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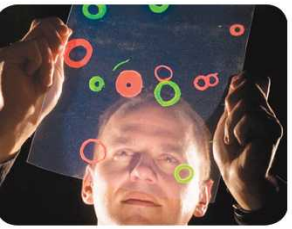
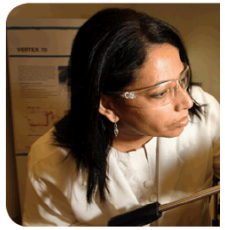


Regression Testing with Selenium

NLIT Summit, May 2017

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Agenda

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- Who Are We?
- Problems from Inadequate Testing
- Selenium for Automated Testing
- Framework for Automated Testing
- Lessons Learned
- Resources
- Q&A: Closing Discussion

Who are we?

- Role
- Background
- Experience

Problems from Inadequate Testing

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1. $59.5 **billion** lost per year due to software defects. Source: 2002 federal study.
2. $100 **billion** lost annually in U.S. due to cybercrime, global total is $575 billion. Source: 2014 McAfee report.
3. 43% of software projects cost more, take longer, or do less; 18% of software projects fail. Source: 2013 Chaos Manifesto

Links to Sources:

1.https://www.nist.gov/sites/default/files/documents/director/planning/report02-3.pdf

2.https://www.csis.org/events/2014-mcafee-report-global-cost-cybercrime

3.https://larlet.fr/static/david/stream/ChaosManifesto2013.pdf

Selenium Website

Selenium Website: http://docs.seleniumhq.org

Selenium for Automated Testing

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- Selenium is a great open source tool for Web UI testing with a large community that supports it, including Google
- Supports C, C#, Java, Python and Ruby languages
- Support IE, FireFox and Chrome browsers
- Selenium provides support for integration of open source frameworks like TestNG, JUnit, and NUnit
  - We use NUnit for our framework
  - We've done some additional testing with JUnit
- Large community of users
- IDE for recording in Firefox

