Just Married – Mr. Software Testing & Mrs. Analytics

Ajay Jain | Adobe Systems

Agenda

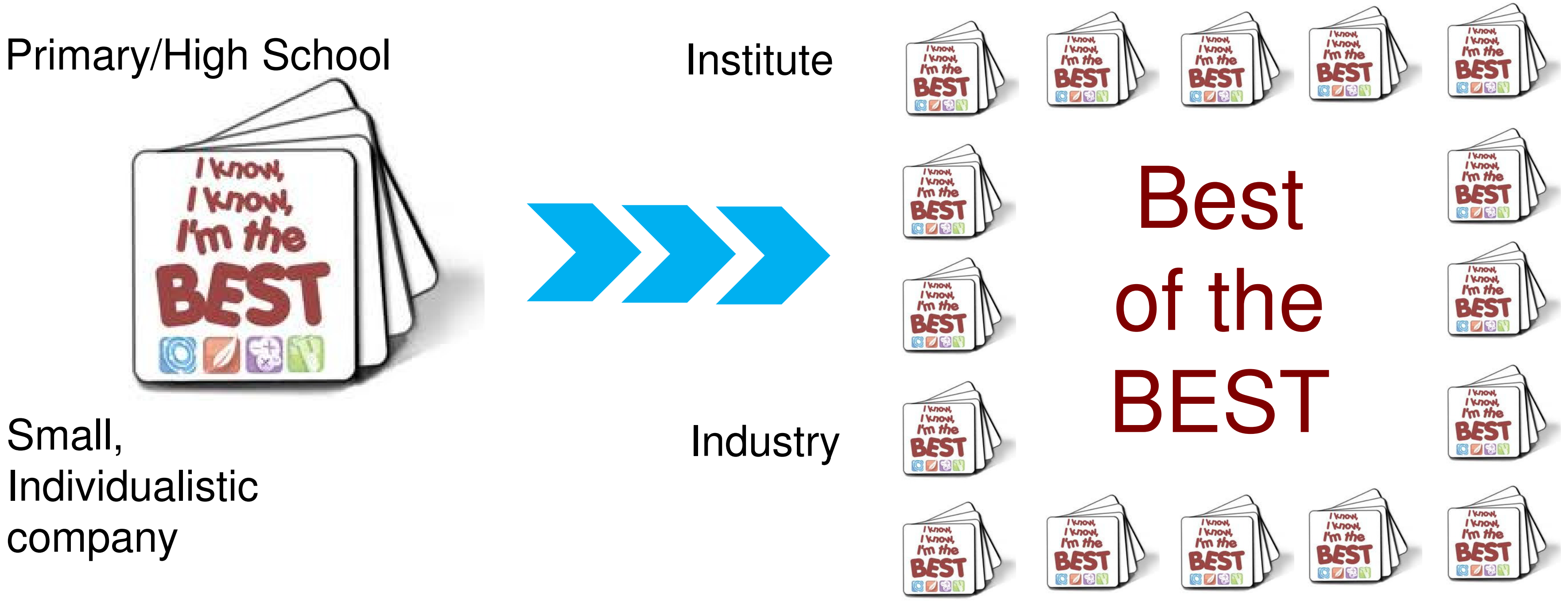
- Question time
- Challenges
- Solutions
- Where do we add efficiency
- Analytics in focus
- Case Study
- Benefits

This Presentation is **NOT** about:

- Telling you the need and importance of Metrics in Testing projects
- Recommending few more bug/test metrics to measure
- Dumping the system in order to add efficiency and productivity
- Punishing the testing team for not bringing efficiency

[redacted]

What’s my position…?



Primary/High School

Small,
Individualistic
company

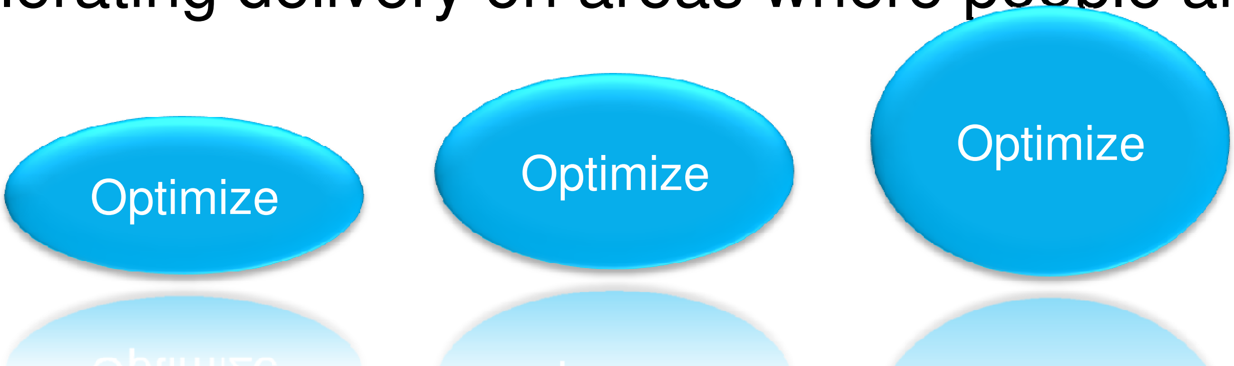
Institute

Industry

Best
of the
BEST

This Presentation is **ABOUT**

- Starting to think
  - Where to bring in change with maximum benefits?
  - Where to optimize in the test plan?
  - Where to test more?
- Accelerating delivery on areas where people are at their best.



Test More with same (or less) Resources
Test More with same (or less) Dollars
Retain and improve your testing team’s happiness

Let's be Pragmatic

Multiple
Test Engineers

Multiple
Operating Systems
& Browsers

Geographically Distributed
Team

Varied
Experience

Dynamic
User
Preferences

Different
Time Zone

Truly a Global Application

The Variables

35+

Test Engineers working

10+

OS configurations to test

25+

Locales application is supporting

100+

Machine configurations

50+

Application variables to test

12+

Project Cycle (in months)

3

Locations

2 major worries…

how much is automated?

Can we release now?

Do we have all test data?

Sanity complete?

What's the bug count?

Traceability matrix

Are we using TestCase Management Systems?

Vendor Coordination

Are we on track wrt test plan?

Resource crunch!!!

How much is done?

How much is pending?

Weekly reports

I am overloaded

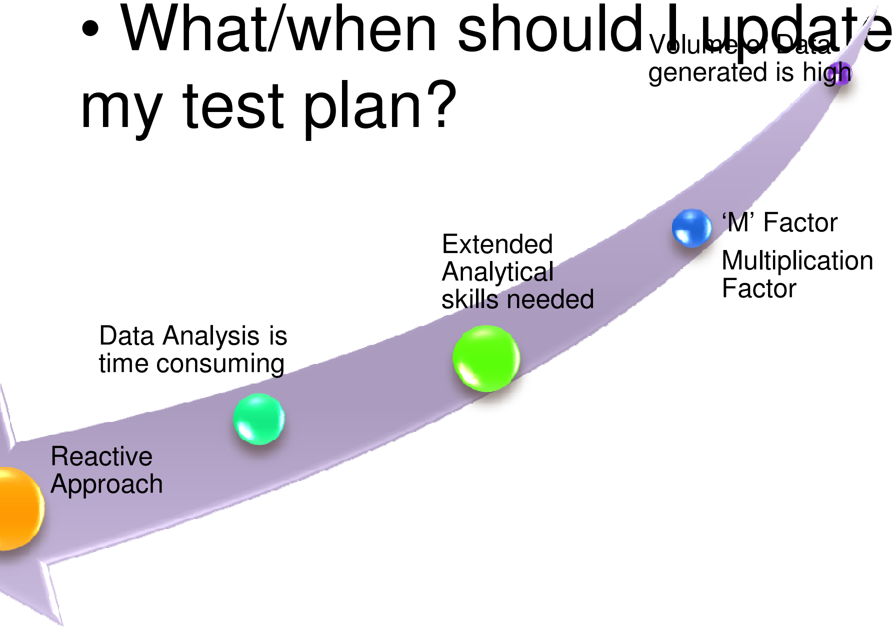
System requirements changing!!!

