Selenium CONFERENCE
THE FUTURE OF TESTING APRIL 4-6

MOET : MObile End-to-end Test

an experimental technique

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Session outline

Selenium CONFERENCE THE FUTURE OF TESTING APRIL 4-6

- Introduction
- Simulator basics
- **Mo**bile **e**nd-to-end **t**esting (Moet)
- Building your mobile tests
- Demo
- Advantages and limitations
- Q & A

What are we solving for

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- Diverse mobile platforms
- Low cost solution
- End-to-end mobile tests
- Leverage black box testers

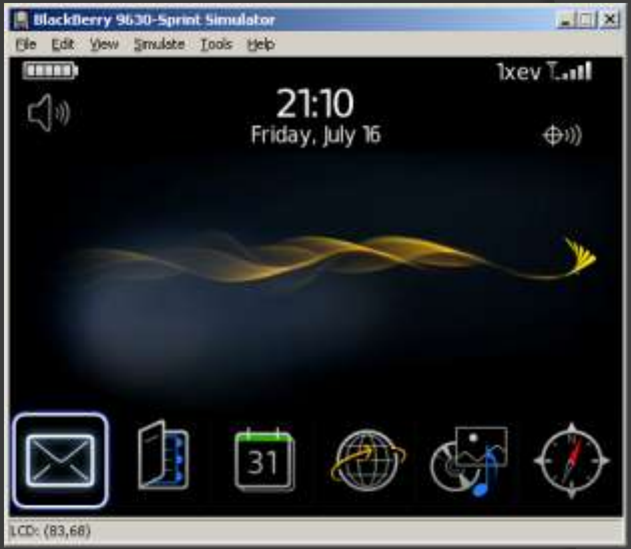
Simulator Basics

- BlackBerry ™
  - Starting simulator

```
fledge.exe
    /app=jvm.dll
    /session=<model>
    /app-param=
          JvmAlxConfigFile:<model>.xml
    /handheld=<model>
```

  - Communicating with simulator

```
fledgecontroller.exe  /session=<model>
```


BlackBerry 9630-Sprint Simulator
File Edit View Simulate Tools Help
1xev
21:10
Friday, July 16
31
LCD: (83,68)

Simulator commands

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Actions	Steps
Start 9630 Tour simulator	fledge.exe /app=jvm.dll /session=9630 /handheld=9630 /app-param=JvmAlxConfigFile:9630.xml
Install application	1. Copy app.jar, app.jad, app.cod to Javaloader directory 2. JavaLoader.exe –u load app.jad 3. Delete app.jar, app.jad, app.cod
Save screenshot as test.png in $TEST_OUTPUT	1. JavaLoader.exe –u screenshot test.png 2. mv test.png $TEST_OUTPUT

bblib.py

Actions	Steps	bblib.py
Start 9630 Tour simulator	fledge.exe /app=jvm.dll /session=9630 /handheld=9630 /app-param=JvmAlxConfigFile:9630.xml	fledgeStart()
Install application	1. Copy app.jar, app.jad, app.cod to Javaloader directory 2. JavaLoader.exe –u load app.jad 3. Delete app.jar, app.jad, app.cod	install()
Save screenshot as test.png in $TEST_OUTPUT	1. JavaLoader.exe –u screenshot test.png 2. mv test.png $TEST_OUTPUT	screenshot('test')

Simulator commands

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Action	Steps

Enter 'Hello World'	StringInjection(Hello)
	KeyPress(SPACE)
	KeyRelease(SPACE)
	StringInjection(World)

Touch screen at (10, 100)	TouchScreenPress(10, 100, 0)
	TouchScreenClick()
	TouchScreenUnclick()
	TouchScreenUnpress(0)

Thumbwheel up twice	ThumbWheelRoll(-1) ThumbWheelRoll(-1)

bblib.py

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Action	Steps	bblib.py

Enter 'Hello World'	StringInjection(Hello)
	KeyPress(SPACE)
	KeyRelease(SPACE)
	StringInjection(World)
		enter('Hello World')

Touch screen at (10, 100)	TouchScreenPress(10, 100, 0)
	TouchScreenClick()
	TouchScreenUnclick()
	TouchScreenUnpress(0)
		touch(10, 100)

