



# Device Emulation with OSGi and Flash

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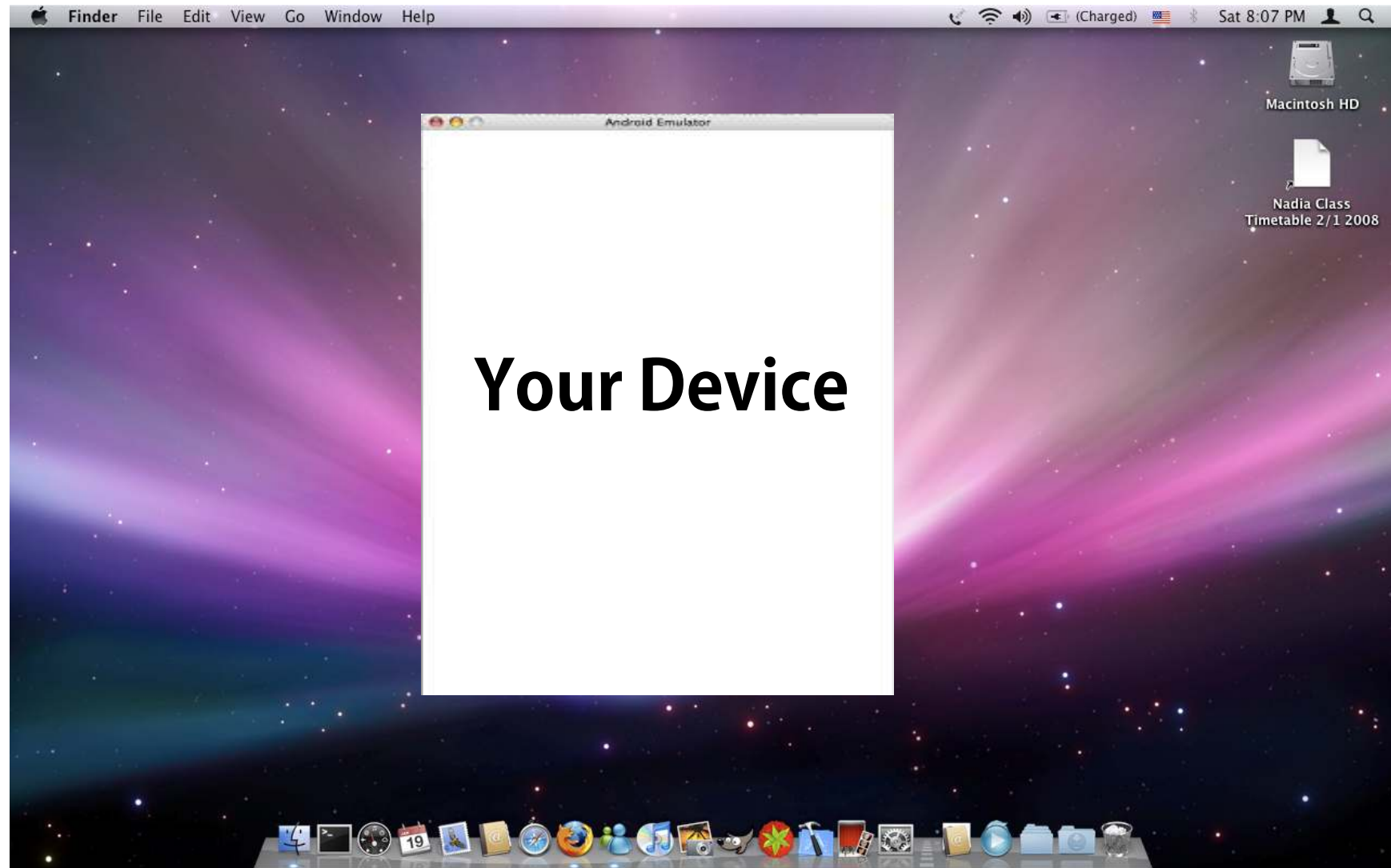