Ad-hoc testing

Feature testing

Continuous thoughts and questions…

- Pull Data from system
- Analyze and Interpret Data
- Investigate why?
- Findings are always surprising?
- Do you have time to correct?
- What/when should I update my test plan?


Volume of Data generated is high
'M' Factor
Multiplication Factor
Extended Analytical skills needed
Data Analysis is time consuming
Reactive Approach

And the Result is …Oh My God!!!

- Test coverage seems incomplete
- Specific Platform coverage is running too low
- Too many bugs on a specific module (which you thought was sufficiently tested)
- Goals - already missed
- Let’s meet in my office

Reactive Approach

Time Consuming

Frustrating

- Blame game starts
- Losing trust
- You end up working for data rather than data working for you….
- People lose focus

Challenge

How much have we covered?

🚫 Easy

Multiplicity Rules

- OS flavors
- Machines
- Resolution
- Languages
- User profiles
- Test data
- People
- Geos

Manual Intervention

- Monitoring
- Control
- Validity of Data
- Compilation
- Coordinate
- Frequency
- Behavioral
- Analysis

Time Sensitive

- When to collect?
- How often to collect?
- Reporting Delay
- Compilation delay
- Analysis Delay

Challenge

How much yet to cover?

You have the goal but if you don’t know where are you…you end up having…

Conflicts

Reduced Confidence

People on target

Lose Trust

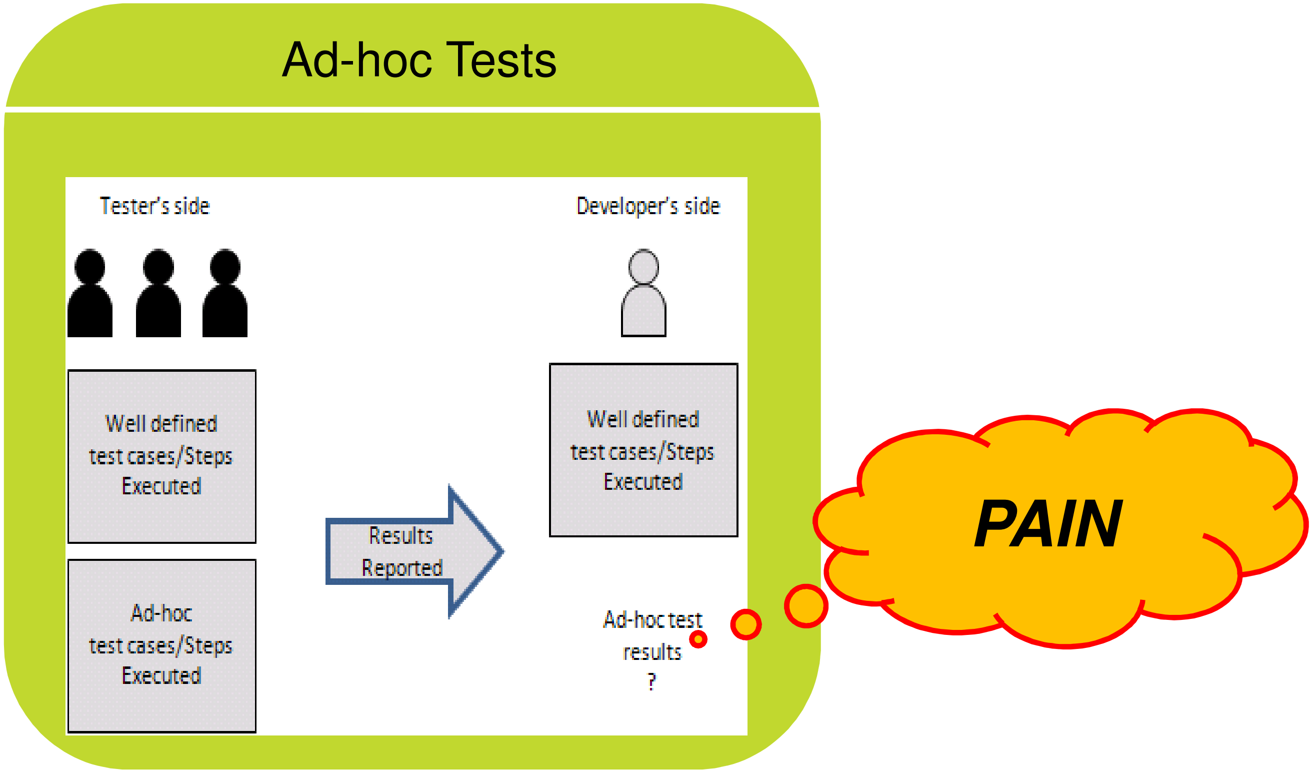
Under-utilization of resources

Panic

Challenge

How much have we covered?

Eas y


Ad-hoc Tests
Tester's side
Developer's side
Well defined test cases/Steps Executed
Ad-hoc test cases/Steps Executed
Results Reported
Well defined test cases/Steps Executed
Ad-hoc test results ?
PAIN

Solution (currently available) (Lot many)

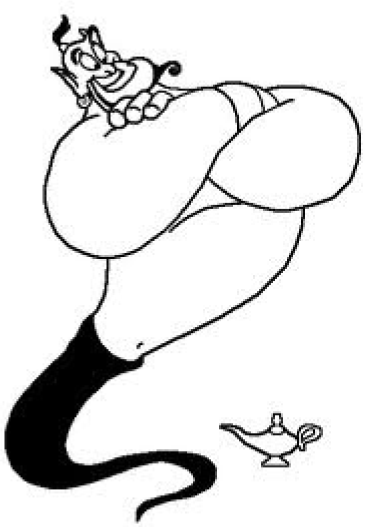
- A brand new Test case management System
- Try using powerful Microsoft EXCEL Sheets
- We have a coordinator now who will help compiling test results
- Try documenting what all you do

But what's missing?

Efficienc
y

Goals

- ❑ Easy way of recording test results
- ❑ Quick results compilation
- ❑ Make results analysis easier
- ❑ Record ad-hoc test activities (steps and results)
- ❑ Solution that provides on the spot project test coverage.