Steps for Using Selenium IDE

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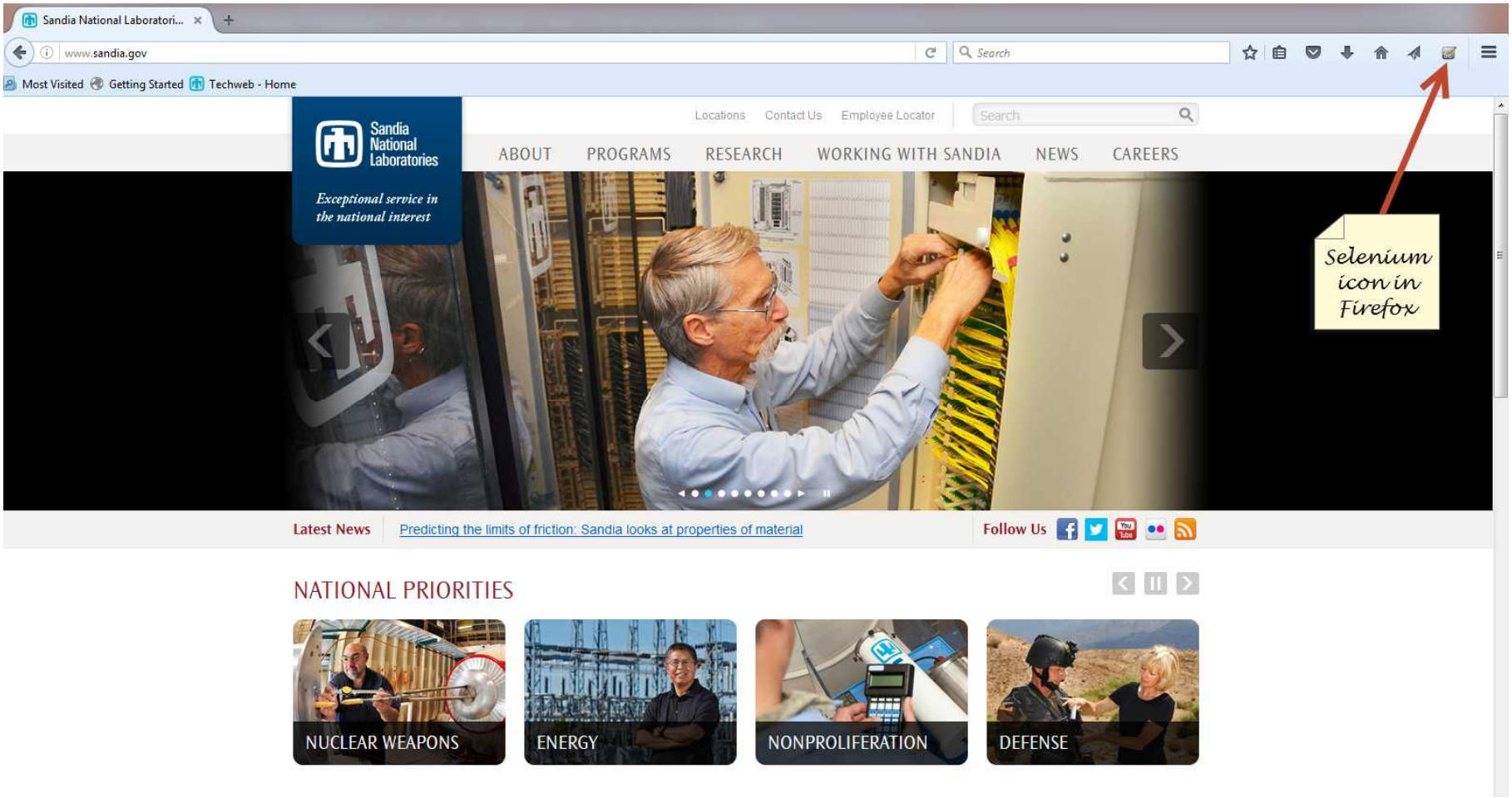
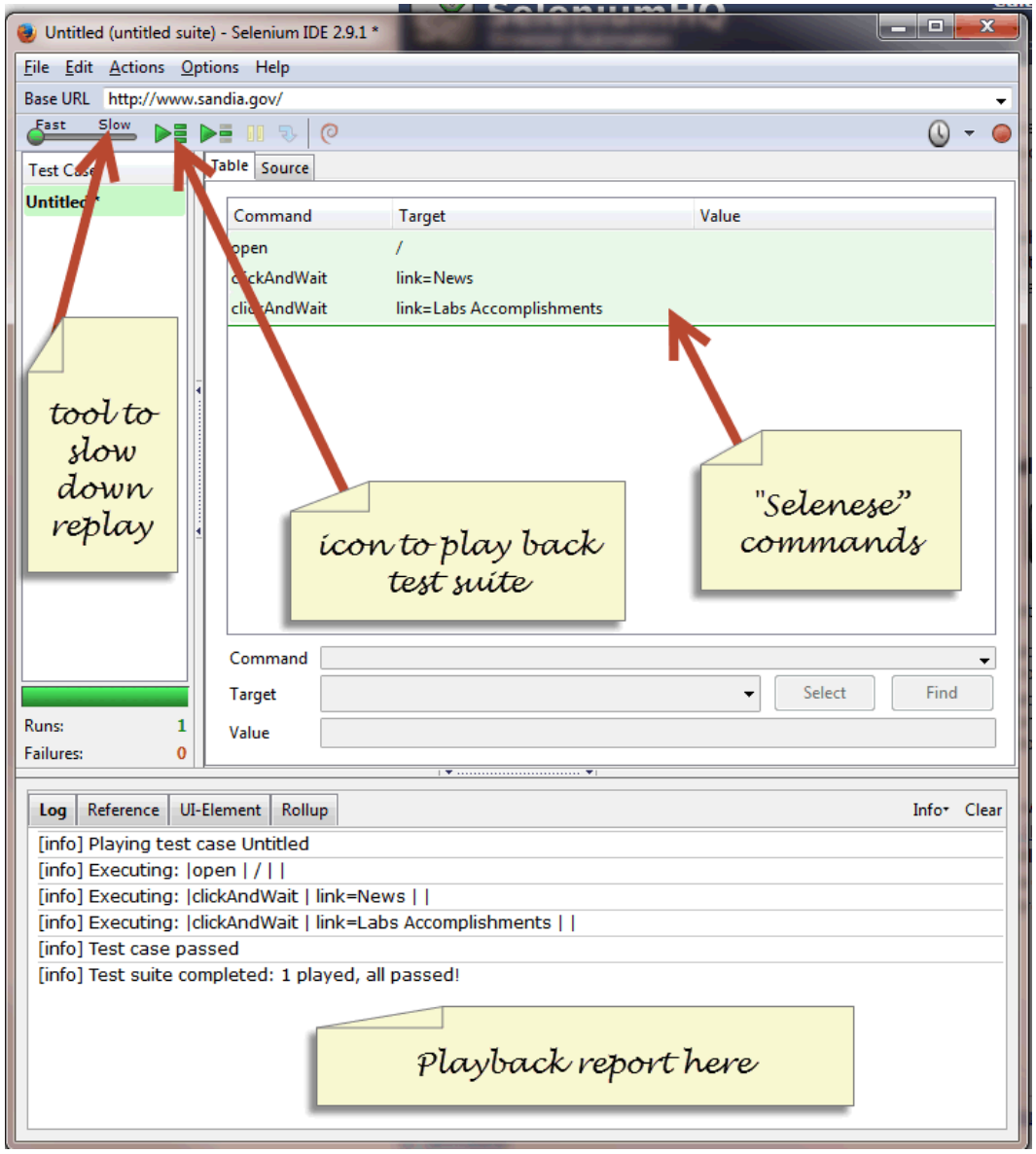
1. Download and install software from website.
2. Add plug-in to Firefox.
3. Open Firefox and open website to be tested.
4. Select Selenium icon from Firefox toolbar (screen shot on next slide).
5. Selenium IDE launches in recording mode (screen shot two slides ahead).
6. Stop recording and save using buttons in IDE (screen shot two slides ahead).
7. Replay Selenium script using buttons in IDE (screen shot two slides ahead).

