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# Using Web Logs in Splunk to Dynamically Create Synthetic Transaction Tests

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splunk>

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# Agenda

- Introduction to Selenium and existing Splunk app
- Demo of data collected
- Building manual tests in Python
- Problems with the manual method
- Building dynamic tests using Splunk data
- Alerting on issues
- Ideas for expanding


# Selenium Testing

splunk>

# Introduction to Selenium

- Selenium – Web Browser Automation
  http://www.seleniumhq.org

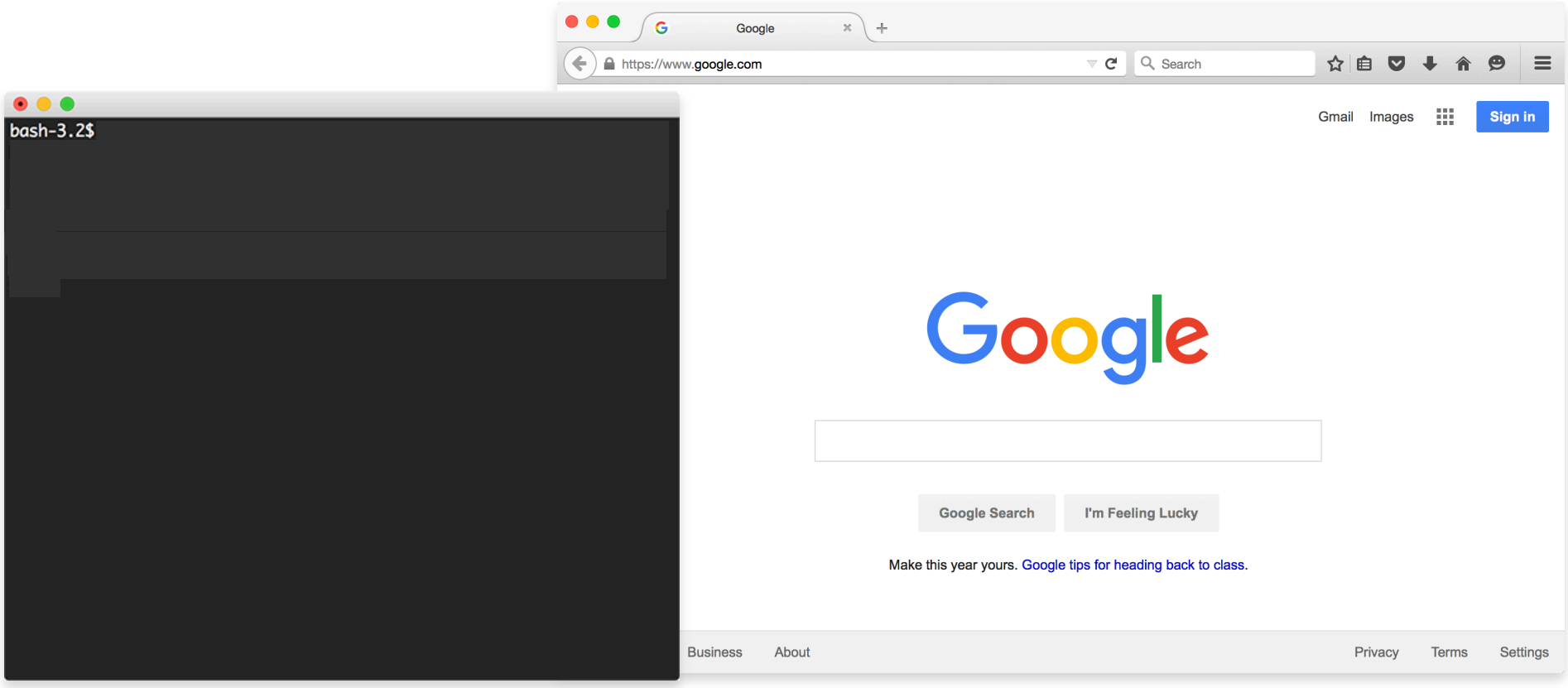
- Python API for Selenium WebDriver
  http://selenium-python.readthedocs.org