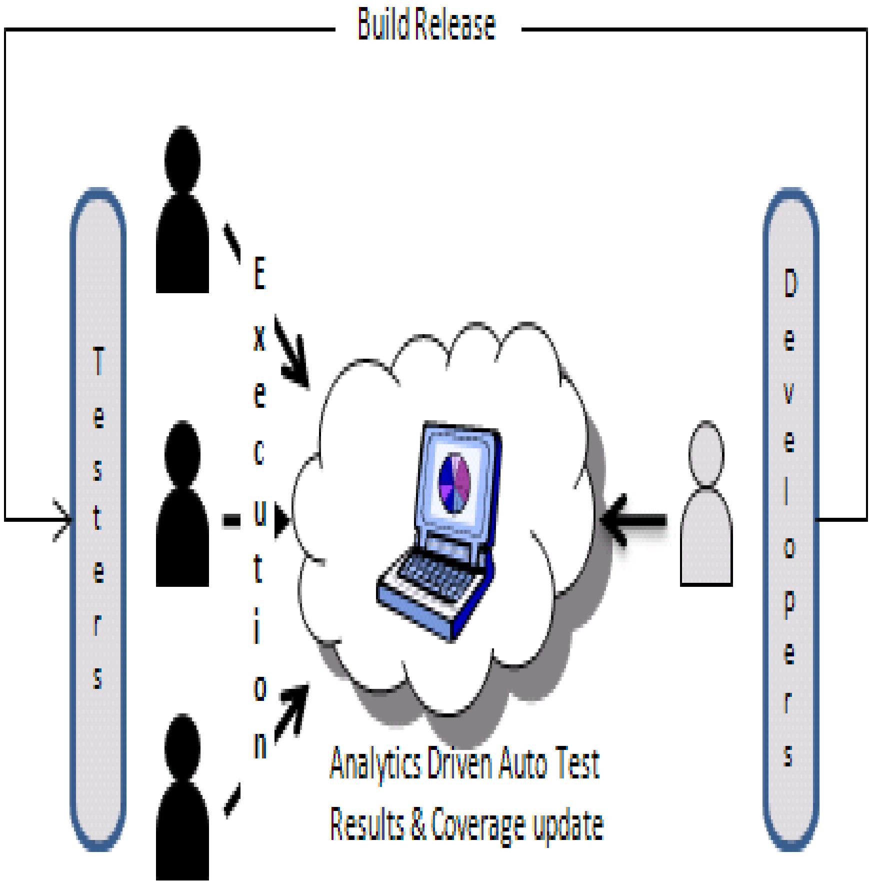


Ms. Analytics

"Analytics is defined as the process of measuring, collecting, and tracking information based on a user's action"

Analytics Driven Test Coverage

- ✓ Estimate total test cases and test coverage
- ✓ Create logical test_objects
- ✓ Add analytics recording code to test_objects
- ✓ Record Tester’s action on the test_objects.
- ✓ Send Data to Dashboard
- ✓ Process raw data and chart test coverage

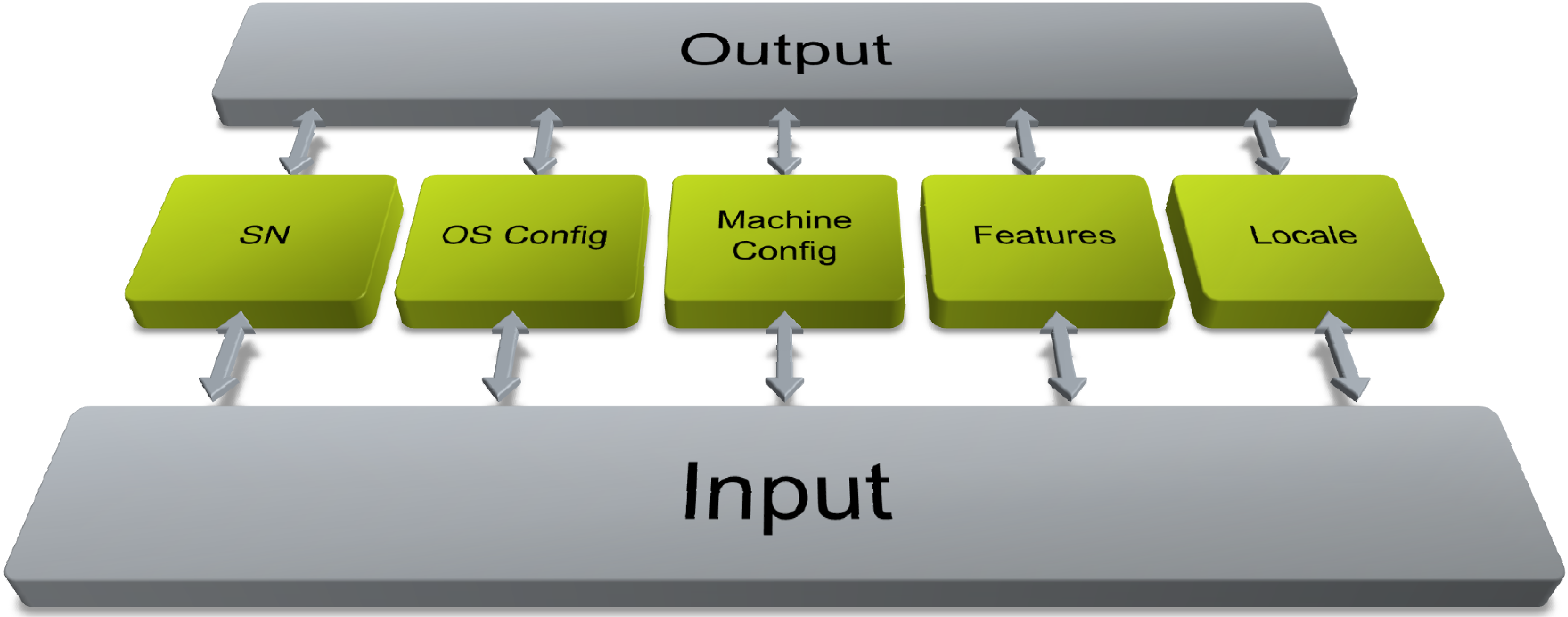


Estimate total test cases and test coverage

❑ Very Simple – Do the way you are currently doing…

- Total test cases (TCcount) in a software project is represented as:
- TCcount $= \sum_{k=0}^{n} Tc1, \quad Tc2, \quad Tc3, \ldots \quad Tcn$
- Tc = Test case
- Each test parameter is identified and all data values associated with the test parameter should be clearly stored.
- Test Label = array [test data vales]