Thumbwheel up twice	ThumbWheelRoll(-1) ThumbWheelRoll(-1)	thumbwheel ('up', 2)

Simulator Basics

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- Android ™
  - Create AVD

    $ANDROID_HOME/tools/android

  - Starting emulator

    emulator –avd <avd>

  - Communicating with emulator

    adb shell

Simulator command

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Action	Steps

Enter 'Hello World'	adb shell
	
	"sendevent /dev/input/event0 1 42 1;
	sendevent /dev/input/event0 1 42 0;
	sendevent /dev/input/event0 1 35 1;
	sendevent /dev/input/event0 1 35 0;
	sendevent /dev/input/event0 1 18 1;
	sendevent /dev/input/event0 1 18 0;
	sendevent /dev/input/event0 1 38 1;
	sendevent /dev/input/event0 1 38 0;
	sendevent /dev/input/event0 1 38 1;
	sendevent /dev/input/event0 1 38 0;
	sendevent /dev/input/event0 1 24 1;
	sendevent /dev/input/event0 1 24 0;
	
	… "

androidlib.py

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Action	Steps	androidlib.py

Enter 'Hello World'	adb shell
	
	"sendevent /dev/input/event0 1 42 1;
	sendevent /dev/input/event0 1 42 0;
	sendevent /dev/input/event0 1 35 1;
	sendevent /dev/input/event0 1 35 0;
	sendevent /dev/input/event0 1 18 1;
	sendevent /dev/input/event0 1 18 0;
	sendevent /dev/input/event0 1 38 1;
	sendevent /dev/input/event0 1 38 0;
	sendevent /dev/input/event0 1 38 1;
	sendevent /dev/input/event0 1 38 0;
	sendevent /dev/input/event0 1 24 1;
	sendevent /dev/input/event0 1 24 0;
	
	… "
		enter('Hello World')

MOET

- **MO**bile **E**nd-to-End **T**est
  - Simulator libraries

    androidlib.py

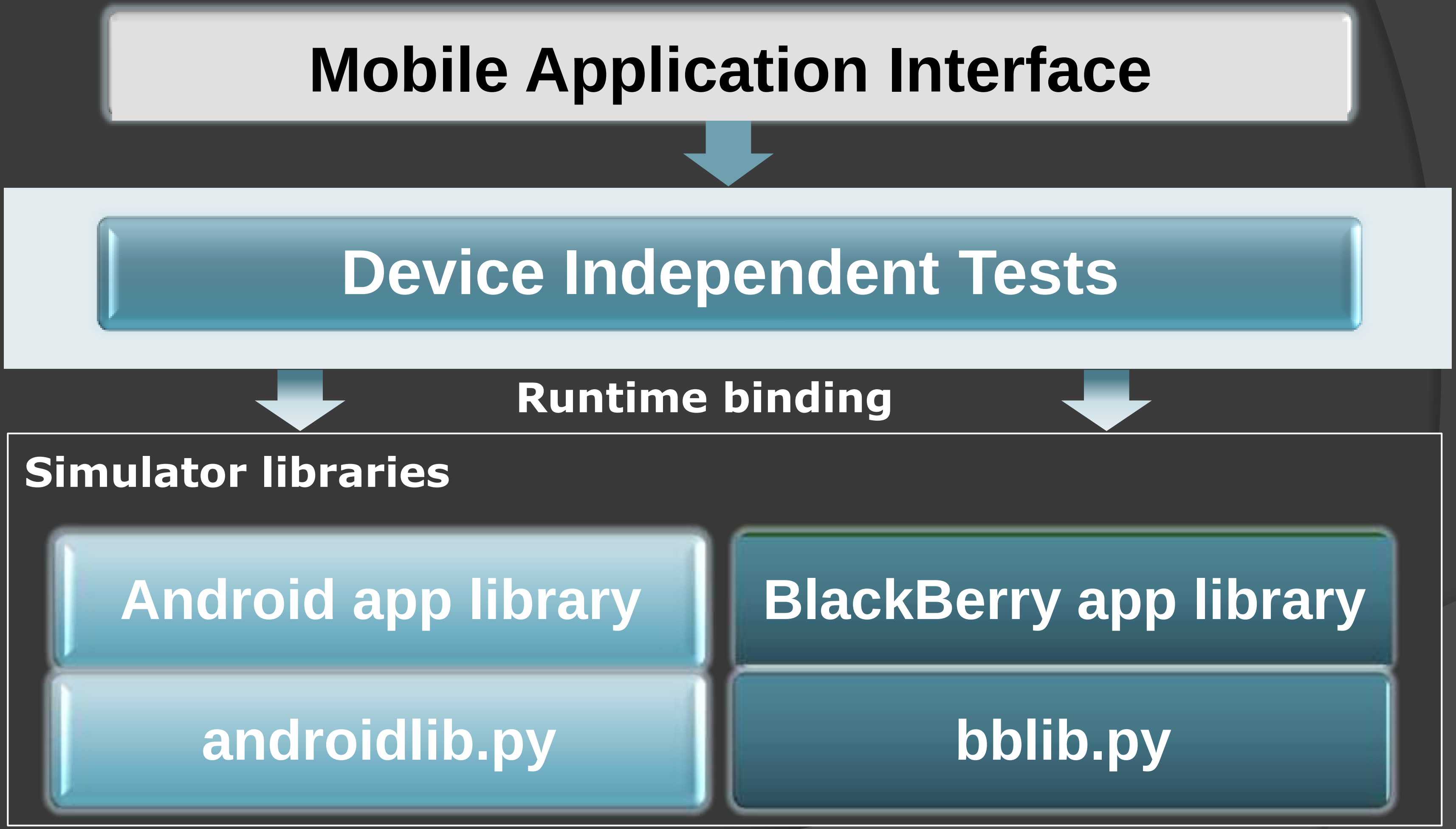
    bblib.py
  - Image processing library

