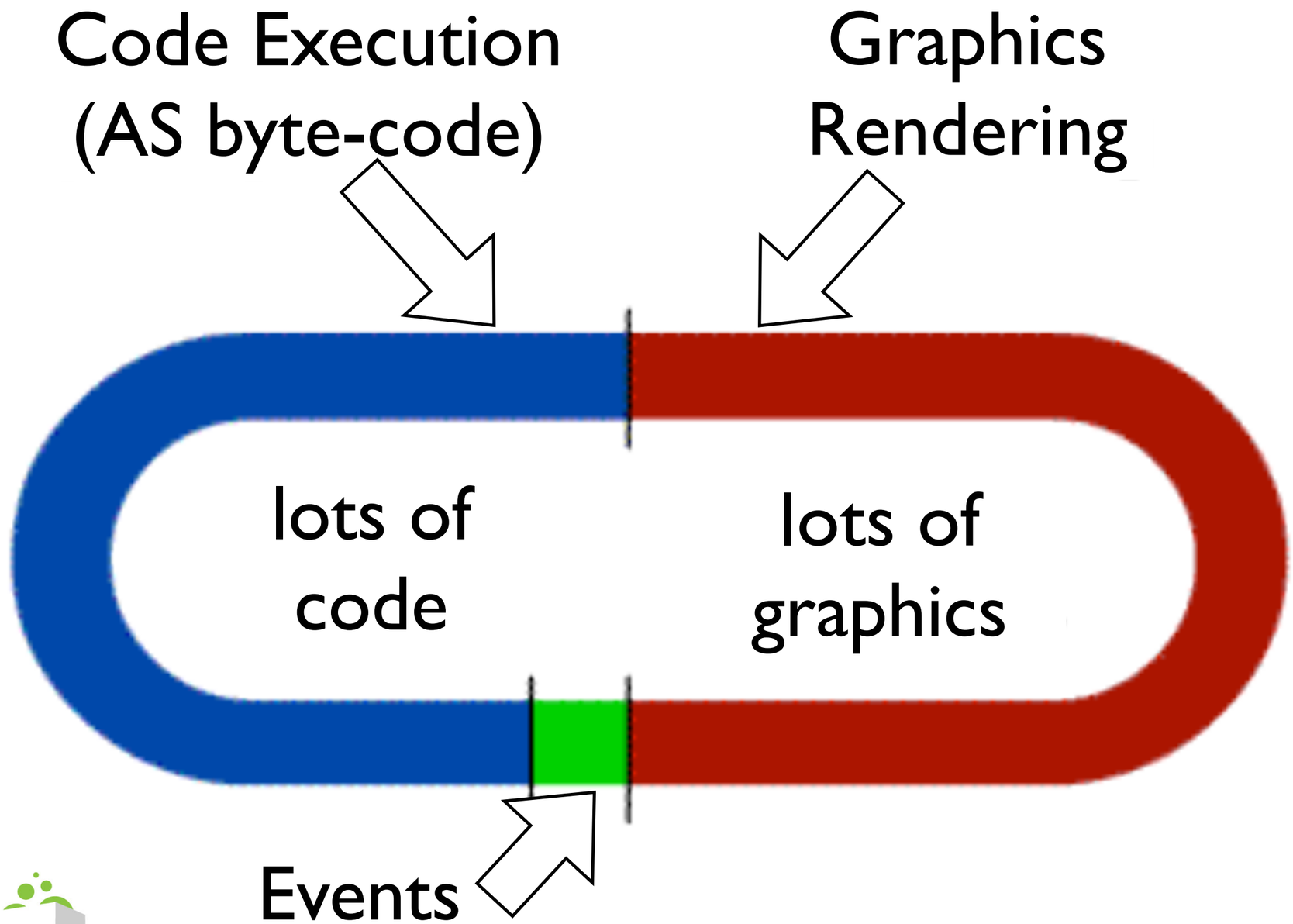
Code Execution
(AS byte-code)

Graphics
Rendering



graphics heavy

Events



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Flash Player Basics

- the Flash Player is a runtime execution environment that runs .SWF files
- every .SWF file has a default *root*-object
- all display objects are under this default *root*-object

How to differentiate between Flash and Flex?