Estimate Test Coverage



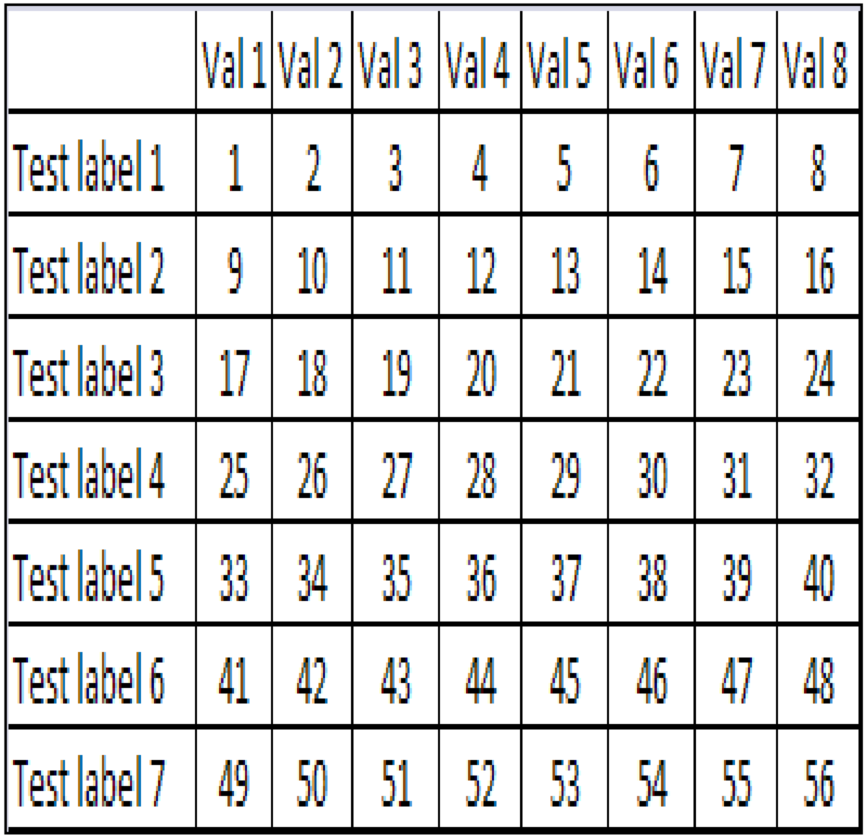
Total Test Combinations = 4 * 10 * 36 * 4 * 24 =
138420

Exponential increase in test configurations

Analytics Driven Test Coverage

This chart represents 7 test variables each running with 8 possible associated data values.

Example: Eula (as test label) that has variables comprising of 23 language options.



	Val 1	Val 2	Val 3	Val 4	Val 5	Val 6	Val 7	Val 8
Test label 1	1	2	3	4	5	6	7	8
Test label 2	9	10	11	12	13	14	15	16
Test label 3	17	18	19	20	21	22	23	24
Test label 4	25	26	27	28	29	30	31	32
Test label 5	33	34	35	36	37	38	39	40
Test label 6	41	42	43	44	45	46	47	48
Test label 7	49	50	51	52	53	54	55	56

Create logical test_objects

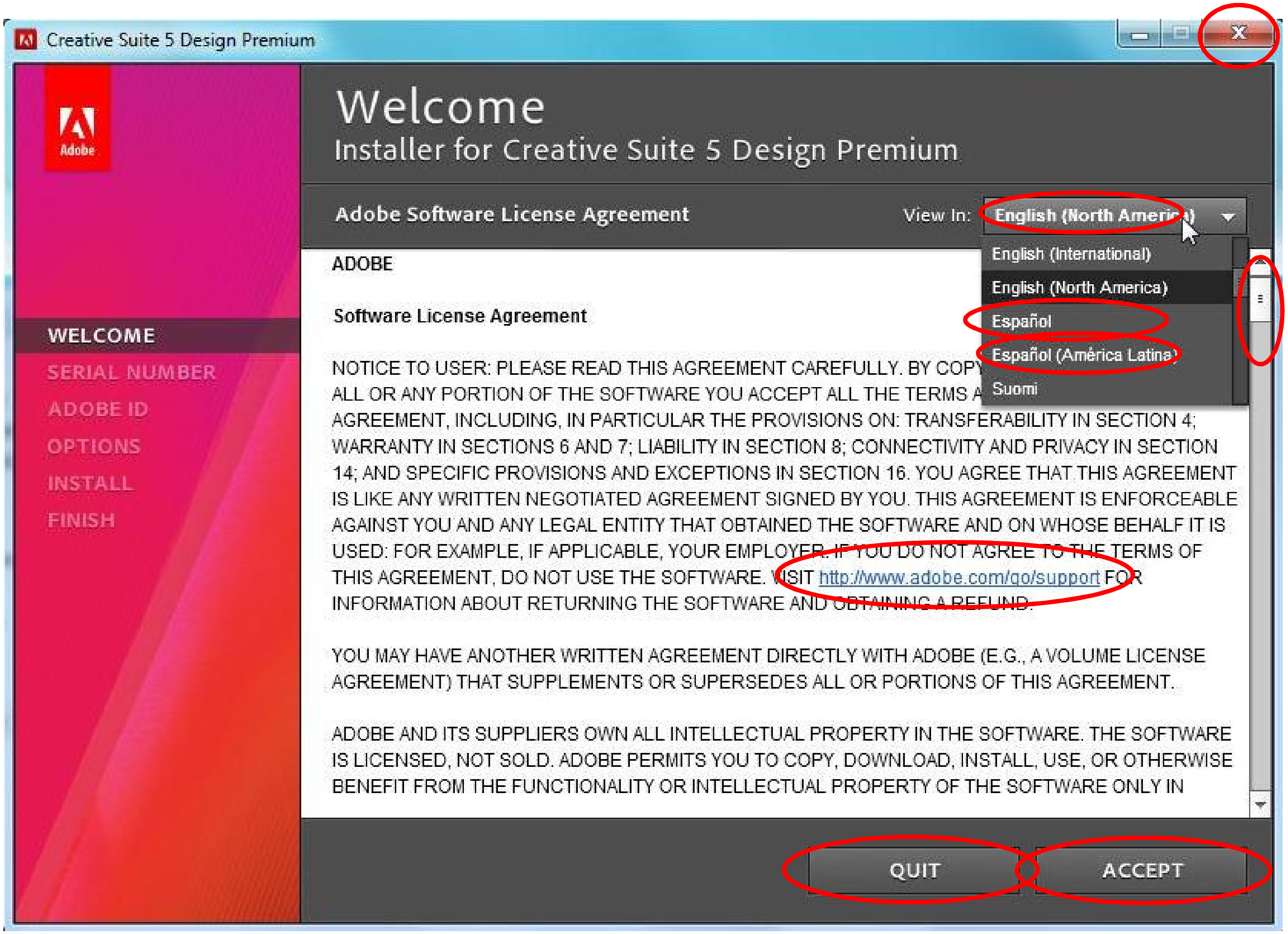
- ❑ A logical test_object encompasses a group of tests that have equal probability of execution.
- ❑ These objects can be identified as transitional objects that a tester selects while progressing in the testing activity.

- Thus, logical test_objects are created by grouping all possible test selections (user's actions) that can be used by a tester.