# Splunk Synthetic App

- Splunk App for Synthetic Transaction Monitoring
  - http://apps.splunk.com/app/1880
  - By: Elias Haddad

- Setup
  - Install Python if using Universal Forwarder
  - Install selenium and user-agents modules for Python

# Basic Webdriver Demo




# What Data Can We Get?

splunk>

# Sample Data

2015-07-17 10:16:12 app_name="External Sites" transaction_name=”www.google.com" event_type="end" transaction_end="2015-07-17 10:16:12" transaction_end_epoch="1439831772.32" execution_id="a30fd38f-4503-11e5-a699-0050568542ad" transaction_duration=”1.56299996376" browser="Firefox" browser_version="40" os="Windows 7" os_version="" ip="173.194.123.72”

2015-07-17 10:16:02 app_name="External Sites" transaction_name=”www.google.com" event_type="start" transaction_start="2015-07-17 10:16:02" transaction_start_epoch="1439831762.76" execution_id="a30fd38f-4503-11e5-a699-0050568542ad" browser="Firefox" browser_version="40" os="Windows 7" os_version="" ip="173.194.123.72”

# Extracted Fields

- app_name
- transaction_name
- event_type
- transaction_start/end
- Execution_id
- Transaction_duration
- Ip
- Browser
- Browser_version
- Os
- Os_version
- min/max/avg_latency
- Packet_loss

# Application Performance

Edit | More Info

Time Range: Today

Application Name: External Sites

## Current Status

Performance KPI <1m ago

**100.0**

▲ +0%

Availibility KPI <1m ago

**100.0**

— no change

## Performance SLA

<1m ago


## Availibility SLA

<1m ago


## Application Availibility

<1m ago


# Building Tests in Python

splunk>

# Example Manual Test

```
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.common.keys import Keys
from selenium.webdriver.support.ui import Select
from selenium.common.exceptions import NoSuchElementException
import unittest, time, re
###### STEP 1
### Include the splunktransactions module in your script
from splunktransactions import Transaction

class GoogleTest(unittest.TestCase):
    def setUp(self):
        self.driver = webdriver.Firefox()

        # replace the above line with the below line to run as Safari
        # Safari driver needs to be downloaded
```

# Set the URL

```
class GoogleTest(unittest.TestCase):
    def setUp(self):
        self.driver = webdriver.Firefox()

        # replace the above line with the below line to run as Safari
        # Safari driver needs to be downloaded
        #self.driver = webdriver.Safari()
        self.driver.implicitly_wait(30)
        self.base_url = "https://www.google.com/"
        self.verificationErrors = []
        self.accept_next_alert = True

    def test_google(self):
        driver = self.driver

        ###### STEP 2
```

# Name your App and Transaction

```
###### STEP 2
### Provide a name to your Application eg. 'Google'
a=Transaction(driver, 'Google')

###### STEP 3
### assign a name to the transaction by defining a start and an end
a.TransactionStart(driver, 'Google Home Page')
driver.get(self.base_url + "/")
#time.sleep(1)
a.TransactionEnd(driver, 'Google Home Page')
time.sleep(4)

###### STEP 4
### Repeat Step 3 and 4 as needed for as many transactions as needed
a.TransactionStart(driver, 'Search Splunk')
driver.find_element_by_id("gbqfq").clear()
```

# Adding Other Tests

```
    ###### STEP 4
    ### Repeat Step 3 and 4 as needed for as many transactions as needed
    a.TransactionStart(driver, 'Search Splunk')
    driver.find_element_by_id("gbqfq").clear()
    driver.find_element_by_id("gbqfq").send_keys("splunk")
    driver.find_element_by_id("gbqfb").click()
    time.sleep(1)
    driver.find_element_by_xpath("//a[@id='vs0p1']/b[2]").click()
    a.TransactionEnd(driver, 'Search Splunk')
    time.sleep(2)

def tearDown(self):
    self.driver.quit()
    self.assertEqual([], self.verificationErrors)
```


