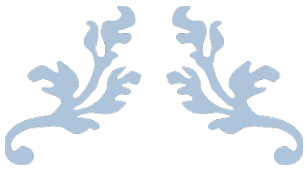

A/B TESTING AND STATISTICAL ANALYSIS ON THE RESULTS

Applying Chi-square Test to Improve Landing Page Conversion

Oceane Li

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JULY 3, 2015

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How to AB Testing Marketo Landing Pages/Emails

Part 1: Overall

A/B testing is generally considered as a great method for figuring out the best online promotional and marketing strategies for digital marketing. A/B testing produces concrete evidence of **what actually works** in your marketing. Continuously testing your hypotheses will not only yield **good results for conversion** rates, but will also give you a **better understanding of your customers**.

So, what A/B testing actually is? My favorite definition is:

*"**It is a method for validating that any new addition or change to your webpage will actually improve its conversion rate**." - Jaan-Matti Lillevälja, writer on testing and survey methodologies, Copenhagen Business Academy.*

As most of digital media is relatively new, create and testing learning measures is important. CEB training says the following to support the importance of having testing in place when working with digital media:

*"Remember, the **learning** from the test may be more important than business impact. " - CEB digital media measurement, testing and optimization.*

Here you go the Experiment Brief Template that has been created by CEB training, which I find useful for developing a testing program.

Part 2: How to A/B testing in Marketo

2.1: Decide Your Testing Strategy

I strongly recommend you to **start with campaign goals & testing strategy, but not tactics**.

Let's start with selecting an appropriate testing approach.

By levels of sophistication, testing - scientific optimization on campaigns, can be broken down into A/B testing (testing only one element at one time) and multivariable testing (testing multiple elements at one time). Let's start with the A/B testing, the one that produces the fastest gains and has lower chances of error through misuse.

We select the A/B testing as our testing approach.

Then, I recommend you, before starting the test, thinking of the goals of the campaign and what you would like to achieve by doing an A/B testing.

Let me give you an example:

- **Campaign**: 437125 FY15 EMEA EM Paid Social Program - Sponsored posts over the course of 2-3 months on LinkedIn promoting various new assets and TRIALs on ca.com.
- **Goals of the campaign**: Social Awareness + Lead Generation (100 – 150 inquiries as targets)
- **Why need A/B testing**: to improve the campaign conversion % by testing which landing page converts better

Following this, you need to define your Key Performance Indicators (KPI here after). Please bearing in mind that, a KPI is a useful metric only if it helps you understand how you are doing against your objectives. That is also why it is critical to first define the objectives.

- **Selected A/B testing metric**: # of Conversion, Conversion %
- **Target of selected metric**: the campaign reach is estimated at approximately 71 k (impressions), the target is 100 – 150 inquiries, so the target of Conversion % would be 0.14% to 0.21% and the target of # of Conversion is 100 – 150.

Next step, you need to define which pages you want to test. I will still use this program as an example.

- **Available click-through pages**: MAA Trial, APM assets, App Synthetic Monitor Trial, DCIM assets, etc.

We select the E.P.I.C. page as test page, because:

1) The asset is new, with a big potential to improve how we present it to customers; **2)** The creative is with good quality, which make sense for us to invest more efforts creating two pages.