- Object 1: Test case {1, 2, 3, 4}
- Object 2: Test cases {5, 6, 7, 8}
- Object 3: Test cases {9, 10, 11, 12}

- Example: Installer screen (as test_object) where user can select configuration of products to install, install location, installation folder name, different navigation buttons (Next, Cancel) etc

Sample Screens showing Test_objects, labels and parameters for analytics



Welcome

Installer for Creative Suite 5 Design Premium

Adobe Software License Agreement

ADOBE

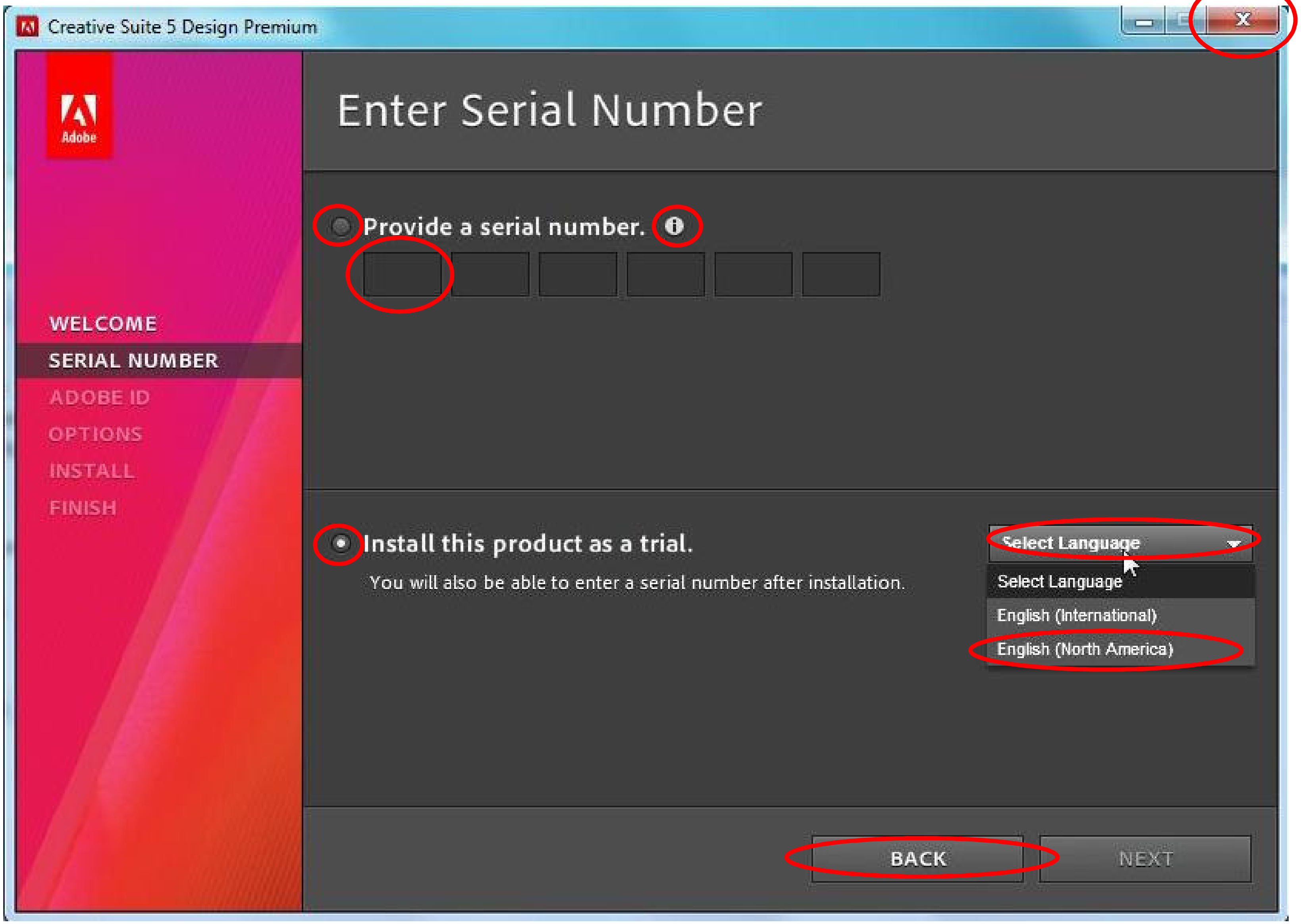
Software License Agreement

NOTICE TO USER: PLEASE READ THIS AGREEMENT CAREFULLY. BY COPY ALL OR ANY PORTION OF THE SOFTWARE YOU ACCEPT ALL THE TERMS A AGREEMENT, INCLUDING, IN PARTICULAR THE PROVISIONS ON: TRANSFERABILITY IN SECTION 4; WARRANTY IN SECTIONS 6 AND 7; LIABILITY IN SECTION 8; CONNECTIVITY AND PRIVACY IN SECTION 14; AND SPECIFIC PROVISIONS AND EXCEPTIONS IN SECTION 16. YOU AGREE THAT THIS AGREEMENT IS LIKE ANY WRITTEN NEGOTIATED AGREEMENT SIGNED BY YOU. THIS AGREEMENT IS ENFORCEABLE AGAINST YOU AND ANY LEGAL ENTITY THAT OBTAINED THE SOFTWARE AND ON WHOSE BEHALF IT IS USED: FOR EXAMPLE, IF APPLICABLE, YOUR EMPLOYER. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT USE THE SOFTWARE. VISIT http://www.adobe.com/go/support FOR INFORMATION ABOUT RETURNING THE SOFTWARE AND OBTAINING A REFUND.

YOU MAY HAVE ANOTHER WRITTEN AGREEMENT DIRECTLY WITH ADOBE (E.G., A VOLUME LICENSE AGREEMENT) THAT SUPPLEMENTS OR SUPERSEDES ALL OR PORTIONS OF THIS AGREEMENT.

ADOBE AND ITS SUPPLIERS OWN ALL INTELLECTUAL PROPERTY IN THE SOFTWARE. THE SOFTWARE IS LICENSED, NOT SOLD. ADOBE PERMITS YOU TO COPY, DOWNLOAD, INSTALL, USE, OR OTHERWISE BENEFIT FROM THE FUNCTIONALITY OR INTELLECTUAL PROPERTY OF THE SOFTWARE ONLY IN