# Problems With The Manual Method

splunk>

# Problems We Encountered

- Two events per test
  - Forced to use TRANSACTION command
  - False positives in app
  - False alerts when service restarted on indexers
- Missing data
  - No server info
  - No context for failures
- Manually building tests is slow
  - Slow to build
  - Difficult to maintain


# Building Dynamic Tests

splunk>

# Goals

- Single event per test
- Capture error information
- Build tests dynamically given an array of info
  - URL
  - App Name
  - Transaction Name
  - Expected title
  - Server

# Single Event Per Test

- Modified **splunktransactions.py**
  - Added Passed / Warning / Failed status
  - Added error info
  - Added server info
  - Combined data into one event

2015-08-17 11:30:47 app_name=”Google" transaction_name=“Home Page" result=Passed duration=1.63 browser="Firefox" browser_version="39" os="Mac OS X" os_version="10.10" ip="173.194.123.72" server="unknown"

# Capturing Failed Test Info

- Failure types
  - Server responds:  Error on page (404, 500, etc)
  - Server doesn't respond:  Problem loading page
  - Timeout issues ( > 30 seconds to load)
    - Check for login prompt
  - Unknown

# Testing for Errors

- Testing for 400 and 500 errors
  - self.assertNotRegexpMatches(page_title, r'[4,5]\d\d', '1’)
- Testing for no page loaded
  - self.assertNotRegexpMatches(page_title, r'problem|not\savailable|error', '2’)
- Testing for a specific title
  - self.assertIn(title, self.driver.title, '3')

# Try / Except

```
def test(self):
    a=Transaction(self.driver, 'Google')
    a.TransactionInfo('Google Home Page')
    try:
        self.driver.get('https://www.google.com')
        page_title = self.driver.title.lower()
        self.assertNotRegexpMatches(page_title, r'[4,5]\d\d')
        self.assertNotRegexpMatches(page_title, r'problem|not\savailable|error')
        self.assertIn('Google Home Page', self.driver.title)
        a.TransactionPass()
    except AssertionError as error:
        # Warn on 401 or 403 errors
        try:
            self.assertNotRegexpMatches(page_title_lc, r'40[1,3]')
            a.TransactionFail(page_title)
        except AssertionError as error:
            a.TransactionWarn(page_title)
        except TimeoutException:
            error = 'Timeout: Page did not load within 30 seconds'
            try:
                alert = False
                while True:
                    Alert(self.driver).dismiss()
                                        alert = True
            except NoAlertPresentException:
                a.TransactionFinish()
                if alert == True:
                    a.TransactionWarn('Test account denied access')
                else:
                    a.TransactionFail(error)
        except:
            a.TransactionFinish()
            error = 'An unknown error occured: %s' % page_title
            a.TransactionFail(error)
            raise
    finally:
        a.TransactionOutput()
```

# Build Tests Dynamically

Set up the array

```
# Array of arrays: app_name, transaction_name, url, title
tests = [
    ['Google','Google Home Page','https://www.google.com','Google'],
    ['Yahoo','Yahoo Home Page','https://www.yahoo.com','Yahoo'],
    ['Bing','Bing Home Page','https://www.bing.com','Bing']
]
```