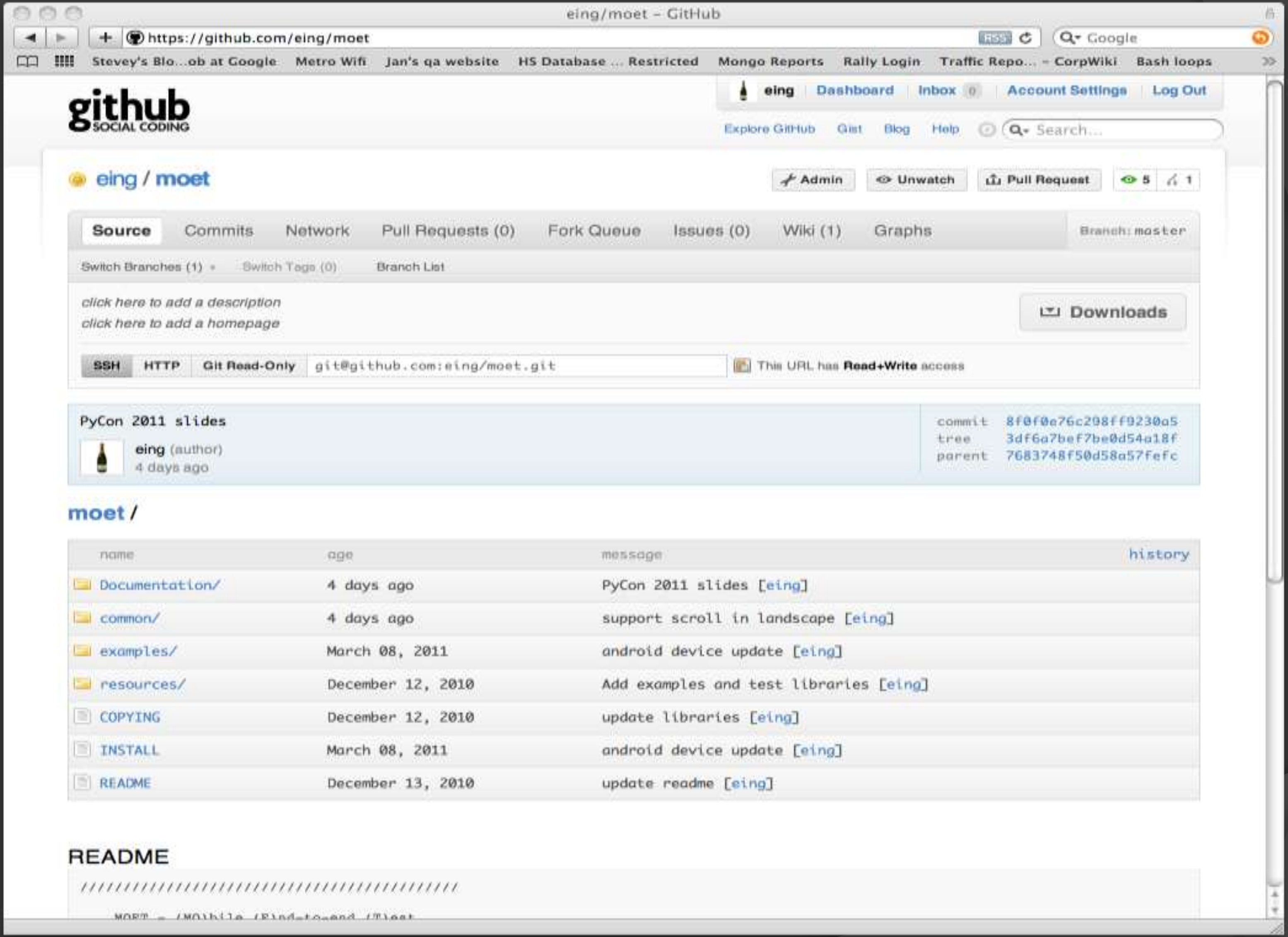
    imagelib.py
  - Testing utilities library