Firefox: SNL External Webpage



Selenium IDE invoked from Firefox



Framework for Automated Testing

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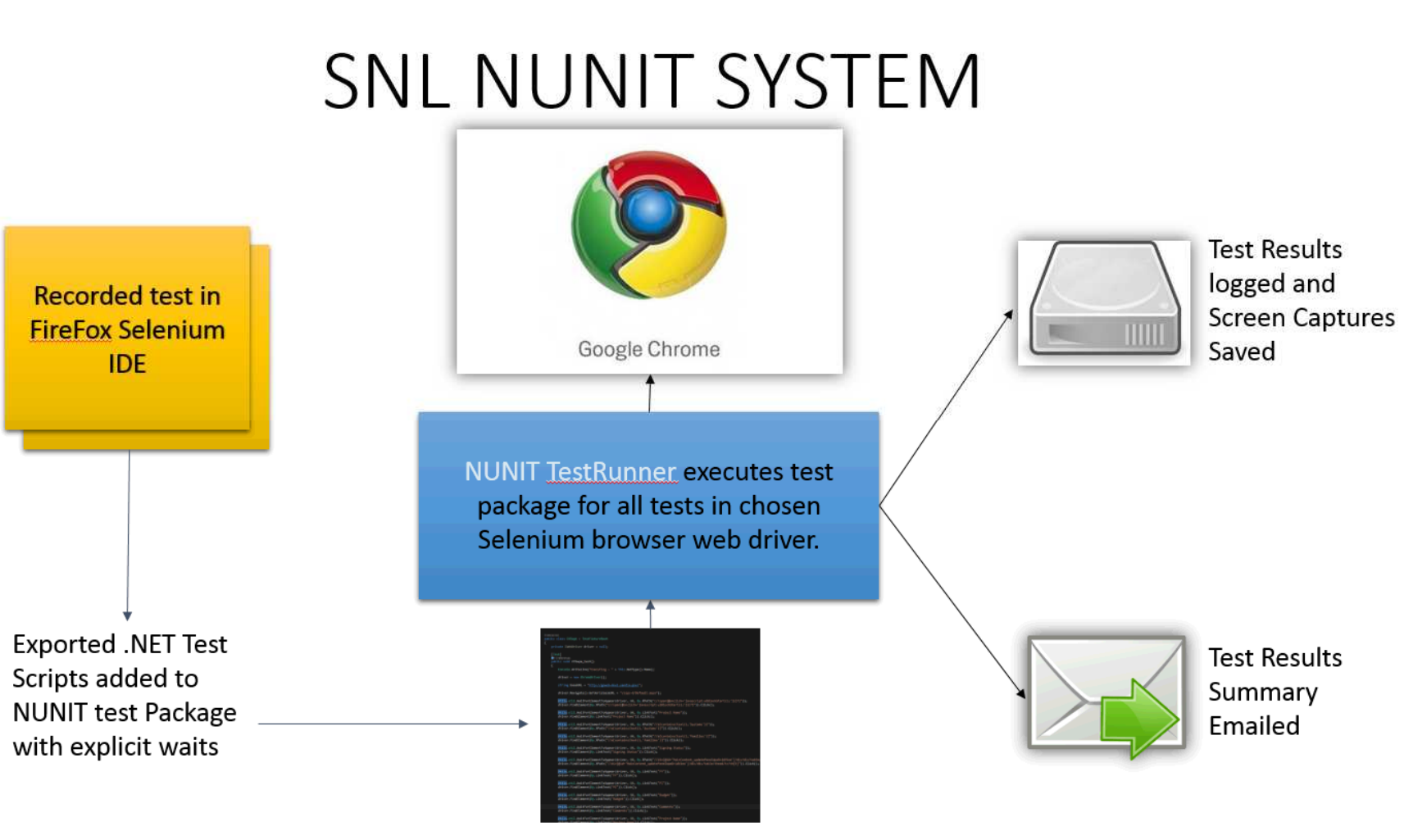
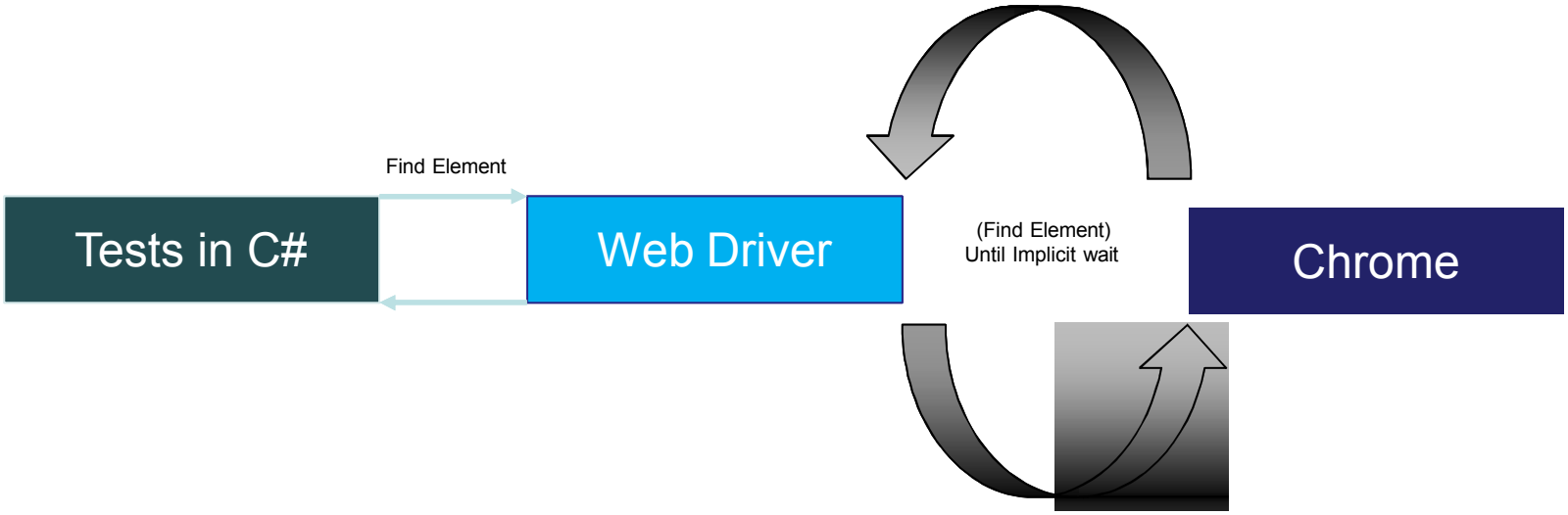
- The team developed a framework to utilize Selenium's IDE and export the tests as C# to NUnit for testing.
- The framework runs the tests nightly and emails the team if any tests failed.
- The framework produces a log of the errors found, along with a screenshot of where the error originated from.

Framework for Automated Testing



Framework for Automated Testing



Lessons Learned

- Browser drivers are constantly being updated which causes us to have to update our framework
- Chrome works best for our testing
- We've had to add wait times in our framework when running the tests because elements would be delayed when getting displayed on the page. Network bandwidth plays role in delays
- JUnit has more drivers, including headless drivers
  - Authentication can be a problem with automated testing.

Lessons Learned (cont.)

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- Long, manual tests need to be broken up for automation
- Automated tests that are dependent on element names or values that change are likely to cause the tests to fail.
- Selenium often fails to properly export to NUnit with tabbed applications
- If applications have role-based security, tests need to be intentionally designed to use different users or change user permissions.

Resources

- Selenium website: http://docs.seleniumhq.org/
- Selenium documentation: http://docs.seleniumhq.org/docs/
- Selenese commands (Selenium scripting language): http://docs.seleniumhq.org/docs/02_selenium_ide.jsp#selenium-commands-selenese
- Books & classes: search engine, Amazon, etc with term "Selenium programming" or "Selenium Automated Testing"

Closing Discussion, Q&A

- Discussion
  - What lessons can you share?
  - What tools and practices work for you?
  - What are your issues?
- Questions?