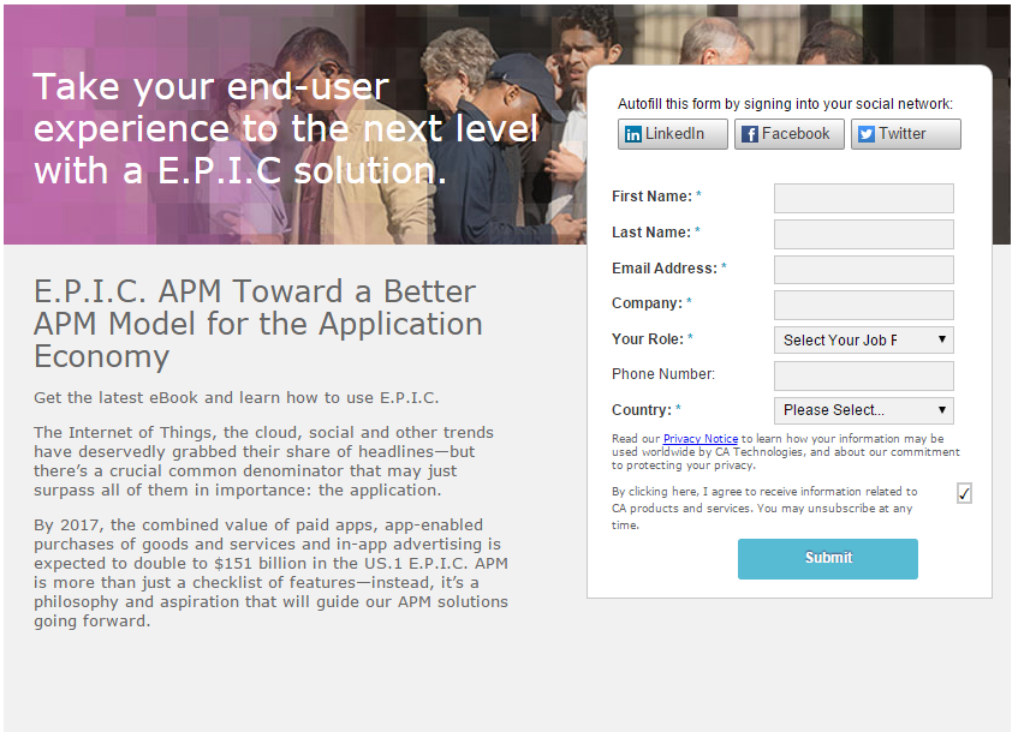
- **Selected test page**: E.P.I.C. APM Toward a Better APM Model for the Application Economy

However, there are many elements in a landing page can be tested, e.g. headline, banner, text, form, etc. You need to decide what element(s) you want to test before moving to the execution stage.

2.2: Create Your Landing Page A

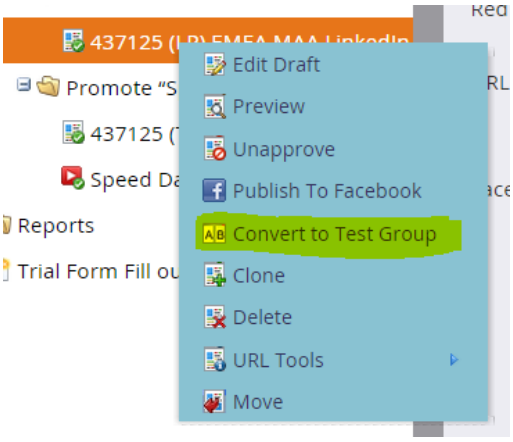
This is just the normal process of creating a Marketo landing page. You can find necessary templates for EMEA marketing here.

Below is the landing page A that I built for the example program (437125).



2.3: Converting to Test Group:

Move your mouse to the landing page A and then right click, you will see a drill-down list appearing. You simply need to select "Convert to Test Group".



N.B. You cannot convert an approved landing page to test group.