- Flex applications are basically Flash applications that are using the Flex Framework
- the classes that are part of the build-in Flash Framework are inside the *flash.** package
- classes that are part of Flex Framework are inside the *mx.** package

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Flash Player Base Classes

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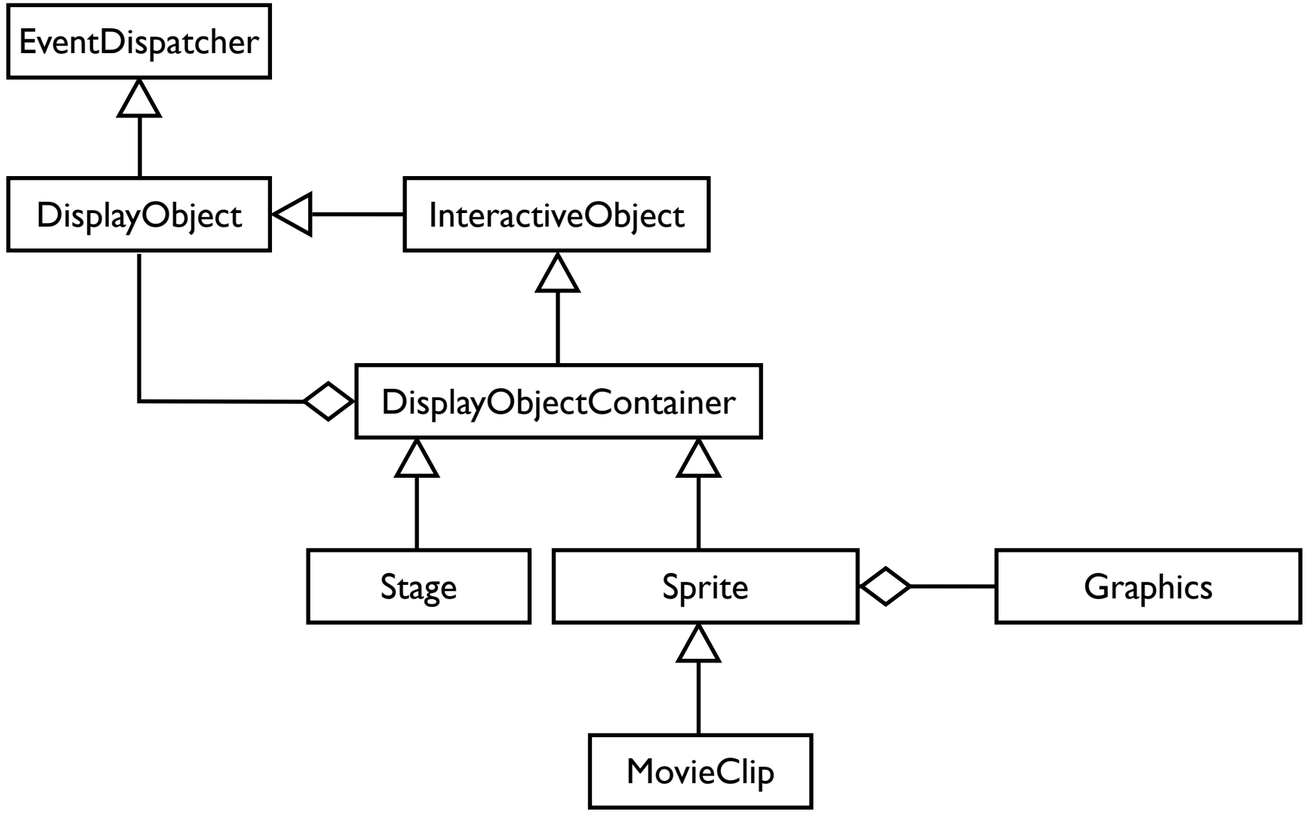
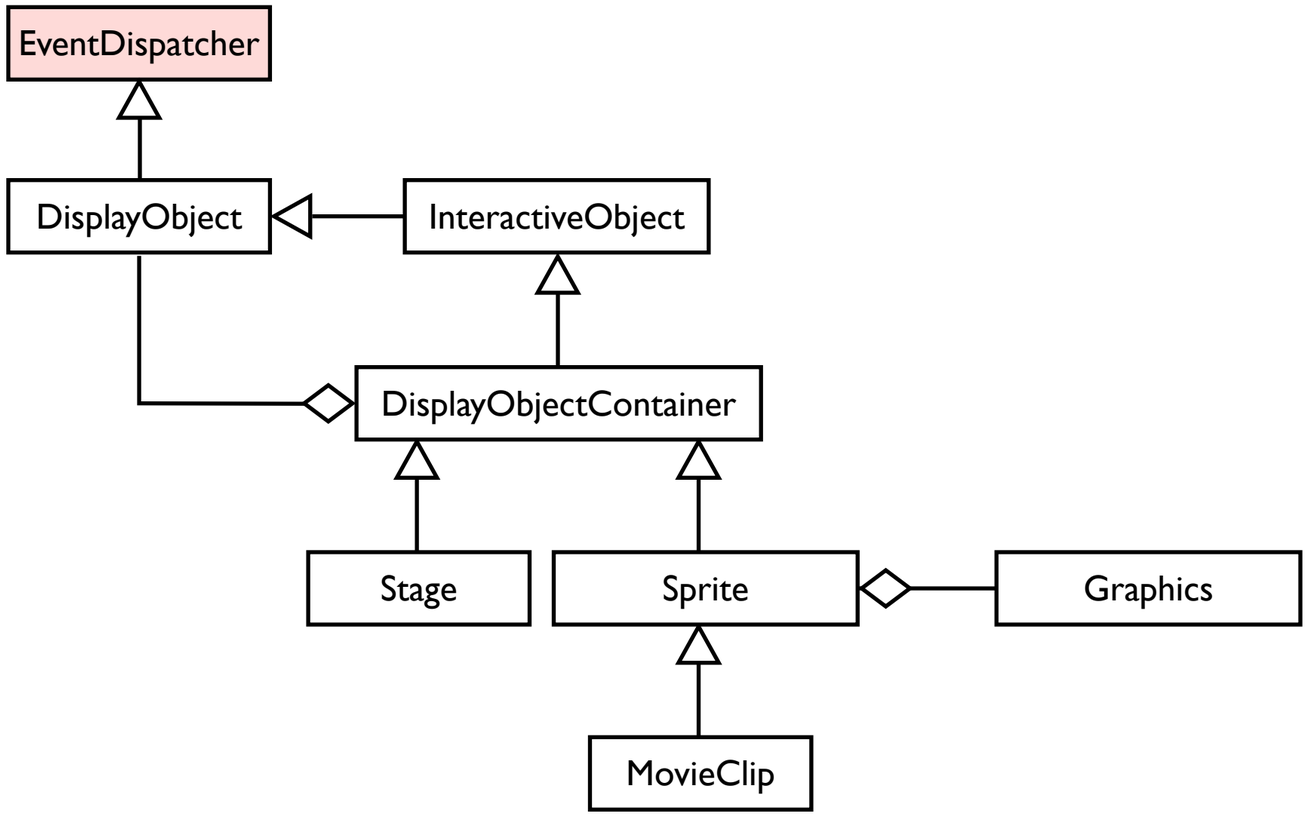
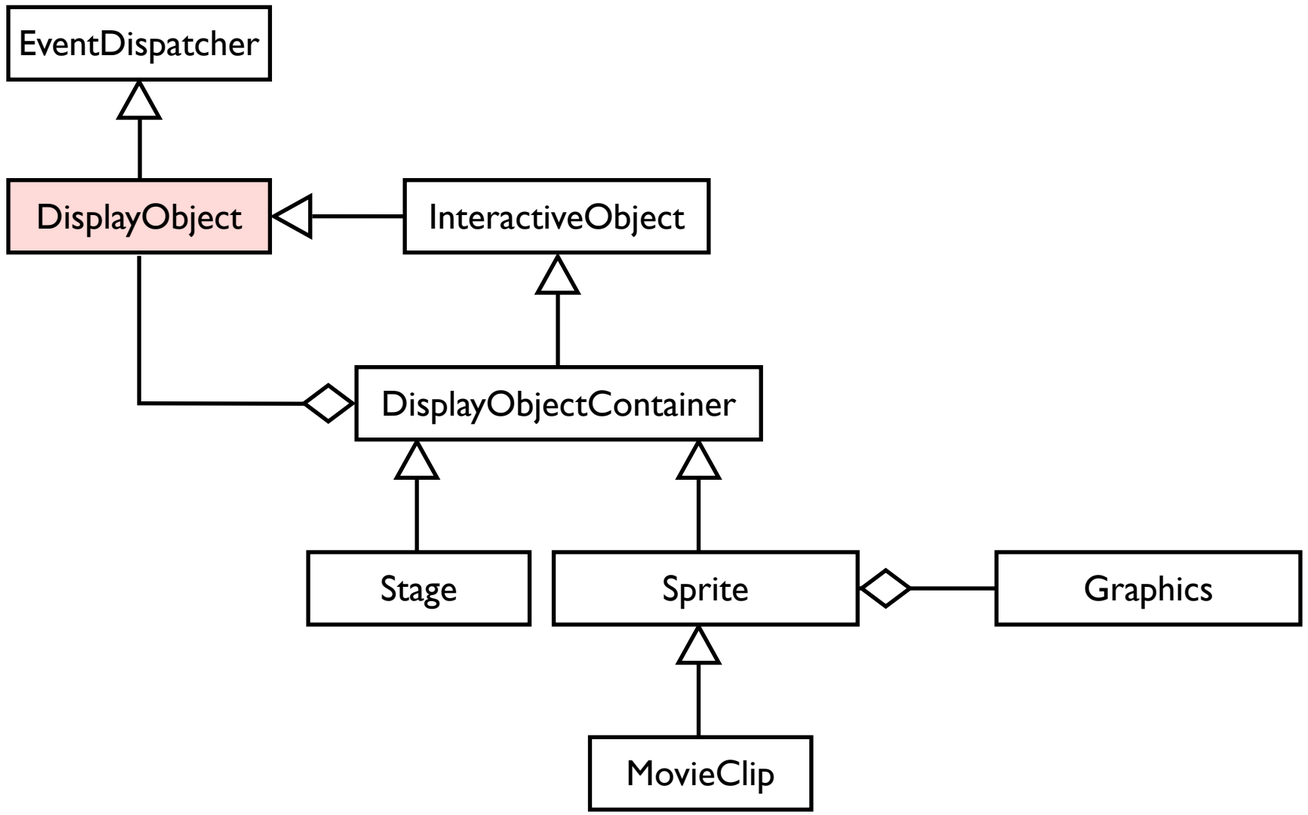