    testlib.py

    logger.py

Moet Framework





eing / moet

click here to add a description
click here to add a homepage

git@github.com:eing/moet.git This URL has **Read+Write** access

PyCon 2011 slides
eing (author)
4 days ago

```
commit  8f0f0e76c298ff9230a5
tree    3df6a7bef7be0d54a18f
parent  7683748f50d58a57fefc
```

moet /

name	age	message
Documentation/	4 days ago	PyCon 2011 slides [eing]
common/	4 days ago	support scroll in landscape [eing]
examples/	March 08, 2011	android device update [eing]
resources/	December 12, 2010	Add examples and test libraries [eing]
COPYING	December 12, 2010	update libraries [eing]
INSTALL	March 08, 2011	android device update [eing]
README	December 13, 2010	update readme [eing]

README

```
////////////////////////////////////////////////
```

Test Automation Overview

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1. Define application interface

   This interface is device-agnostic.

2. Implement the interface

   Implement the interface in your supported devices e.g. Android.

   Utilize python mobile libraries e.g. androidlib.py.

3. Write your tests

   Tests are device independent and reusable on all supported devices.

4. Run

Step 1 : Define app interface

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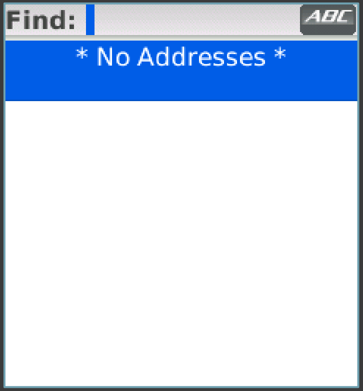
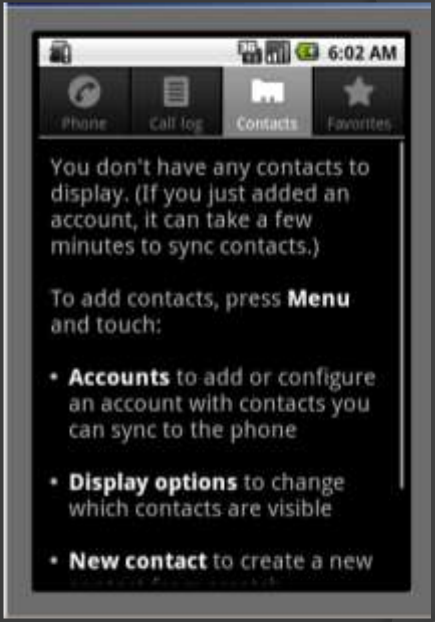
```
class AppInterface:
  """ Application interface for all
     devices to implement """

    def add(self, contact):
        """Add contact """

    def find(self, contact):
        """ Find contact"""

    def delete(self, contact):
        """Delete contact"""
```



* No Addresses *



You don't have any contacts to display. (If you just added an account, it can take a few minutes to sync contacts.)