# What is Device Emulation ?



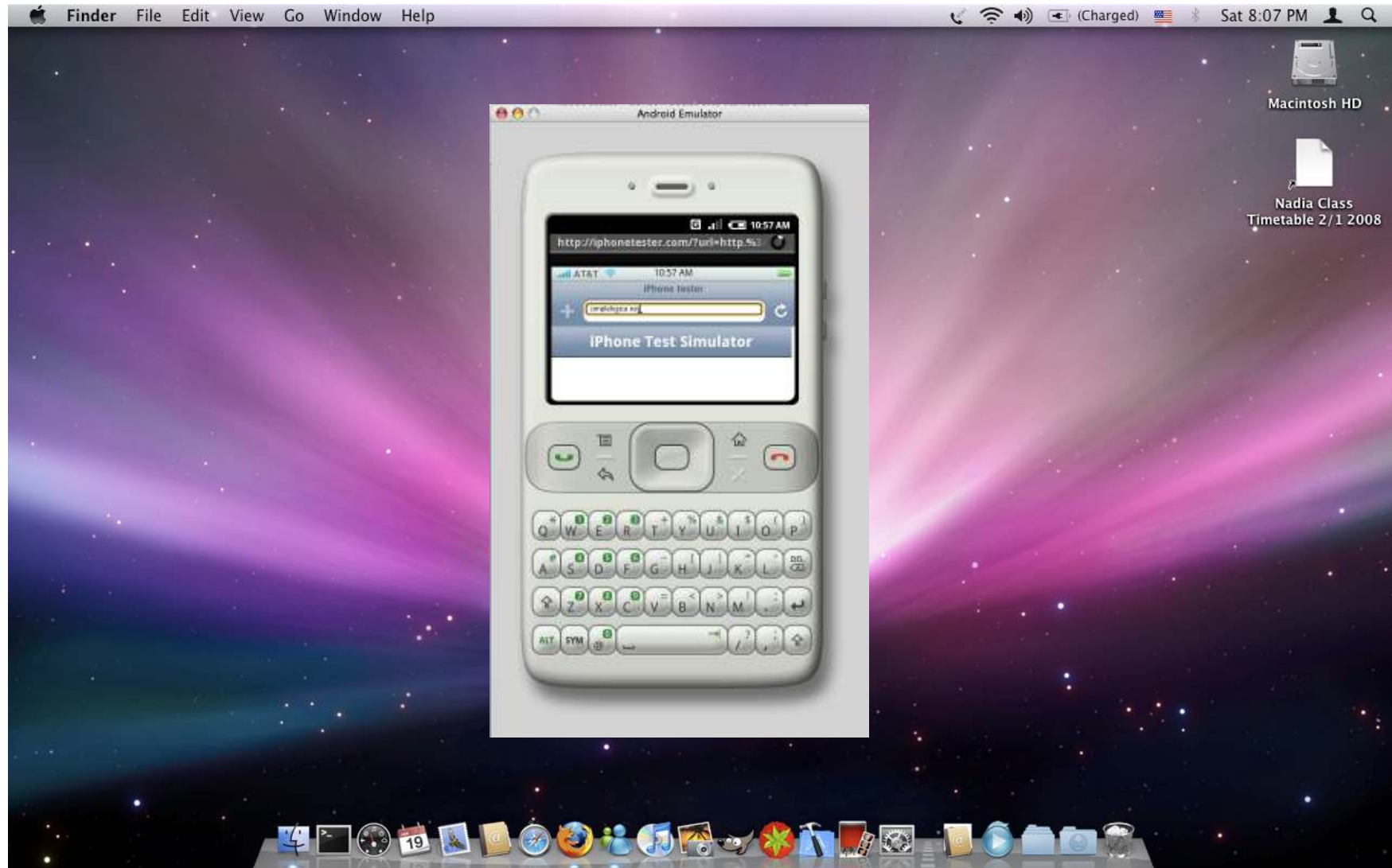
# Device Emulation



# Apple iPhone Emulator



# Google **Android** Emulator



# Nintendo GameBoy Emulator



# SkiData Turnstile Emulator





# Why Device Emulation ?



**remote  
debugging**



**deploy code**



**test manually**



# 10 iPhone Developers

Total cost: 990\$



# 10 Skidata Developers

## Total cost: 100.000\$\*



\* prices are purely fictive



# 10 **Skidata** Developers Distributed Team

Hardware Costs: **100.000\$\***

Shipping Costs: **10.000\$**



Device Emulation with OSGi and Flash | Marcus Harringer



**\* prices are purely fictive**



# Why Device Emulation ?



Save **Time**



Save **Money**



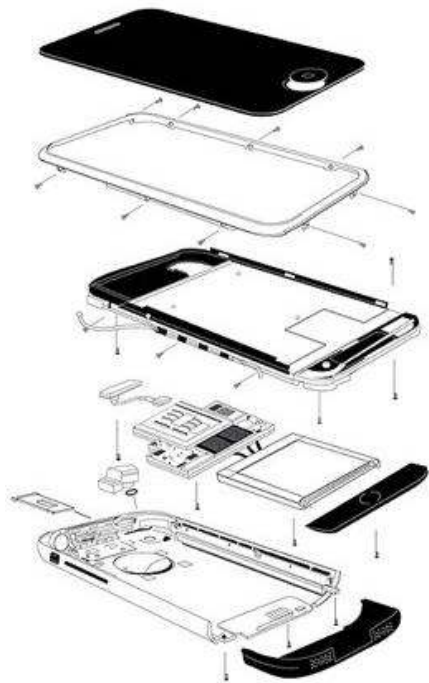
# How to do Device Emulation ?