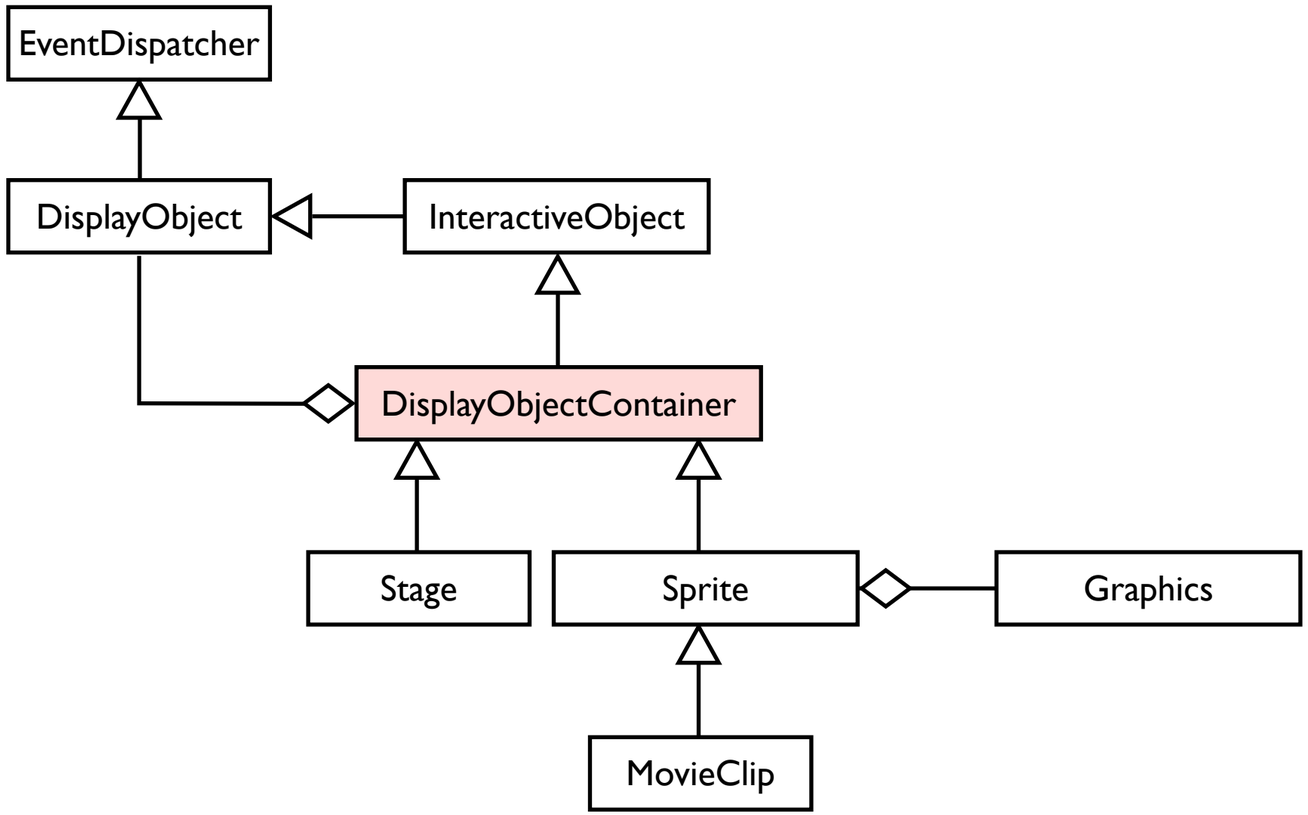
“Мога да излъчвам събития ...”