To add contacts, press **Menu** and touch:

- **Accounts** to add or configure an account with contacts you can sync to the phone
- **Display options** to change which contacts are visible
- **New contact** to create a new

Test Automation Overview

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   Utilize moet libraries.

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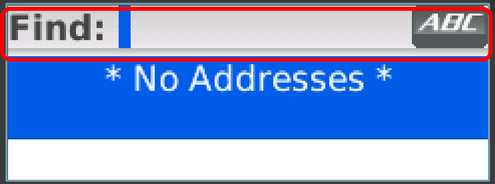
4. Run

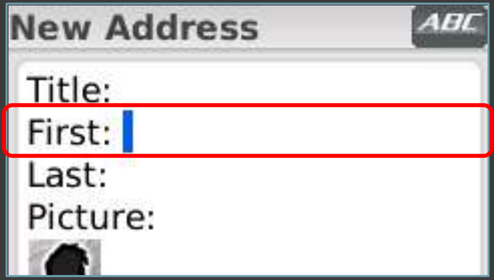
Step 2 (Pearl) : Implement the interface

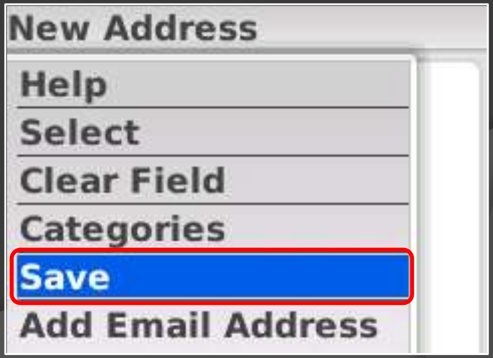
```
def add(self, contact):
    """ Add contact """

    # click add contact
    enter()

    # enter name
    enter(contact.getFirstname()
    thumbwheel('down', 1)
     …
    # save
    menu()
    enter()
```







Step 2 (Android) : Implement the interface

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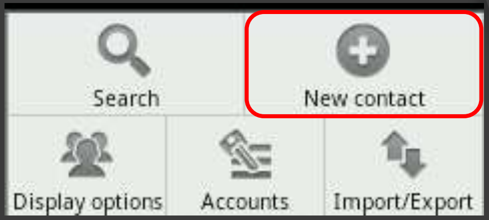
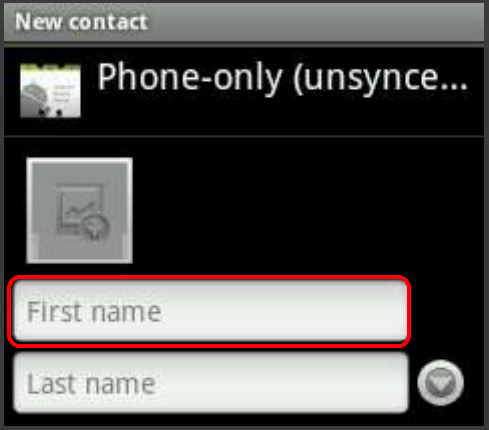
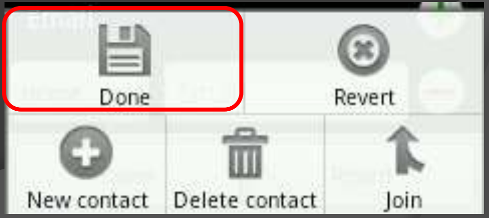
```
def add(self, contact):
    """ Add contact """

    # click add contact
     menu()
     scroll('up')
     scroll('right')
     enter()

     # enter name
    enter(contact.getFirstname())
     scroll('down')
     …
     # save
     menu()
     scroll('down')
      enter()
```