# What is a Device ?



# iPhone “Device”



**Display Device**

**GSM Modem Device**

**Audio Device**





# Turnstile “Device”



## Display Device



## RFID Device



## Barcode Device



## Lightsensor Device



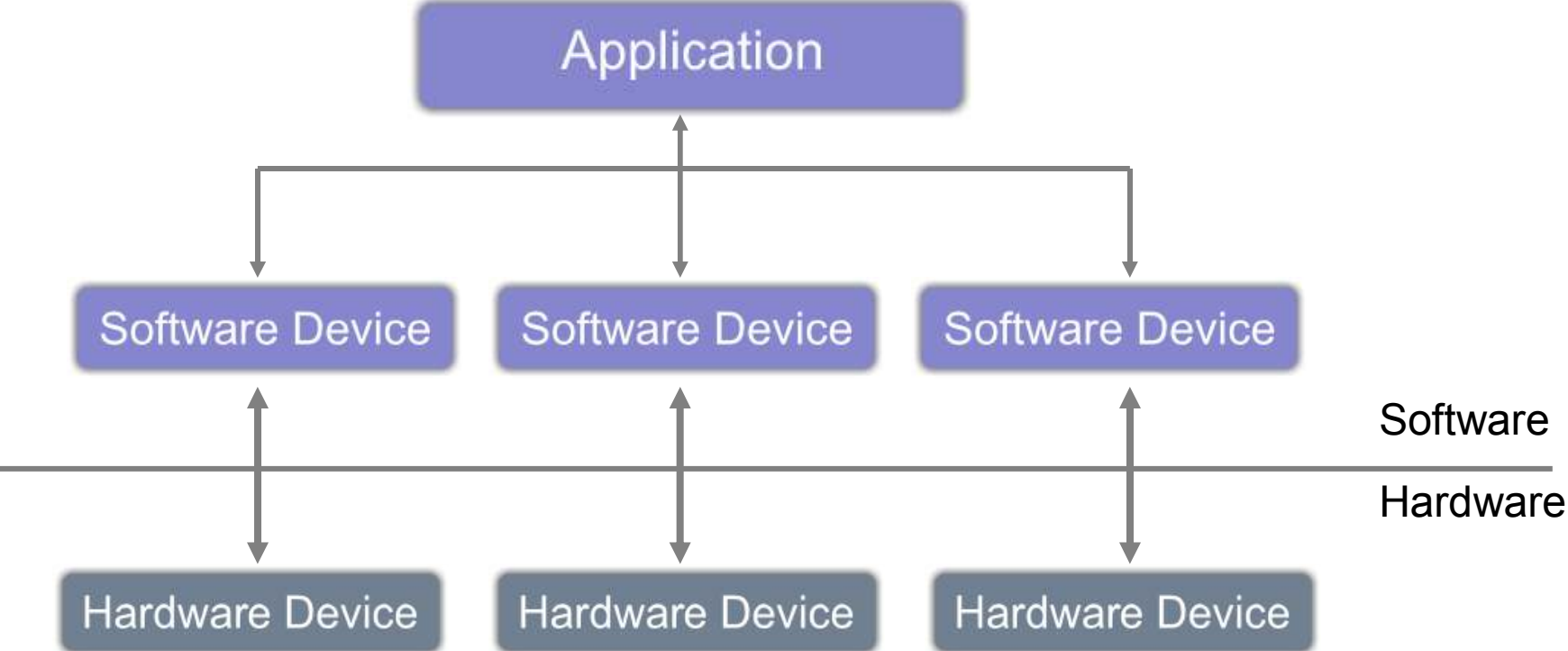
# **Now, what about OSGi and Flash ?**



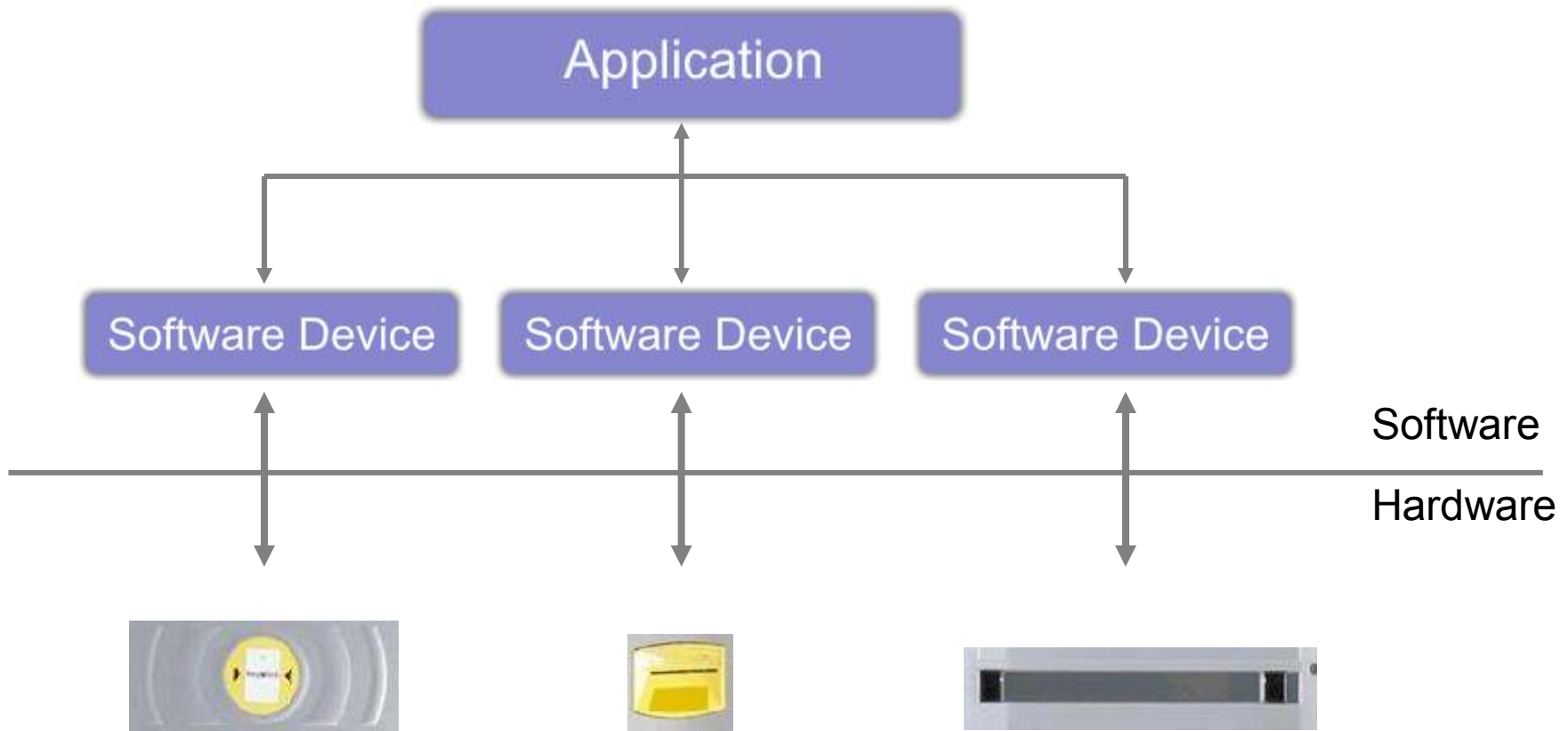
# Embedded Software



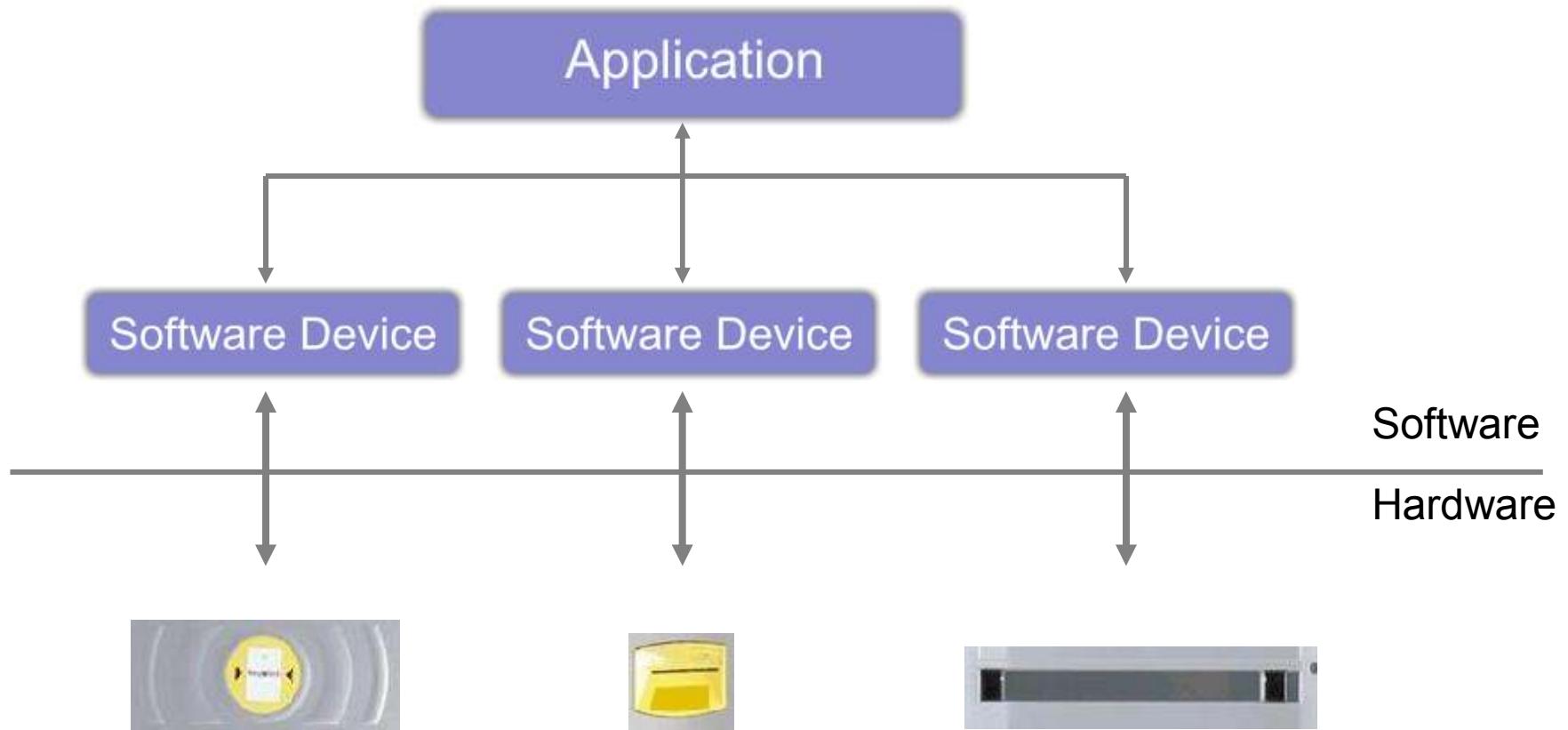
# OSGi Bundles



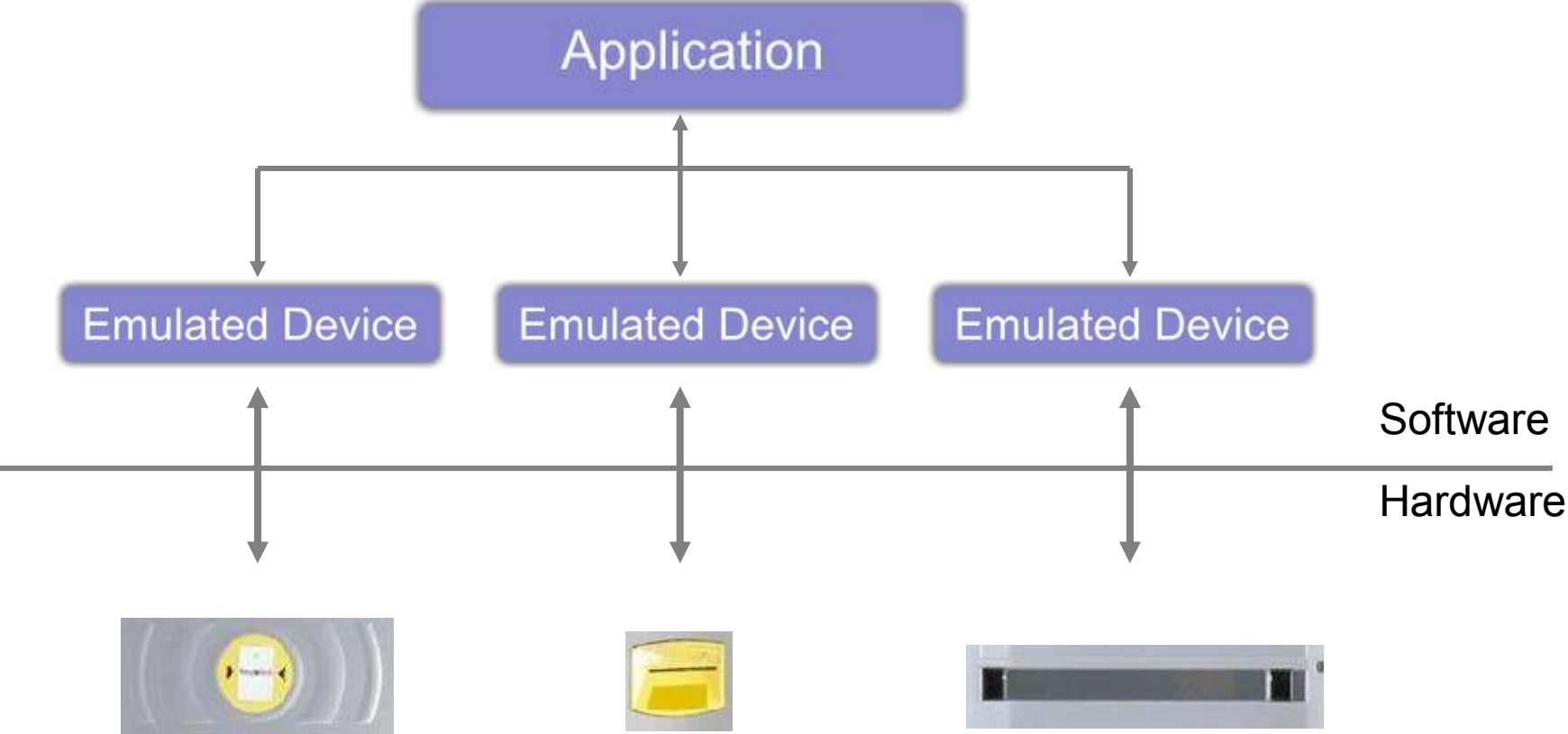