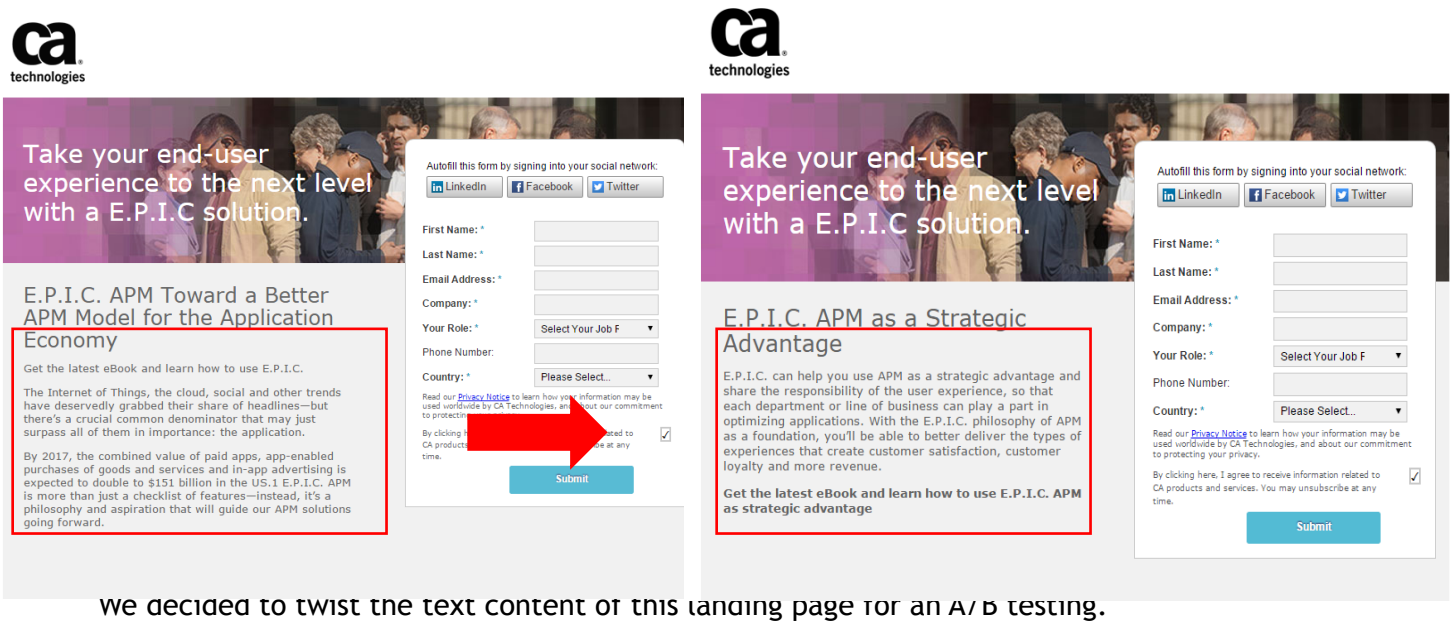
The Test Group will take the original page A URL and the original page's name.

2.4: Clone Page A to create Page B

Typically you will want to Clone Page A to create a Page B. Doing so will ensure you have an exact replica to adjust.

The new Page B has its own URL, but that doesn't matter so much right now.

2.5: Edit Page B – Change the element that you want to test between these 2 pages



We decided to twist the text content of this landing page for an A/B testing.

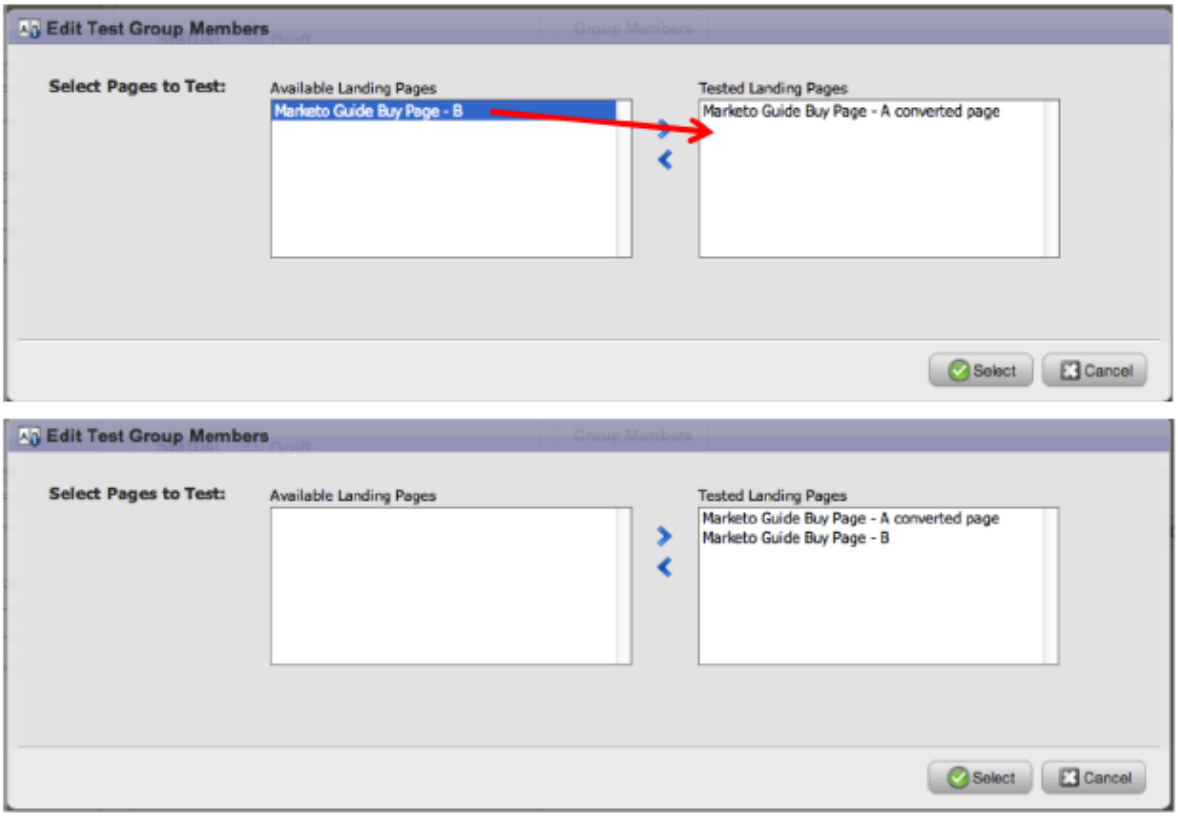
- **Email A:** Start with a call-to-action "Get the latest eBook……" and followed by the description of the eBook
- **Email B:** Start with the description telling audience why they need to download this eBook, then followed by a call-to-action.