Вече знаем за *EventDispatcher*



“... И мога да бъда на екрана ...”

***DisplayObject* е базовият клас на всички визуални компоненти в *display list*-ата**



“... И мога да имам деца, които да имат деца, които да имат деца ...”

DisplayObjectContainer **добавя функционалността на** *Composite* **към** *DisplayObject*

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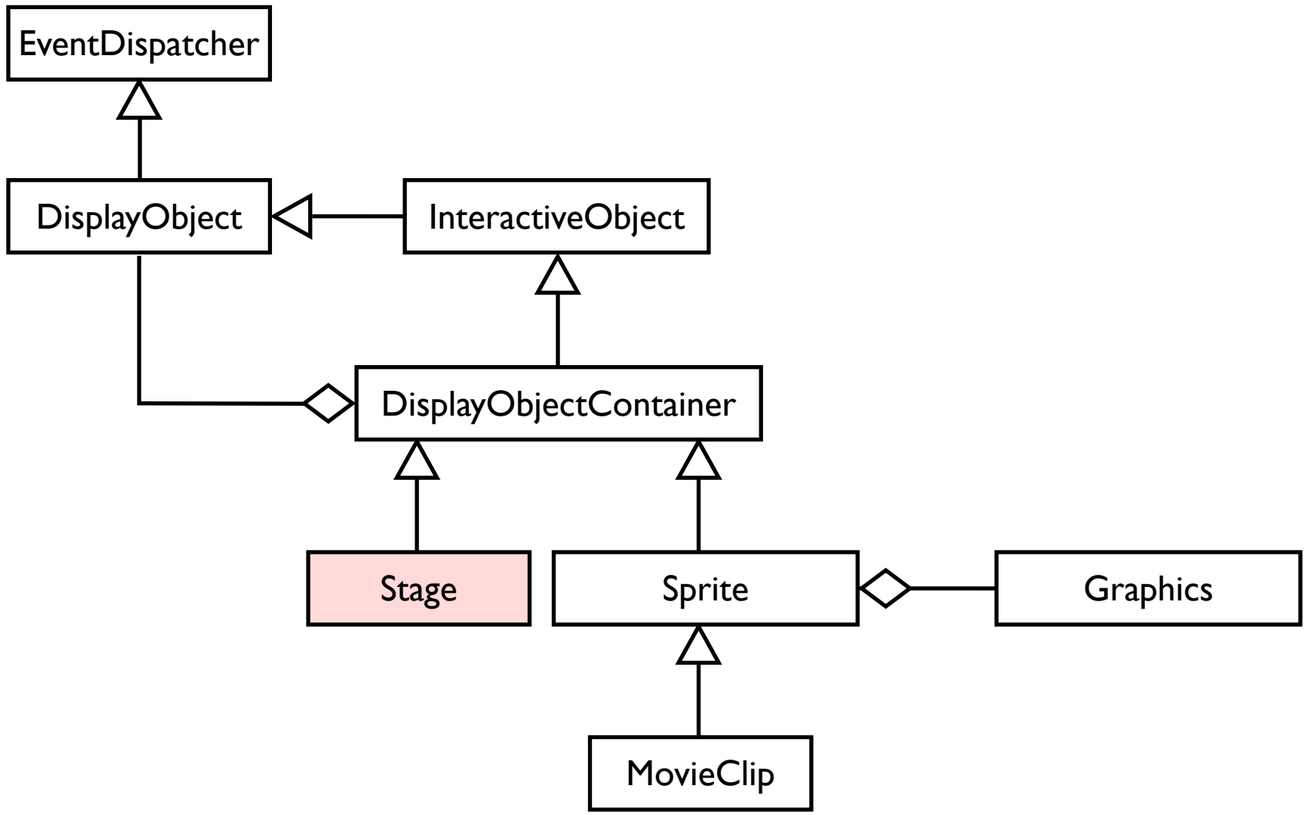