# Build Tests Dynamically

## Create “Test Builder” Function

```
def test_generator(app_name,transaction_name,url,title):
    def test(self):
        a=Transaction(self.driver, app_name)
        a.TransactionInfo(transaction_name)
        try:
            self.driver.get(url)
            page_title = self.driver.title.lower()
            self.assertNotRegexpMatches(page_title, r'[4,5]\d\d')
            self.assertNotRegexpMatches(page_title, r'problem|not\savailable|error')
            if title != None:
                self.assertIn(title.lower(), page_title_lc)
            a.TransactionPass()
        except AssertionError as error:
            # Warn on 401 or 403 errors
            try:
                self.assertNotRegexpMatches(page_title_lc, r'40[1,3]')
                a.TransactionFail(page_title)
            except AssertionError as error:
                a.TransactionWarn(page_title)
            except TimeoutException:
                error = 'Timeout: Page did not load within 30 seconds'
                try:
                    alert = False
                    while True:
                        Alert(self.driver).dismiss()
                                        alert = True
                except NoAlertPresentException:
                    a.TransactionFinish()
                    if alert == True:
                        a.TransactionWarn('Test account denied access')
                    else:
                        a.TransactionFail(error)
             except:
                a.TransactionFinish()
                error = 'An unknown error occured: %s' % page_title
                a.TransactionFail(error)
                raise
        finally:
            a.TransactionOutput()

return test
```

# Build Tests Dynamically

Add each test to the Unit Test suite

```
count = 0

# Build tests from test array
for test in tests:
    count = count + 1
    test_name = 'test_%03d' % count
    test_case = test_generator(test[0],test[1],test[2],test[3])
    setattr(DynamicTests, test_name, test_case)
```


# Building Dynamic Tests Using Splunk Data

splunk>

# Build Splunk User & Report

- Create a user in Splunk with minimal privileges
- Create a report with that user
  - IIS Logs
  - Top sites by unique users over 7 days

```
index=iis cs_method=GET sc_status=200
| stats dc(c_ip) as count, min(s_port) as port, min(s_ip) as s_ip by cs_host, s_computername
| sort - count
| eval server = upper(s_computername)
| eval category = <insert magic here>
| table category, cs_host, url, server, s_ip
```

# Accessing Report in Python

- Get the splunklib module for Python: http://dev.splunk.com/python

```
import splunklib.client as client
import splunklib.results as results

def splunksearch(offset=0, limit=0):
    HOST = ”localhost"
    PORT = 8089
    USERNAME = ”splunk_user"
    PASSWORD = ”changeme"

    service = client.connect(host=HOST, port=PORT, username=USERNAME, password=PASSWORD, owner="splunk_user", app="splunk-app-synthetic")

    savedsearch = service.saved_searches["SWT_top_sites_by_users"]

    history = savedsearch.history()
    search_kwargs = {
        "offset":   offset,
        "count":    limit
    }
    searchresults = results.ResultsReader(history[0].results(**search_kwargs))
```