2.6: Add Page B to Test Group

To add the cloned Page B to the Test Group, go to the Test Group.

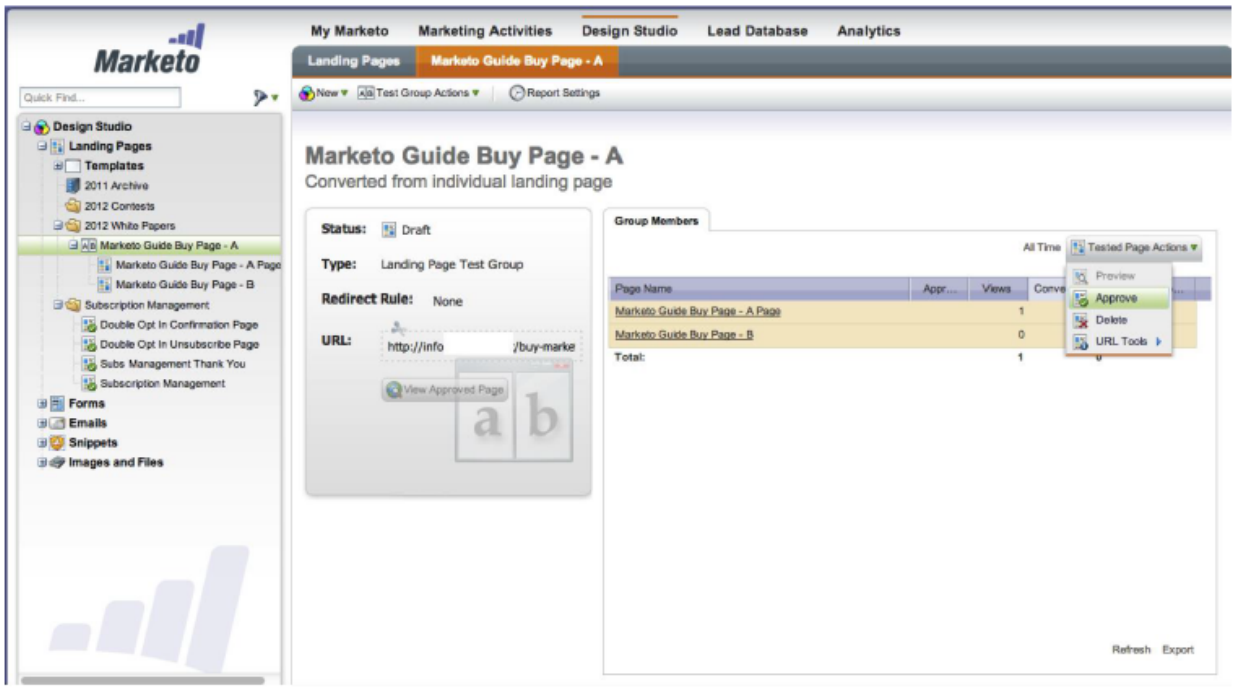
Menu: Test Group Actions > Edit Group Members

Use the arrows to move the available page(s) to the Tested Landing Pages box.