# OSGi Bundles

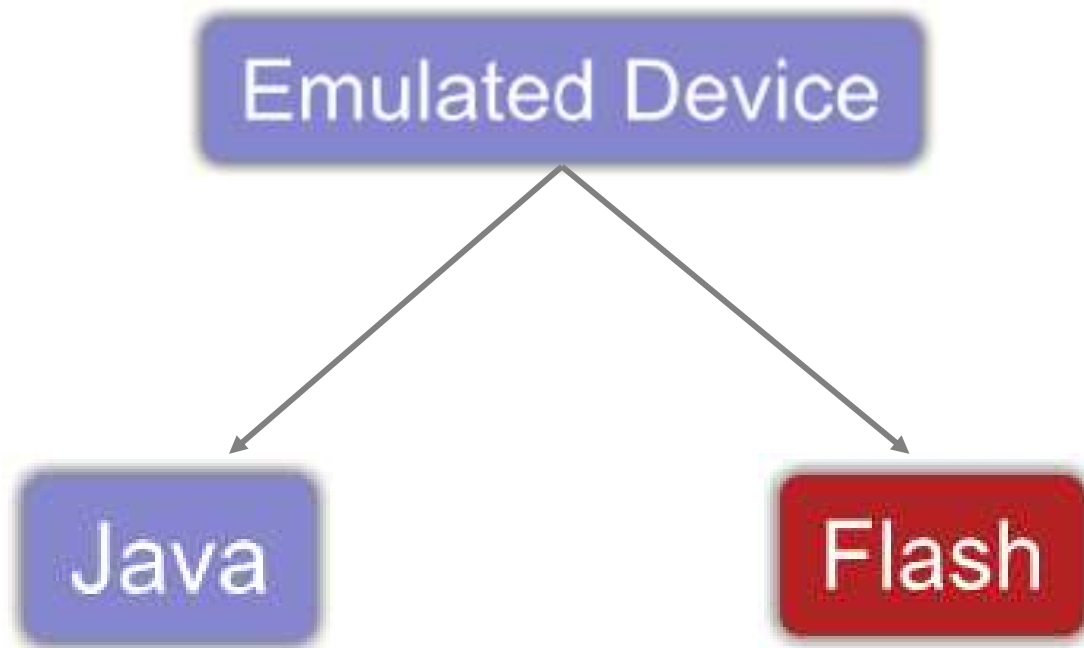


# OSGi Bundles



# OSGi Bundles









HTTP

TCP



HTTPS

# URL Encoding



Flash



`http://test.at/index.html?action=something`

Java

# HTTP

# LoadVars Object



Flash

```
o = new LoadVars ();  
o.id = 17;
```



Object

Java

```
String myId = request.getParameter("id");
```

# HTTP

# XML Object



Flash



XML

Java

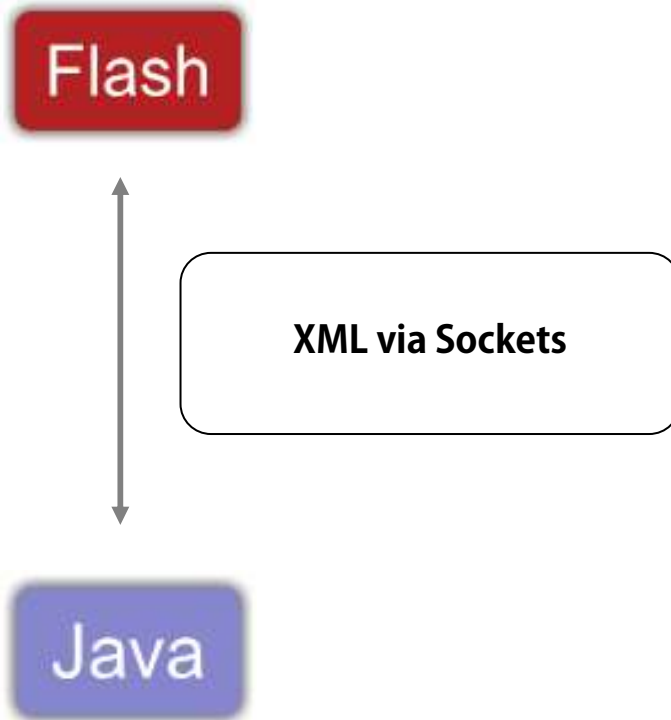
```
s = buildXMLObject()
```



```
o = parseXMLString()
```