# Alerting on Issues

splunk>

# Things to Alert On

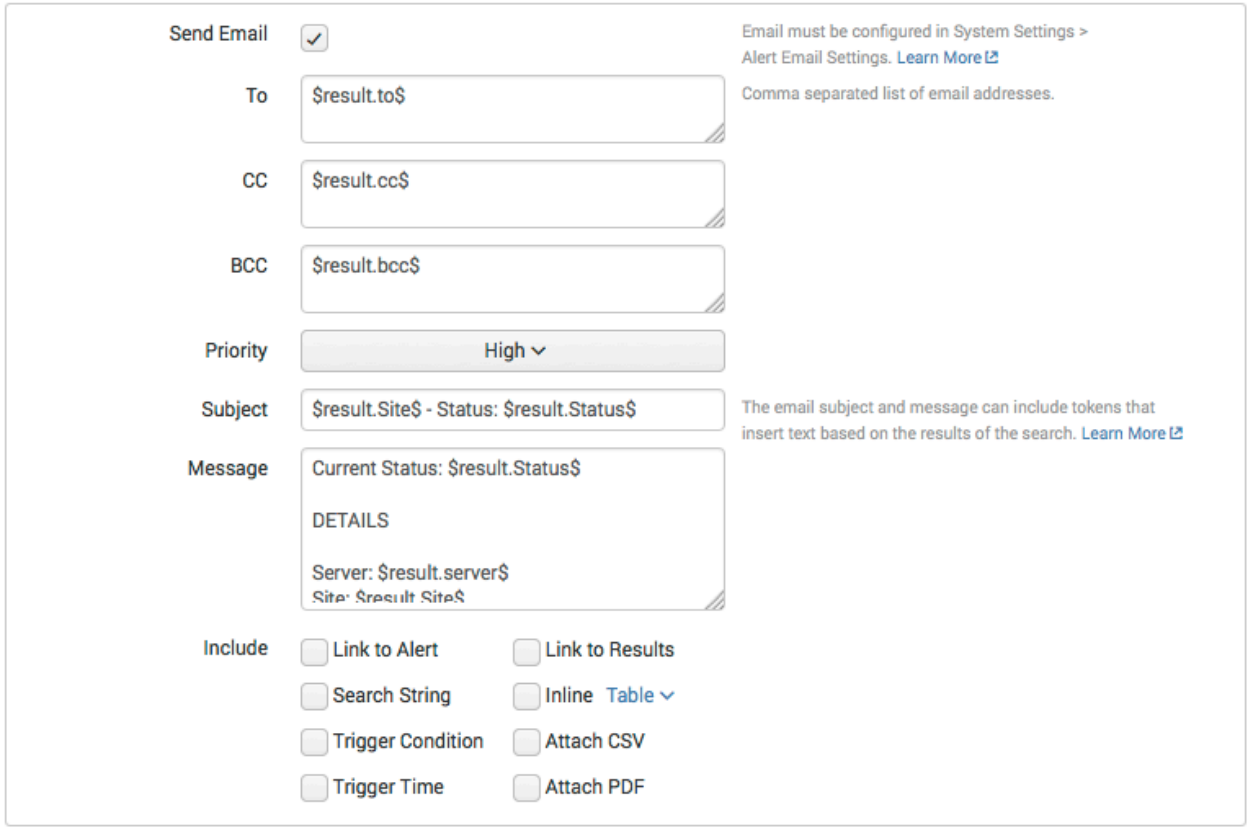
- Synthetic Transactions have stopped
- Test failures on individual websites

# One Query for All Sites

| transaction_name | failure_kpi | to | cc | Bcc |
|---|---|---|---|---|
| Google Home Page | 4 | admin@google.com | | |

```
index=web sourcetype=synthetic:transaction
| transaction transaction_name endswith=result!="Failed" keepevicted=true
| search result=failed eventcount>1
| lookup alert_subscriptions transaction_name output failure_kpi,to,cc,bcc
| fillnull value=2 failure_kpi
| eval Status = if(mvindex(result,-1)="Failed","DOWN","Service Restored")
| search Status=DOWN OR (Status="Service Restored" AND eventcount>2)
| eval Downtime = tostring(duration, "duration")
| fillnull value="justin@pnnl.gov, arzu.gosney@pnnl.gov" to
| eval failures = if(Status="DOWN", eventcount, eventcount-1)
| where failures >= failure_kpi AND _time + duration > relative_time(now(), "-1h")
| rename transaction_name as Site
| eval link = replace(Site, " ", "%20")
| eval eventstart = strftime(_time,"%m/%d/%Y - %I:%M:%S %p")
| eval UniqueId = _time + Status
| eval eventend = strftime(_time + duration, "%m/%d/%Y - %I:%M:%S %p")
| eval details = if(event_type == "end", "Service Restored: " . eventend, "Last Failure: " . eventend)
| table server, Site, Status, eventstart, Downtime, failures, UniqueId, failure_kpi, to, cc, bcc, link, details, error
```

# Configuring the Alert




# Ideas For Expanding

splunk>

# Future Plans

- User interface in app for:
  - Subscribing to alerts
  - Adding sites to manual list
  - “Blacklisting” sites

- Combine test failures inline with IIS logs


# THANK YOU!

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