Step 2 (recap) : Implement the interface

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```
def  PearlImpl(appbase.AppInterface):
    def add(self, contact):
        """ Add contact """
        enter()
        enter(contact.getFirstname()
        thumbwheel('down', 1)
        …
        menu()
        enter()
```

```
def  AndroidImpl(appbase.AppInterface):
    def add(self, contact):
        """ Add contact """
        menu()
        scroll('up')
        scroll('right')
        enter()
        enter(contact.getFirstname())
        scroll('down')
        …
        menu()
        scroll('down')
        enter()
```

Test Automation Overview

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4. Run

Step 3 : Writing tests

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```
class AddContactTest(unittest.TestCase):

    device = testenv.getDeviceClass()

    def addContactWithOnlyFirstnameTest(self):
        self.contact.setFirstname(firstname)
        self.device.add(self.contact)

    def addContactWithOnlyLastnameTest(self):
        self.contact.setLastname(lastname)
        self.device.add(self.contact)
```

Step 3 : Runtime binding

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```
def getDeviceClass(self):
     """ Returns the device to test """

    mobileDevice = self.getMobileDevice()

    if mobileDevice == 'pearl':
            import pearl
            deviceClass = pearl.PearlImpl()

    elif mobileDevice == ‘android':
            import android
            deviceClass = android.AndroidImpl()

    return deviceClass
```

More device-independent tests

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Additional tests are easy to write

```
def addContactWithEmailTest(self):
def addContactWithAddressesTest(self):
def addContactWithAllDetailsTest(self):
def addContactWithLongDetailsTest(self):
def addContactAddressWithStateZip(self):
def addContactAddressWithCityStateZip(self):
def addContactAddressWithNoDataNegativeTest(self):
```

Step 4 : Run

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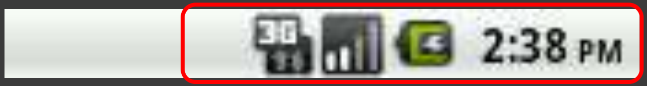
- Basic run command
  - python <test.py>
- Python test frameworks
  - unittest
  - PyUnit
  - python-nose

Test Verification

- Server hosted apps
  - API assertions
  - Database assertions
- Image assertions



```
self.assertTrue(
    imagelib.compare(
        self.device, testname, '100%x90%‘, tolerance))
            # Crop settings examples
            # 100%x80%+10%+20%  (crop size + offset)
            # 320x90+0+0
            # +0+90
```

Test Logging

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- Logs

  AddressTest.log :

```
2010-06-10 15:19:46,773 - testCreateAddressMethod - INFO -
    [Address] 200 Villa St Mountain View CA 94040 BUSINESS ADDRESS
```

- Initialization

```
self.log = self.device.initLogger(self._testMethodName,
                                  self.__class__.__name__)
```

- Usage

```
self.log.info('Starting test: ' + self._testMethodName)
self.log.debug(self.contact)
self.log.error(‘Missing image to compare’)
```

Demo

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- Simulators
  - Android
  - BlackBerry Pearl
- Moet
- Test automation
  - Address book app
    - Add contact
    - Find contact
    - Delete contact

Advantages

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- Low cost and ease of use
- Reusable end-to-end tests
- No device sharing/scheduling
- Bigger device pool
- Reduce manual testing time
- Run on developer machines
- Debugging capabilities

Limitations

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- Requires ethernet or internet connectivity
- Does not simulate network performance
- Does not support hardware controls testing
- Dependent on simulator reliability
- Limited peer-to-peer applications testing

Resources

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MOET http://github.com/eing/moet/

Android ®

Emulator http://developer.android.com/guide/developing/tools/emulator.html

ADB http://android-dls.com/wiki/index.php?title=ADB

Forum http://developer.android.com/resources/community-groups.html

BlackBerry ®

Downloads http://na.blackberry.com/eng/developers/javaappdev/javadevenv.jsp

Fledge Controller
http://docs.blackberry.com/en/developers/deliverables/6338/Testing_apps_using_the_BBSmrtphnSmltr_607559_11.jsp

Forum http://supportforums.blackberry.com/

Q & A

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Thanks and enjoy the rest of SeleniumConf 2011

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