Sample Screens showing Test_objects, labels and parameters for analytics



Creative Suite 5 Design Premium

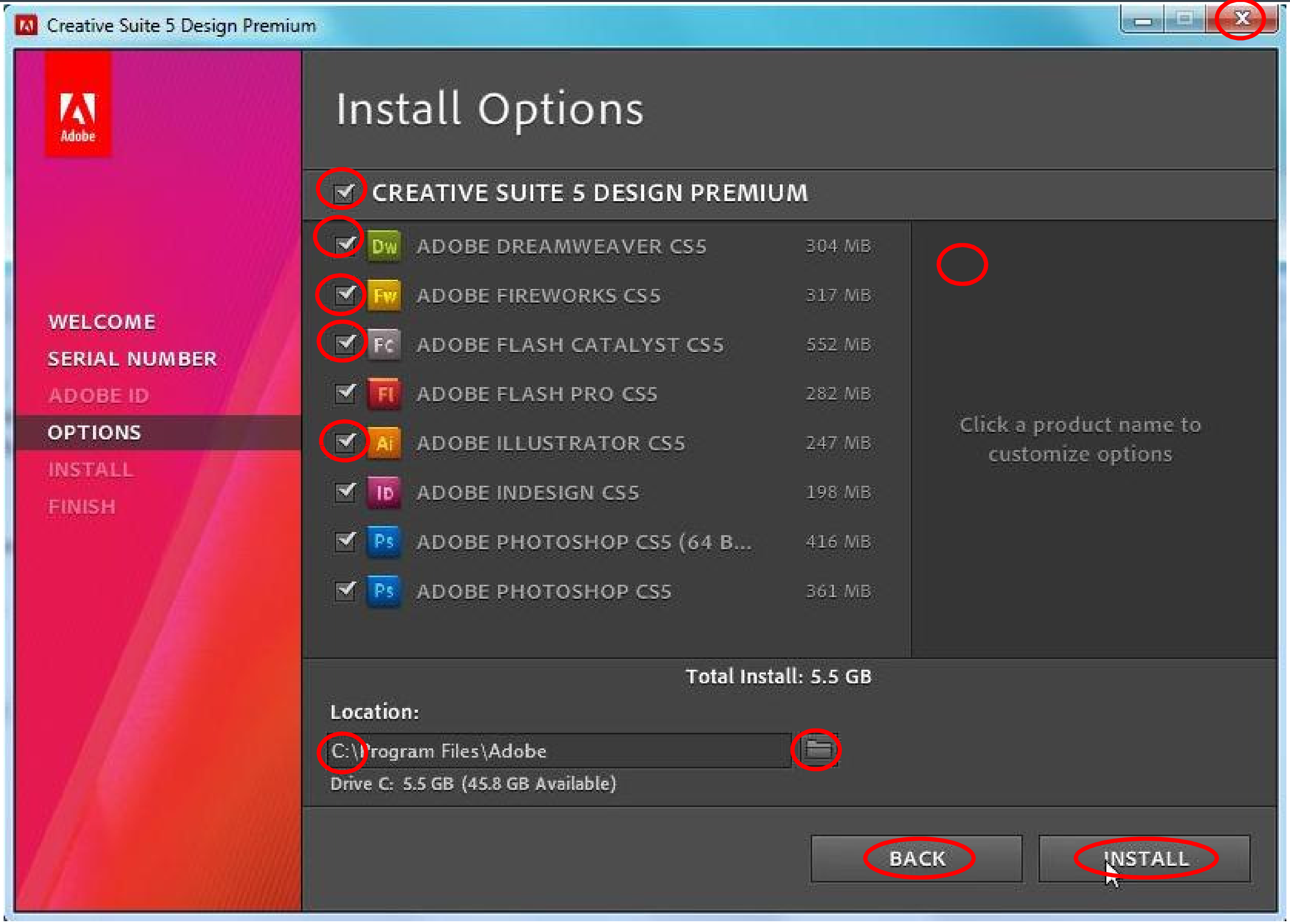
Enter Serial Number

○ Provide a serial number.

● Install this product as a trial.

You will also be able to enter a serial number after installation.

Sample Screens showing Test objects, labels and parameters for analytics



Install Options

☑ CREATIVE SUITE 5 DESIGN PREMIUM

☑	Dw ADOBE DREAMWEAVER CS5	304 MB
☑	Fw ADOBE FIREWORKS CS5	317 MB
☑	Fc ADOBE FLASH CATALYST CS5	552 MB
☑	Fl ADOBE FLASH PRO CS5	282 MB
☑	Ai ADOBE ILLUSTRATOR CS5	247 MB
☑	ID ADOBE INDESIGN CS5	198 MB
☑	Ps ADOBE PHOTOSHOP CS5 (64 B...	416 MB
☑	Ps ADOBE PHOTOSHOP CS5	361 MB

Click a product name to customize options

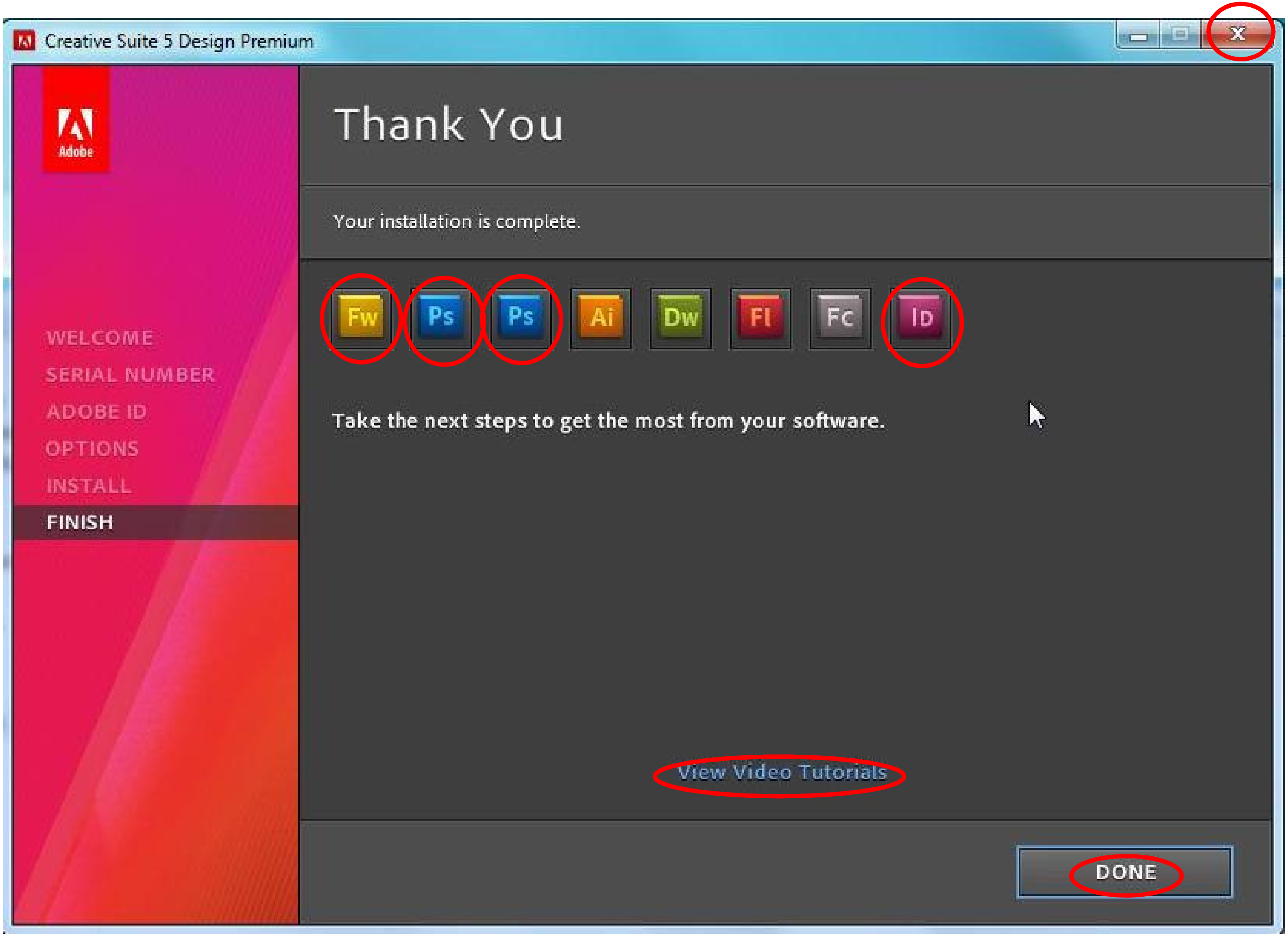
Total Install: 5.5 GB

Location:

C:\Program Files\Adobe

Drive C: 5.5 GB (45.8 GB Available)

Sample Screens showing Test objects, labels and parameters for analytics



Creative Suite 5 Design Premium

Thank You

Your installation is complete.