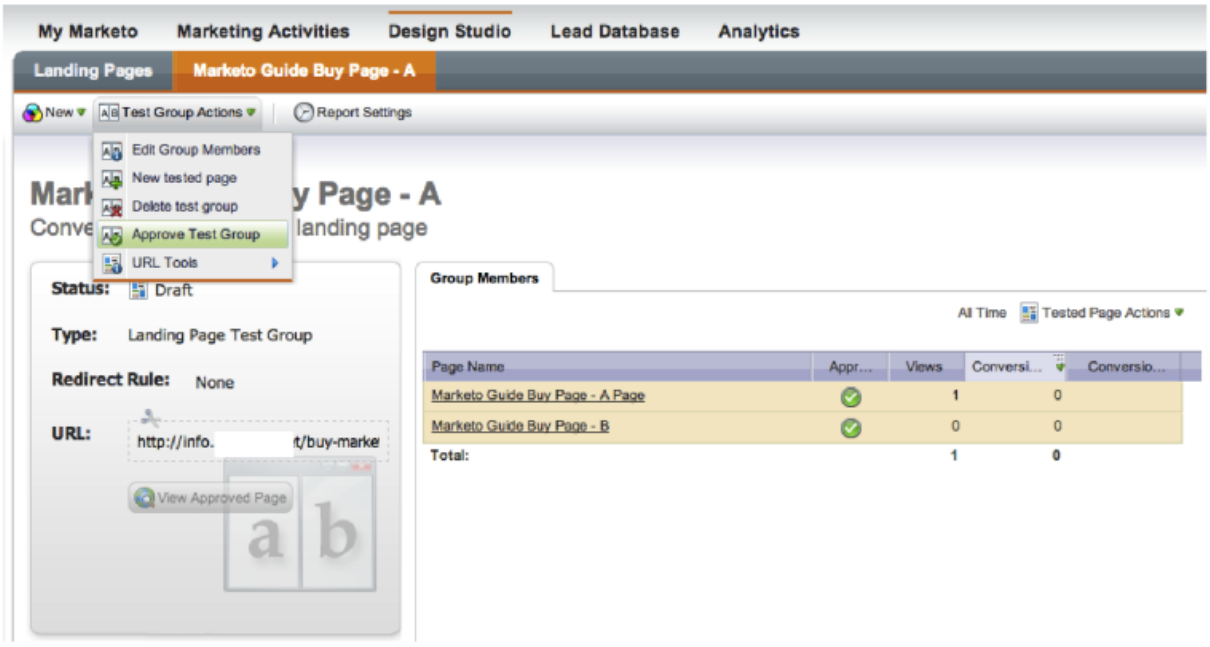
2.7: Approve the AB Pages

You can approve or unapprove individual pages inside the Test Group by selecting them and using the Tested Page Actions menu. If you go to the Approved Page's URL, you will see the page with the actual URL.