“... И всички са мои деца, и знам размерите на прозореца ...”

***Stage* е сцената (прозореца), в който се намира всичко**

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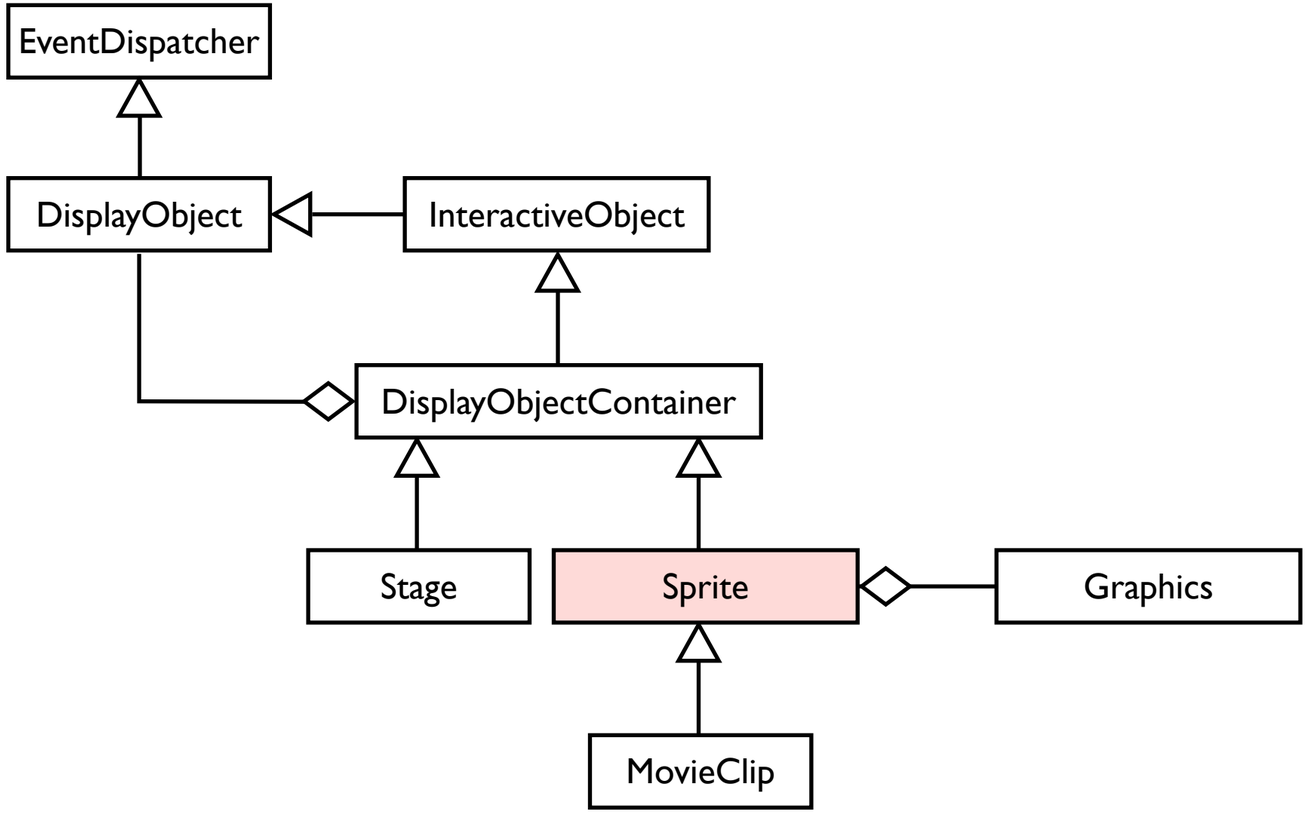

“... И върху мен могат да рисуват всички, които знаят AS3 ...”