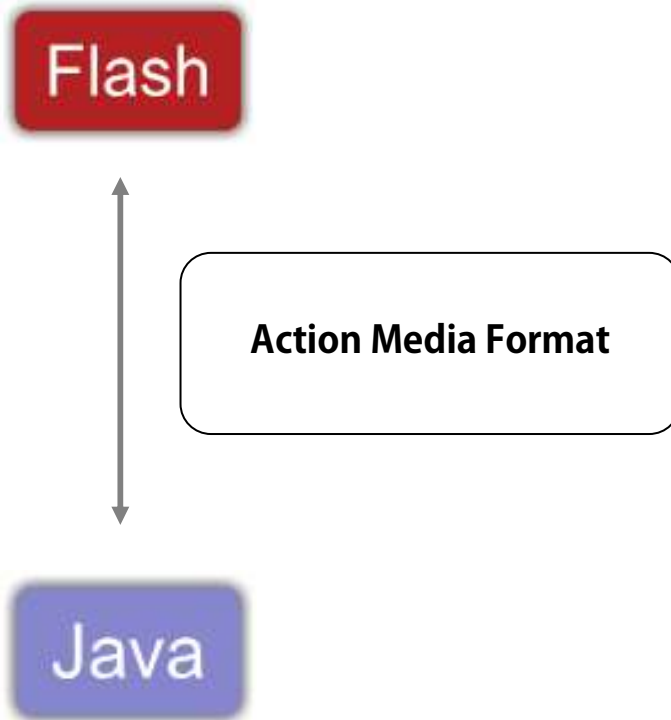
# HTTP

# XML Sockets



TCP

# Flash Remoting



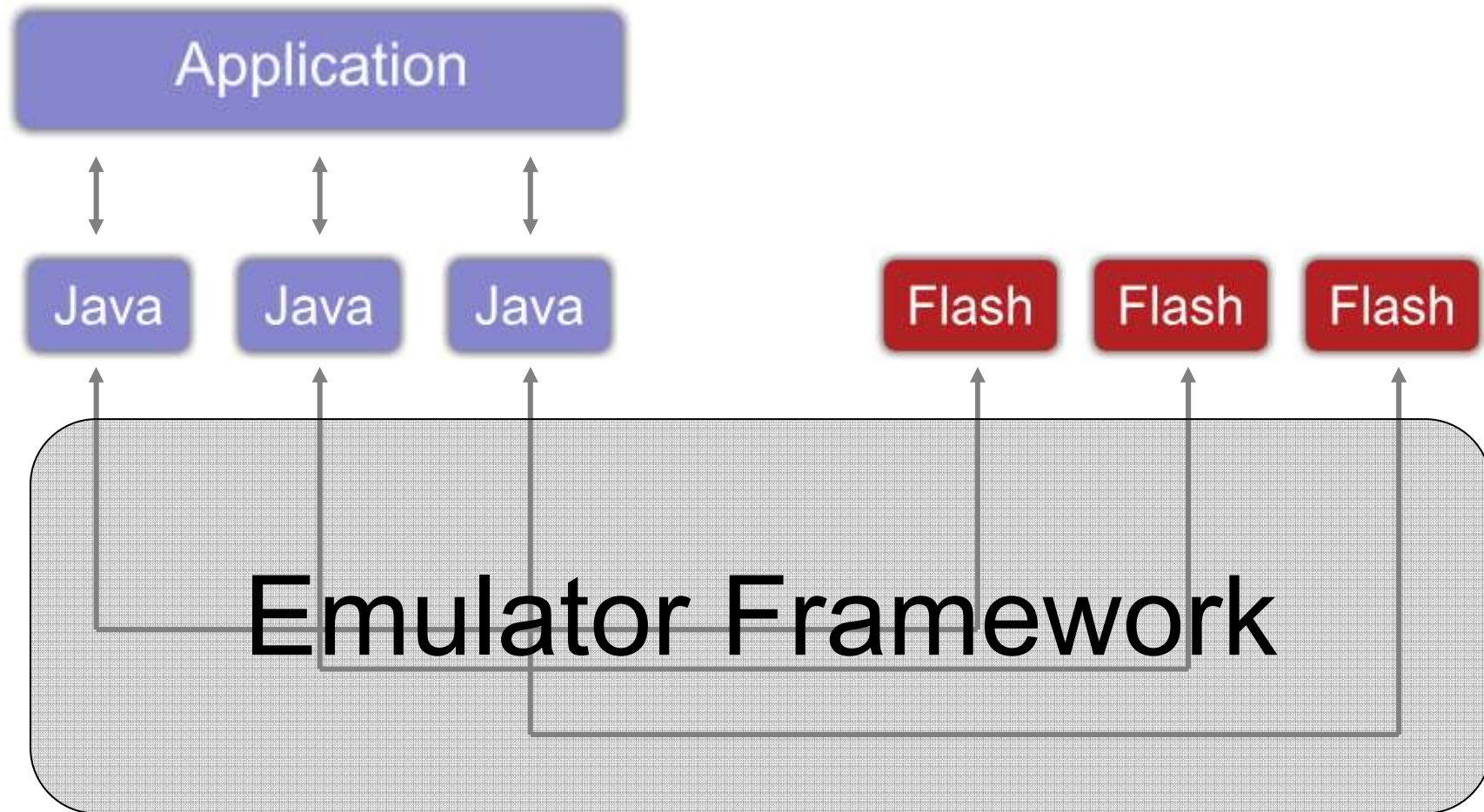
HTTP/HTTPS

# Our Approach



**XML Sockets !**

TCP







# Framework Features

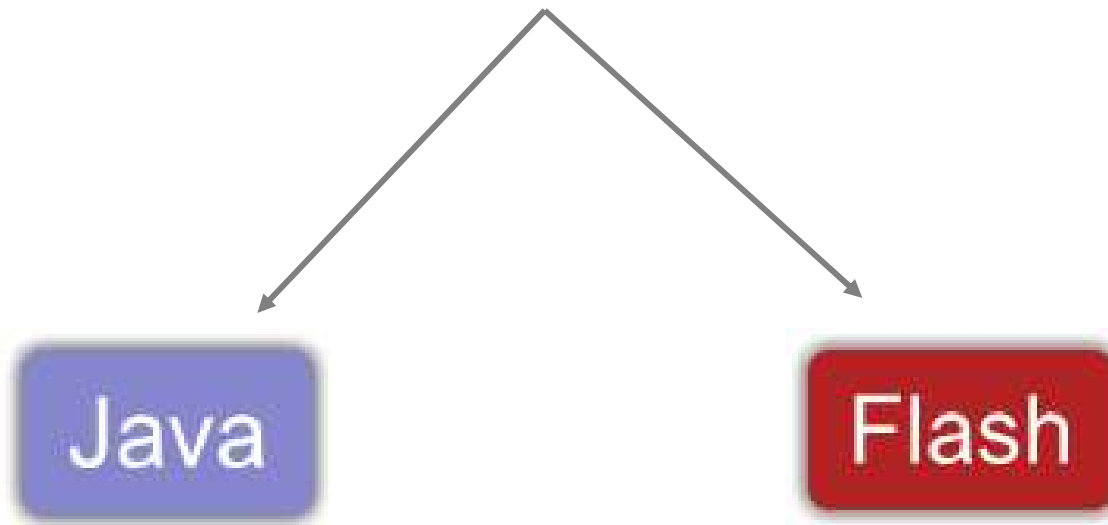
# Java Flash Communication



# Dynamic Loading



```
osgi> start my.device.X
```



# Programmable Emulator Behavior



**Lightsensors**

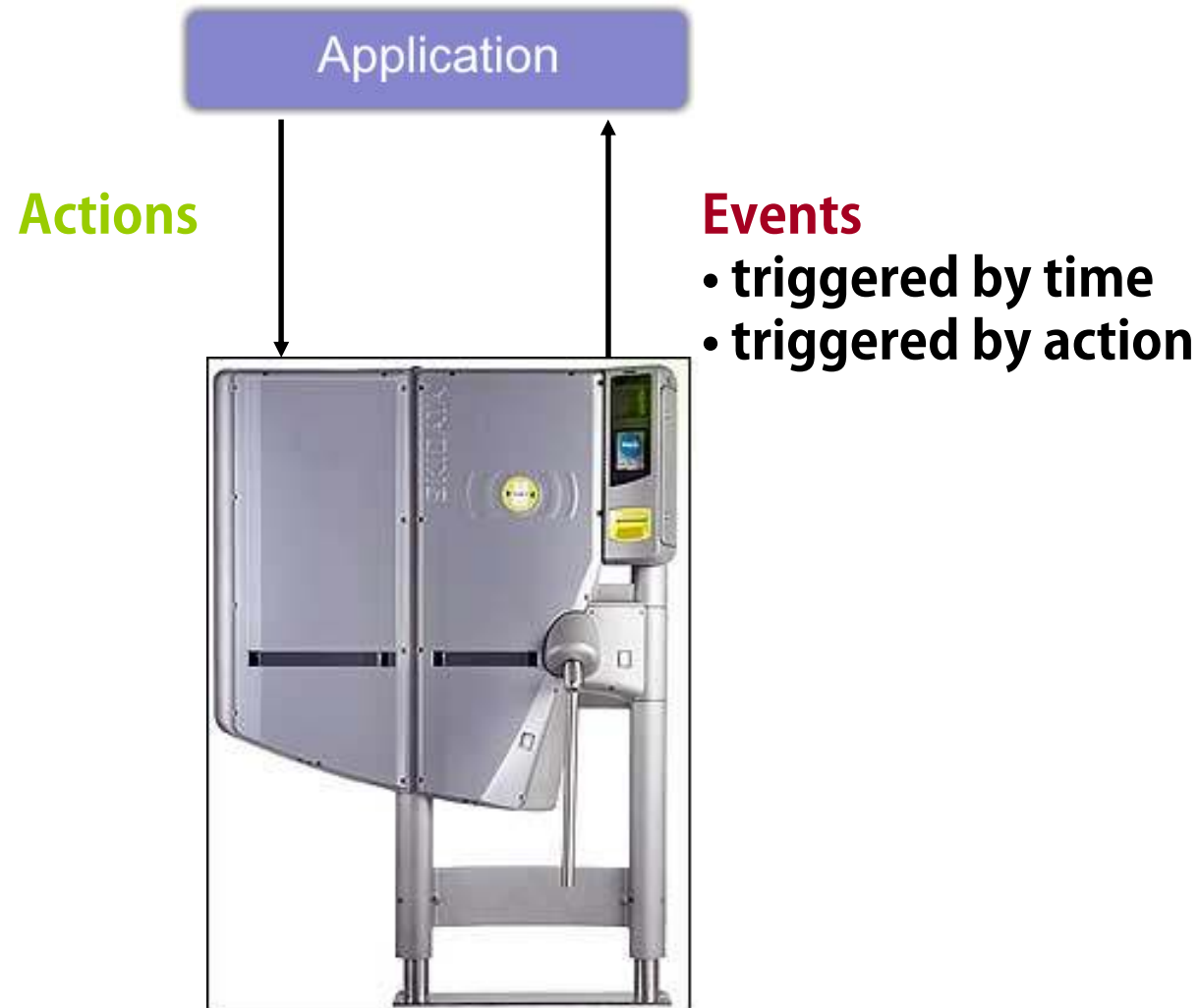
**RFID**



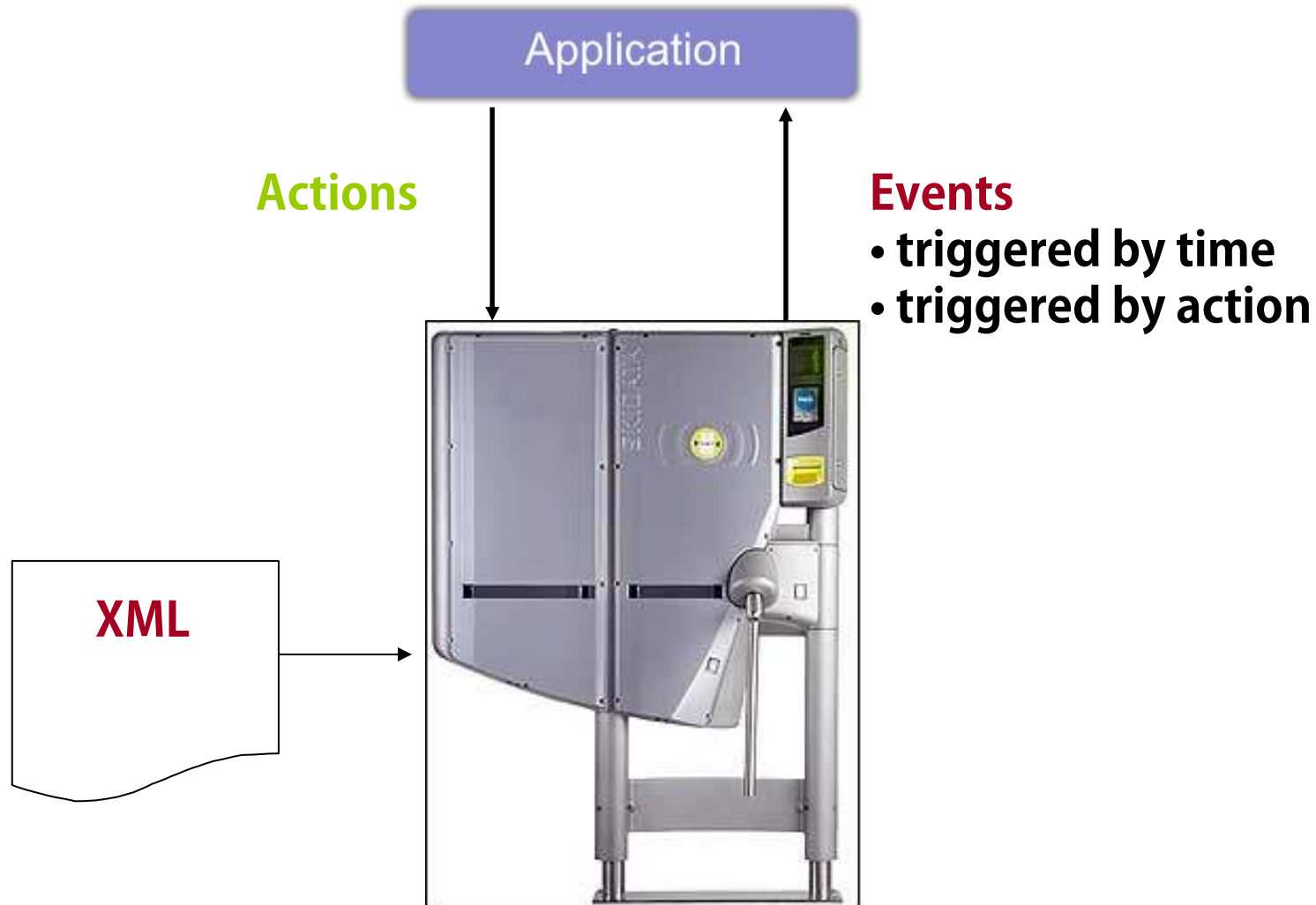
**Display**

**Turnstile**

# Programmable Emulator Behavior



# Programmable Emulator Behavior



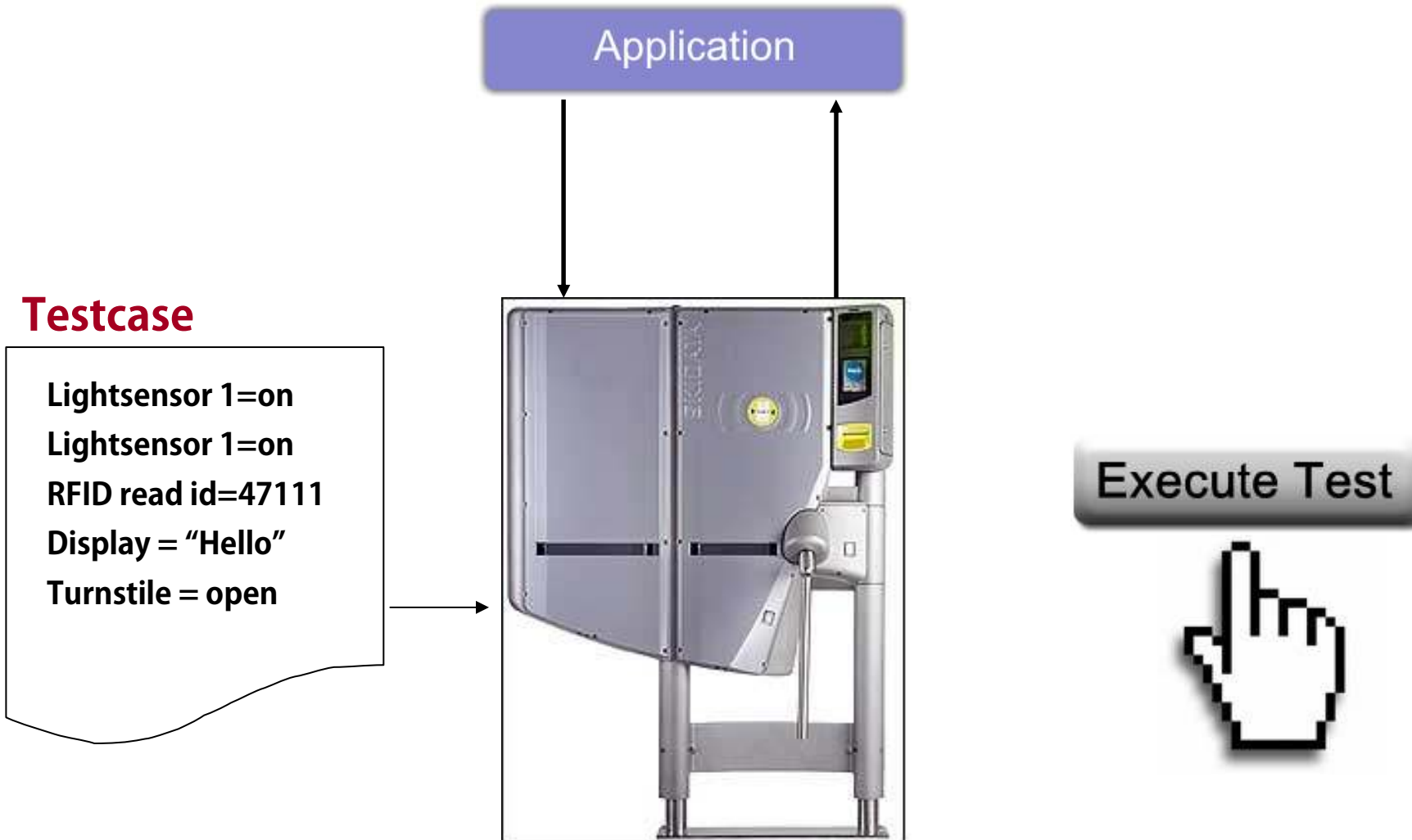