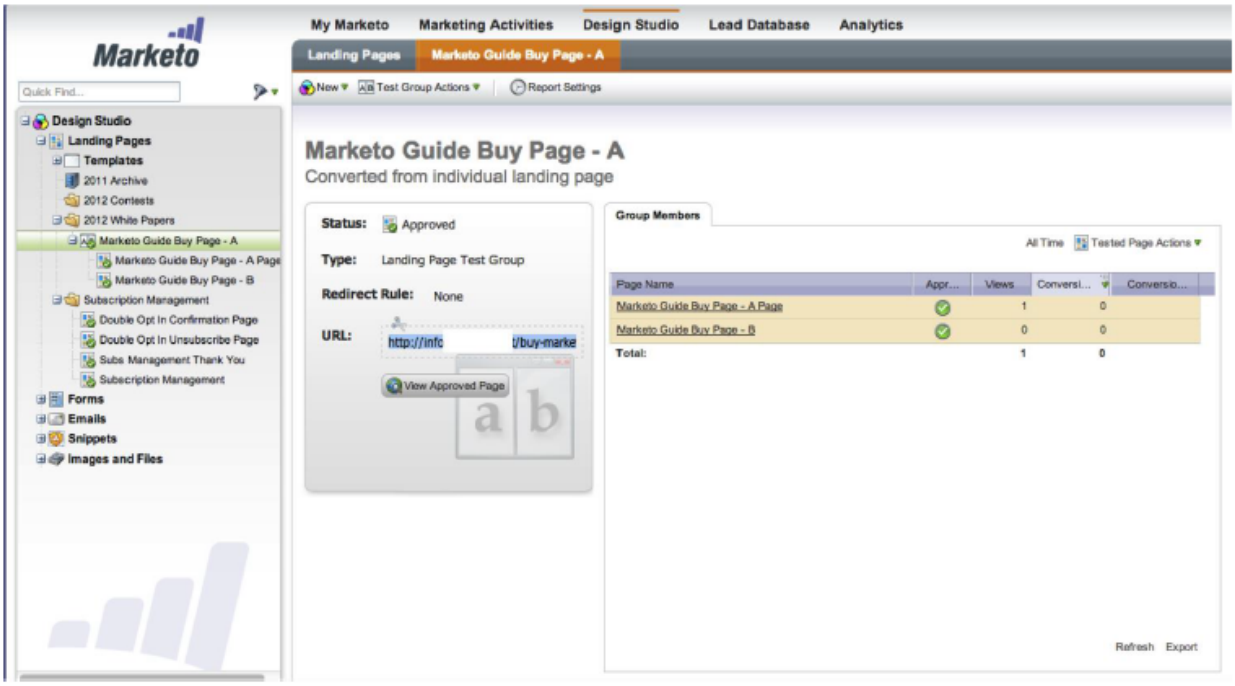
2.8: Approve the Test Group

In order for the Test Group URL and AB Testing functions to work, you also need to Approve the Test Group: Test Group Actions > Approve Test Group.

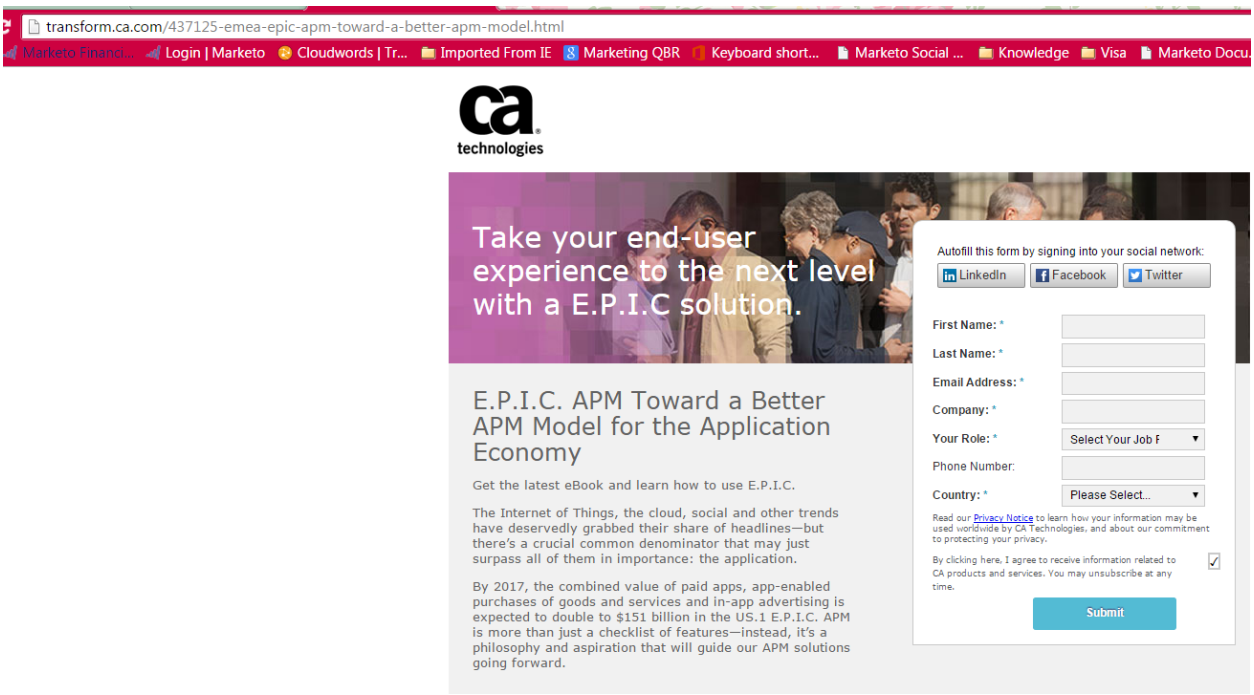


2.9: Test the URL to view the page as your lead will see them

Copy the URL of this test group, and paste it to the web browser.