Take the next steps to get the most from your software.

Add Analytics code to Test_Objects

- In this step, analytics code is associated with the logical test_objects, such as the installer screen.

- Analytics code will be tagged with each test case and record the actions, such as the selection of an option/value taken by the testers.

Test Label
Analytics Code

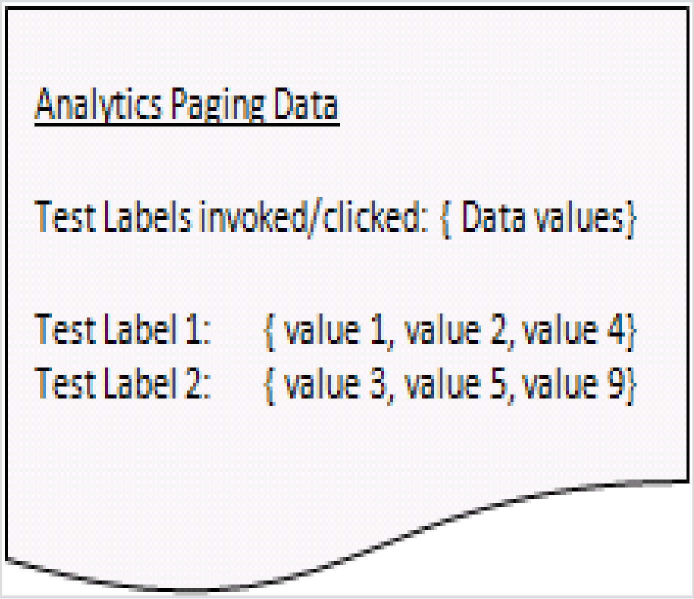
Test_Object

Record Tester’s action and Send data to dashboard

- This step records the actions, *intentional or unintentional*, taken by the testers (single time or multiple times) on all possible areas/options.

- During testing, a tester may choose to complete a workflow, cancel a workflow, change and select different values, pause on a particular step, and get occupied with some other work.

- All these actions are captured by analytics code and data is sent to the dashboard via paging.



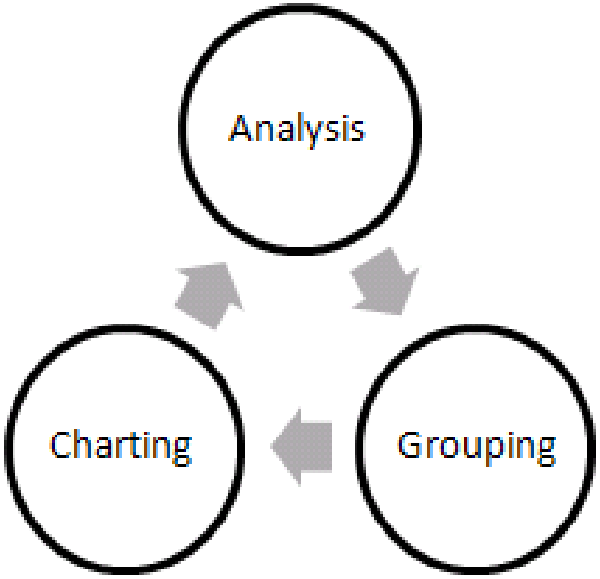
Analytics Paging Data

Test Labels invoked/clicked: { Data values}

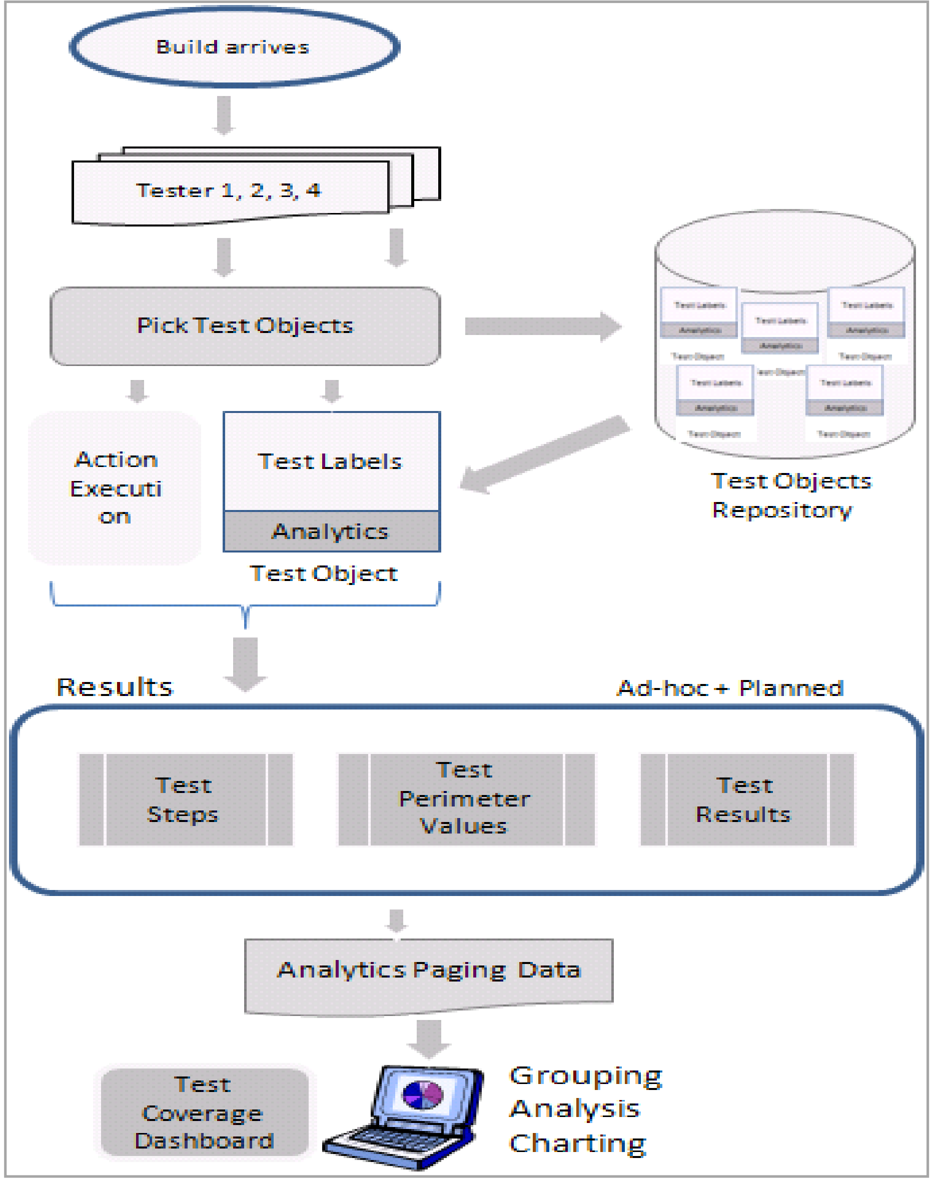
Test Label 1: { value 1, value 2, value 4}
Test Label 2: { value 3, value 5, value 9}

Process Raw data and chart test coverage

- Server listens to paging data.
- Data is received.
- Test_Object is broken down into respective test labels and associated values
- Data is processed by grouping right set of values among right headings
- Duplicate entries might appear (as there are multiple testers), Ref count the duplicate values. E.g. 3 testers might have selected same “German” language during EULA selection.