# Emulator Testing Framework



actual	expected
Lightsensor 1=on	Lightsensor 1=on
Lightsensor 2=on	Lightsensor 1=on
RFID read id=47111	RFID read id=47111
<b>Display = "Hello"</b>	<b>Display = "Hello"</b>
<b>Turnstile = open</b>	<b>Turnstile = open</b>

A green checkmark is positioned below the table, indicating that the actual results match the expected results.

# Emulator Testing Framework

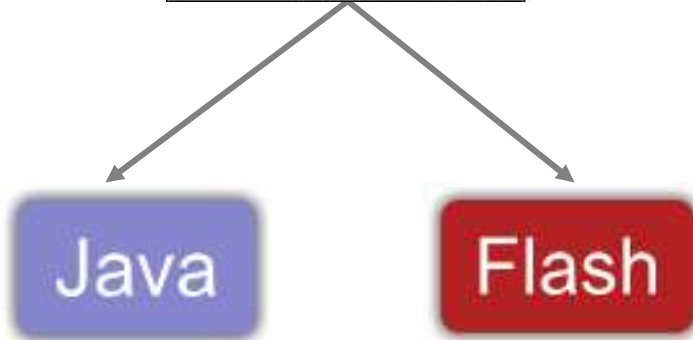




# Emulator **Testing Framework**



Do we really need a **GUI** ?



Execute Test



# Emulator Testing Framework



**NO !**

Java

~~Flash~~

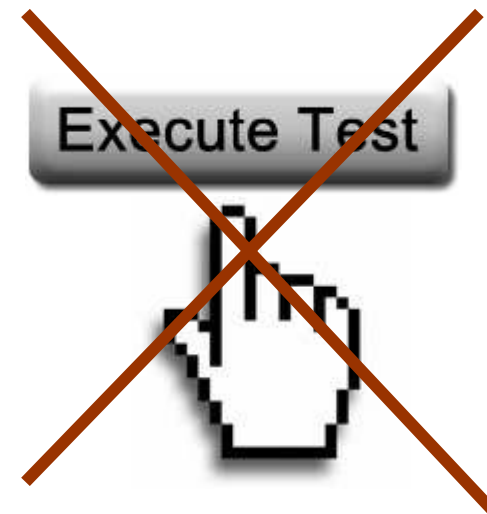