And you will see the page A and page B showing up with each 50% of chance. (**N.B.** 50% because you choose 50% leads receive "control" page and the rest receive the "challenge" page).



transform.ca.com/437125-emea-epic-apm-toward-a-better-apm-model.html

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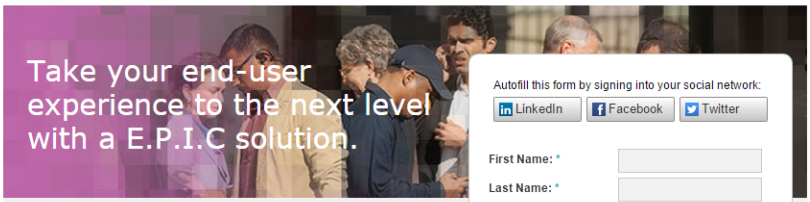

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Statistical Analysis on A/B Testing

Part 1: Testing

1.1 Form your Hypothesis

In order to have a good testing, you need to first form a clear and well-defined hypothesis which correctly reflects the business issue that you want to tackle by doing this test.

For instance, for the campaign 437125 EMEA MAA LinkedIn Social Campaign landing pages, our concern was that our content does't convert enough leads, so our hypothesis for the reason of that occurring may be that "People are more likely to register if the landing page starts with call-to-action (CTA)".

An example of a hypothesis in action:

- **Problem:** "Less than one percent of visitors register to download MAA offers."
- **Hypothesis:** "People are more likely to register if the landing page starts with call-to-action (CTA)".

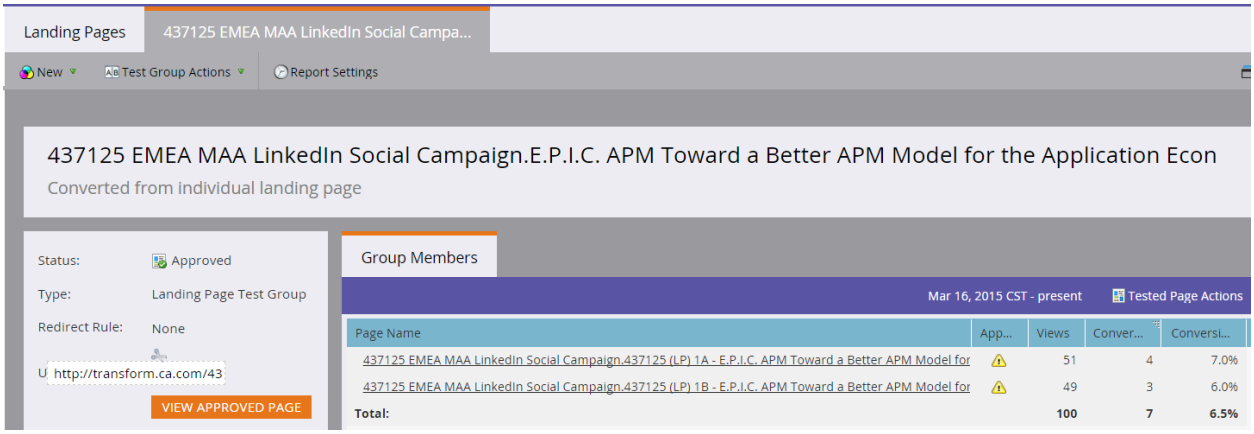
In this case, you clearly defined why you did the test and can draw conclusions based on the outcome. Also, you make sure you can learn visitors from the results.

1.2 Start the Testing

You simply need to make sure the campaign is activated and leads can click through to your test pages. Then Marketo will do the reporting work for you.

Part 2: Reporting the Results

This is the easiest method. Simply click on the Landing Page Test Group. Marketo will show you the Views, Conversions, and Conversion% for all pages within the Group.



Part 3: The Most Critical - Learning from the Data

*"**Never stop testing**, and your advertising will never stop improving." – David Ogilvy*

3.1 The MATH behind Campaigns

Do you know that ignoring statistical confidence while running an A/B test is worse than not running a test at all?

In the following sections, I am going to show you how hypothesis testing can tell you whether A/B tests actually effect user behavior, or whether the variations you see are due to random chance.

Let's start with College math – what is statistical confidence and how we use it in hypothesis testing?