Algorithm and working logic



Build arrives

Tester 1, 2, 3, 4

Pick Test Objects

Test Objects Repository

Action Executi on

Test Labels

Analytics

Test Object

Results

Ad-hoc + Planned

Test Steps

Test Perimeter Values

Test Results

Analytics Paging Data

Test Coverage Dashboard

Grouping
Analysis
Charting

Test Coverage Sample sheets

Coverage Target

	Val 1	Val 2	Val 3	Val 4	Val 5	Val 6	Val 7	Val 8
EULA	en_US	en_IE	Fr	Du	Hr	Ge	Mx	Jp
	It	Sp	Sw	Nr	Da	Fi	Br	Pt
	Ko	CS	CT	Ar	He	Gr	Po	Ru
	Tu	Uk						
Machine Configuration	32 bit	64 bit	1 Ghz	1.5Ghz	RAM-512MB	RAM-1024	RAM-2048	RAM-4096
OS Configurations	XP - SP1	XP-SP3	Vista	Win 7	10.4.10	10.5.8	10.5.9	10.6.0
Screen Resolution	800x 600	1024 x768	1280 x720	1280 x768	1280 x800	1280 x1024	1400 x1050	

Dynamic Coverage updated via Analytics

	Val 1	Val 2	Val 3	Val 4	Val 5	Val 6	Val 7	Val 8
EULA	🟩 en_US	en_IE	🟩 Fr	Du	Hr	🟧 Ge	Mx	🟩 Jp
	🟧 It	Sp	Sw	🟧 Nr	Da	Fi	Br	🟧 Pt
	🟩 Ko	🟩 CS	CT	Ar	🟧 He	Gr	Po	Ru
	🟧 Tu	Uk						
Machine Configuration	32 bit	64 bit	1 Ghz	🟧 1.5Ghz	RAM-512MB	RAM-1024	RAM-2048	🟧 RAM-4096
OS Configurations	XP - SP1	🟩 XP-SP3	🟩 Vista	🟩 Win 7	10.4.10	🟧 10.5.8	10.5.9	10.6.0
Screen Resolution	800x 600	🟧 1024 x768	1280 x720	1280 x768	1280 x800	🟩 1280 x1024	🟩 1400 x1050	

🟩 Tested by Multiple testers (>50% of team)

🟧 Not tested even once

Power unleashed – Software Testing and Analytics Together

✓**Clear Identification of Focus Areas for next set of testing.**

✓**Leverage data for resource movement across modules.**

✓**Extremely helpful in identifying and reducing Redundancy**

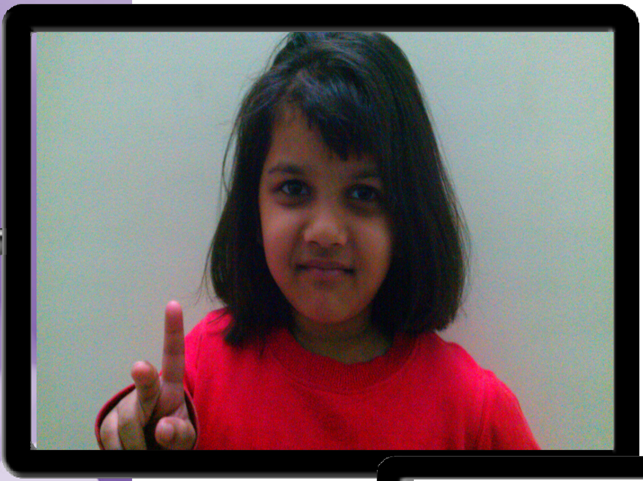
✓**Better and On the Spot Test coverage**

❑ **It works – Tried and Tested**

❑**Working Prototype is made.**

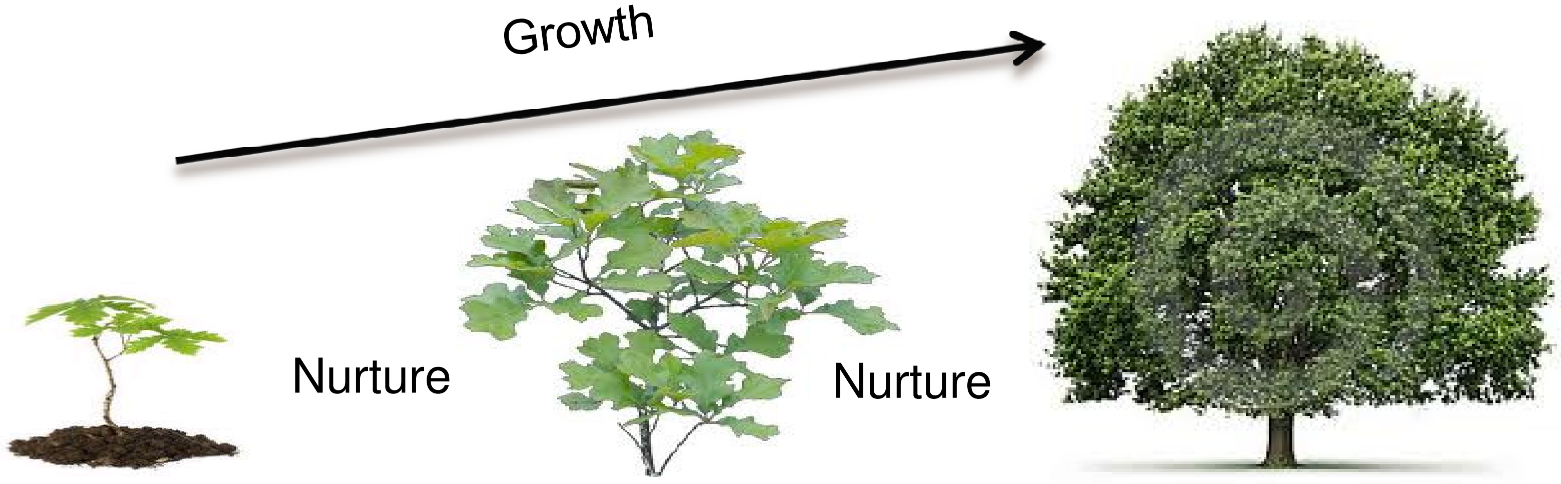
❑ **Prototyping done for Out of the Box Experience project .**

Gain



- Time Saving
- Proactive Approach
- People independent
- Zero Frustration
- Early variation indication
- Let each one focus on what they are best at. (BB/WB/Automation/IC/Mgr)
- Do More with same $

And that's how you win the BIG League



Growth

Nurture

Nurture

Disclaimer

Metrics/Analytics should always be used ***ONLY*** *for improvement purposes and should NOT be used against people.*

Action for us

A ***20 minute optimization*** achieved every day (in a company of 5K people) will give you back a recurring competitive advantage of ~2 years of ***additional*** productive work every 1 month.

Let’s Optimize each day by 20 minutes for our own company.

Let’s Make Testing More Effective and Equally Interesting

Vote of Thanks

Thanks a lot for your time and attention.

Any questions/queries, feel free pinging me

ajjain@adobe.com
consultajayjain@gmail.com

Adobe