Execute Test



# Emulator **Testing Framework**



How do we **trigger tests** without a GUI ?



# Emulator **Testing Framework**



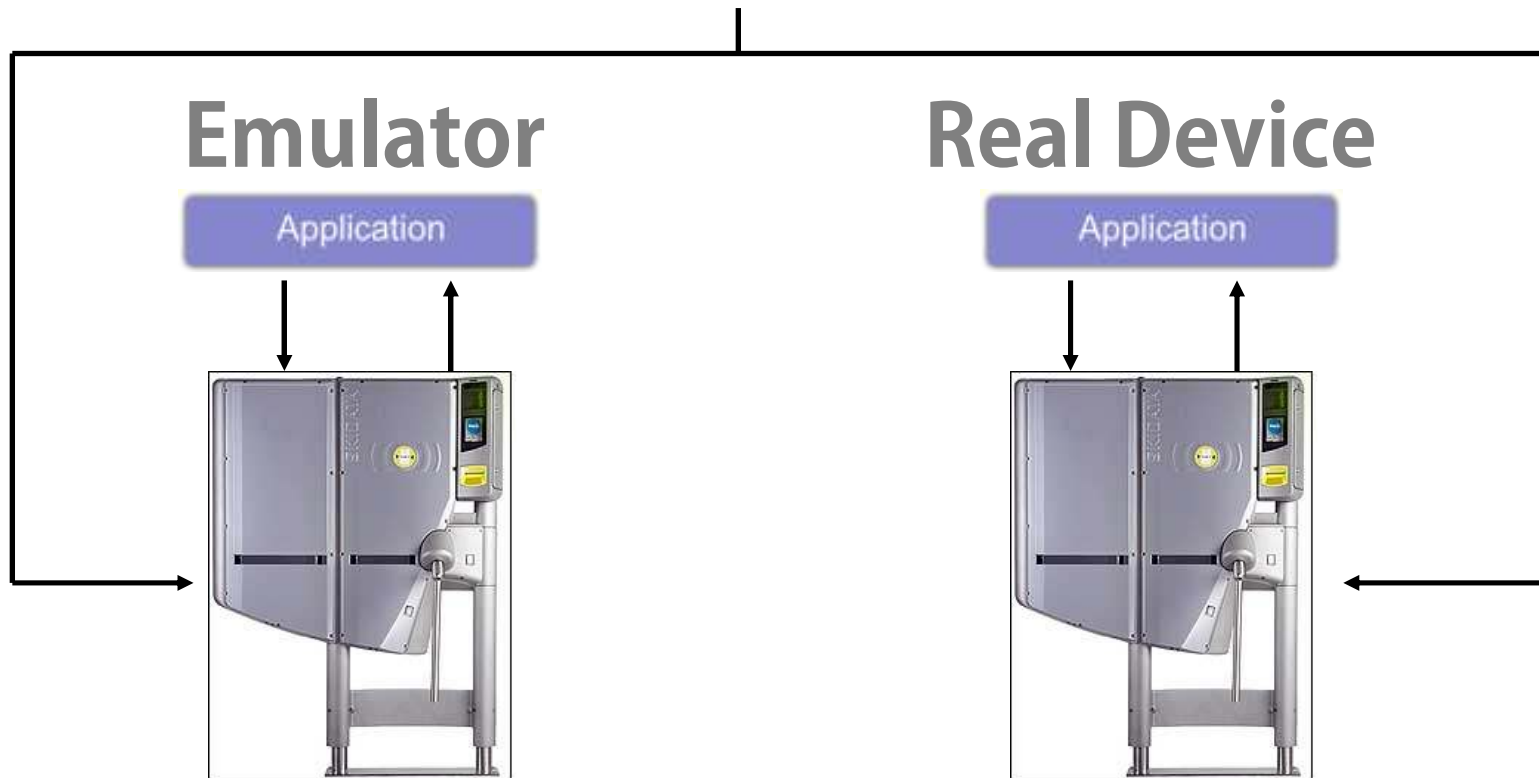
*"How Fit is Your Device ?"*

# Overall **Testing** Picture



*"How Fit is Your Device ?"*

# Overall **Testing** Picture



# A Quality Gate...



...through, **continuous** and **automated** testing



# Logging



Java

```
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
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<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages  
<2009-17-06 13:12:14> INFO : Test : some log messages
```