Sprite **добавя** *Drawing API*

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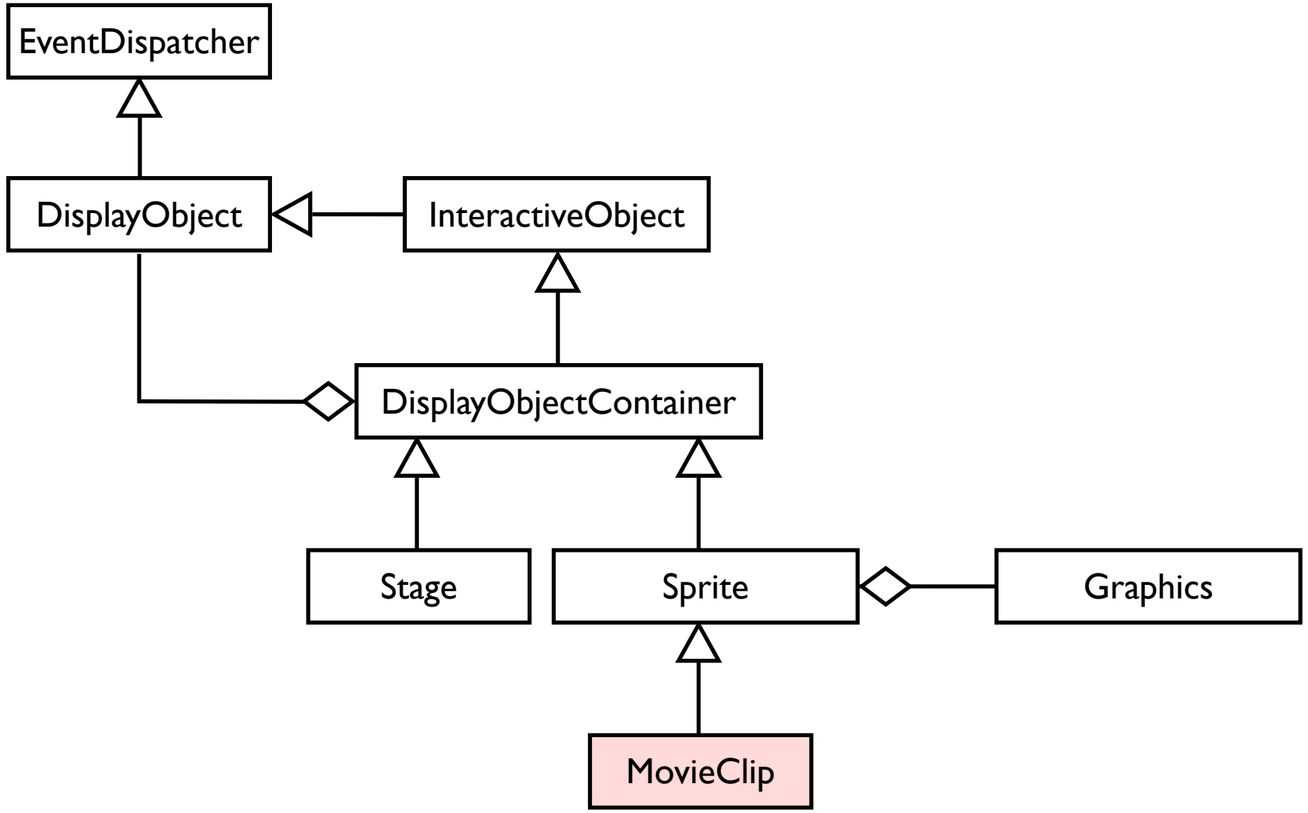

“... И мога да имам анимация, на която да казвам - напред, назад, тръгни, спри, прескочи ...”

MovieClip **добавя** *timeline*

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Summary

- the architecture of the Flash player
- runtime execution environment - the Flash Player
- the renderer
- the elastic racetrack
- the base classes in Flash