Flash





# Flash Issues

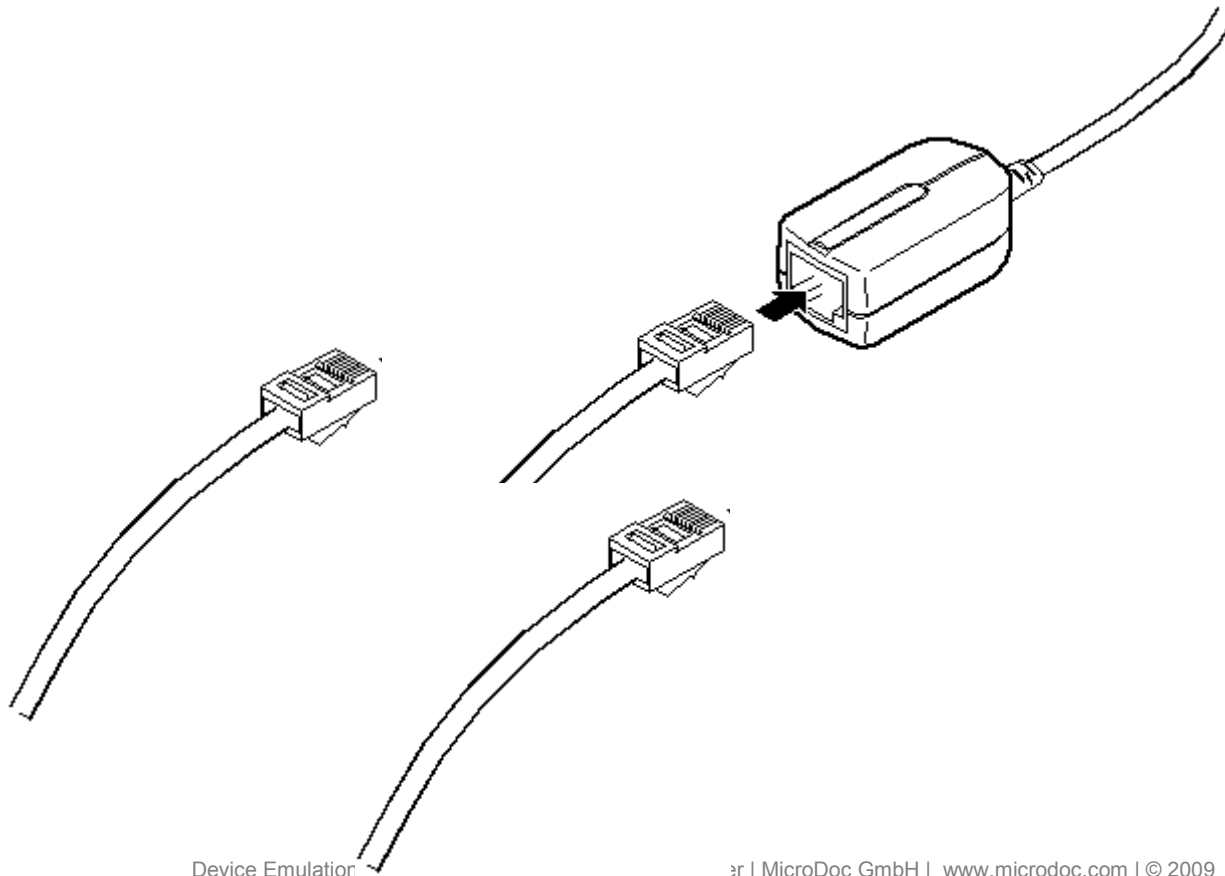


# Flash Security Sandbox



© 2002 Jeff Jacklin

# Flash Local Connection



# Flash Debugging



```
TypeError: ERROR #2007:  
child must be non-null  
at m.display line 1050;
```

OK



# So, why use Flash ?

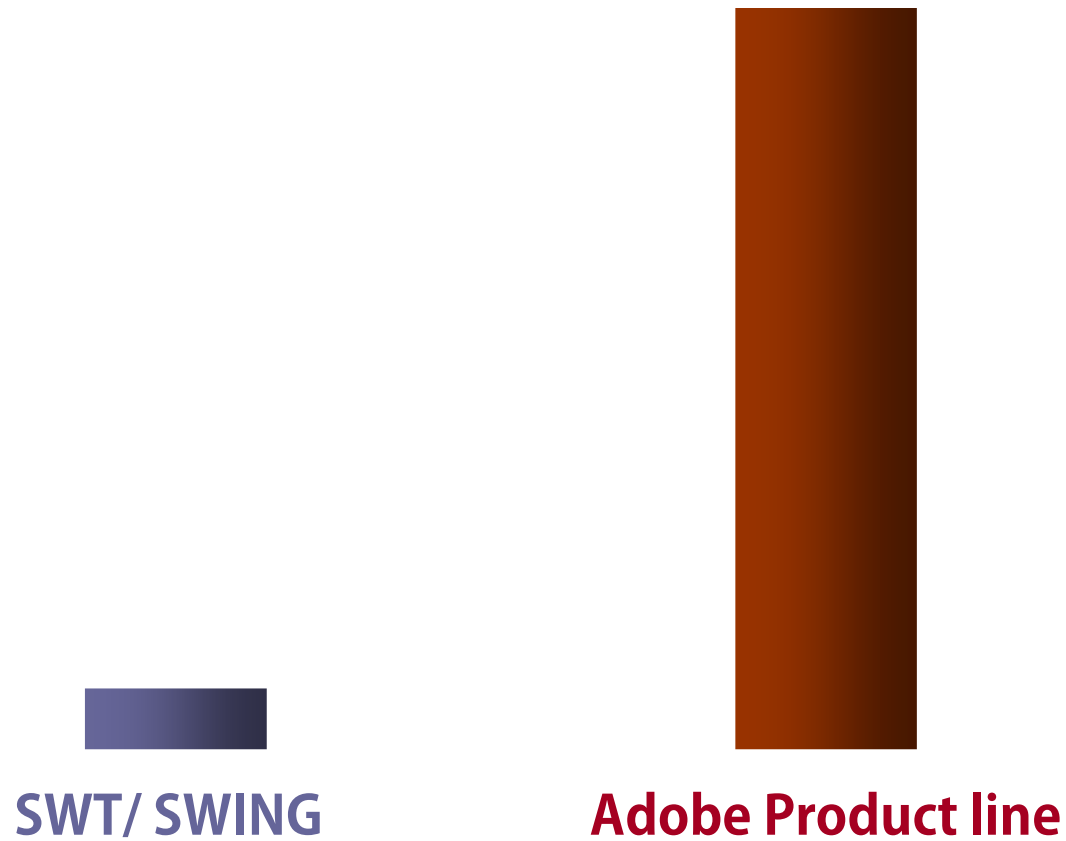


# Animation



# Look & Feel

# Labor Market - Designer







# But, what about JavaFX ?



# Open Source ?



# Live Demo

## Skidata Freemotion Turnstile





# Live Demo !





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