Let me give you an example:

Say you need to take the train from Lausanne to Geneva every day for 2 weeks (10 working days), and you are late because the train gets delayed 4 times within the 2 weeks. What would you say? You probably say that the train system in Switzerland is really badly managed as you got 4 times delayed over 10 in total. However, how certain are you? More specifically, how likely is it actually because this period is just a special period with many unexpected accident in the route?

Questions like the ones above fall into a domain called hypothesis testing. Hypothesis testing is a way of systematically quantifying **how certain you are of the result of a statistical experiment**.

- Any situation where you are taking a random sample of a population and measuring something about it is an experiment, and for our purposes, this includes A/B testing.
- What is the likelihood that the train system in Switzerland is badly managed given the results you observed?

Hypothesis test starts with a null hypothesis: H0, which is the hypothesis that you want to test.

Say you have a set of observations O and a null hypothesis H0. In the above train example we were trying to calculate:

$$P(O \mid H_0)$$

The expression above is the probability that we observed what we did given the null hypothesis. If that probability is sufficiently small we're confident concluding the null hypothesis is false.

You can choose at which level of confidence that you would reject the null hypothesis: 90%, 95% or 99%. If you choose, for example, the level of confidence at 90%, that is to say, if $P(O \mid H_0)$ < (1 – 90%) = 10%, you would reject the null hypothesis; if not, you accept (are confident with) the null hypothesis.

3.2 Using Statistical Model to Read the Data

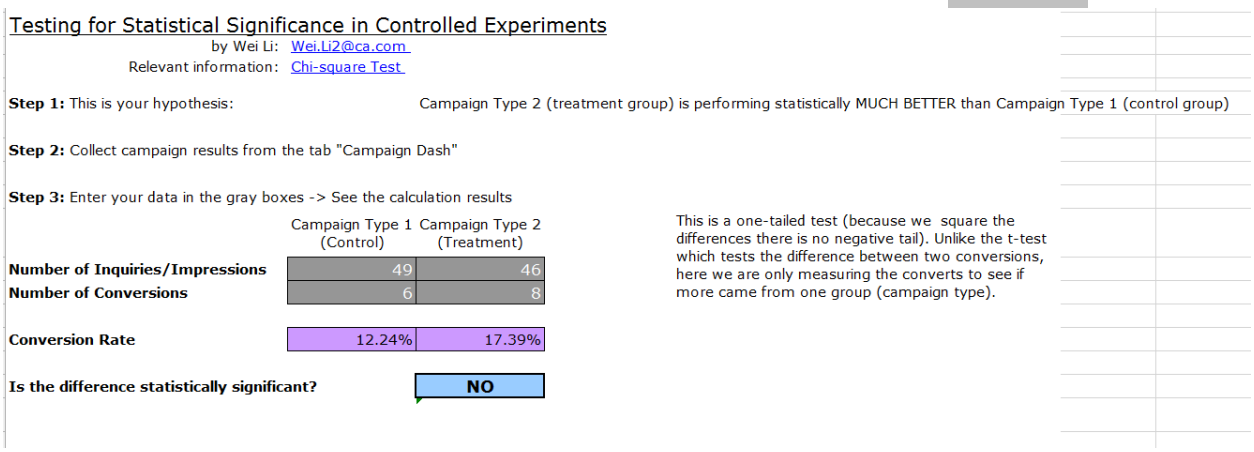
Don't worry if you find the math is too complicated to apply in real life.

I have developed a statistics model to help campaign managers to interpret the results from A/B testing. The model can be found in the SharePoint.

You simply need to:

1) Form your hypothesis

2) Input the # Impressions/# Inquiries and the # Conversions in the grey boxes below



Testing for Statistical Significance in Controlled Experiments

by Wei Li: Wei.Li2@ca.com

Relevant information: Chi-square Test

Step 1: This is your hypothesis: Campaign Type 2 (treatment group) is performing statistically MUCH BETTER than Campaign Type 1 (control group)

Step 2: Collect campaign results from the tab "Campaign Dash"

Step 3: Enter your data in the gray boxes -> See the calculation results

	Campaign Type 1 (Control)	Campaign Type 2 (Treatment)
Number of Inquiries/Impressions	49	46
Number of Conversions	6	8
Conversion Rate	12.24%	17.39%
Is the difference statistically significant?		NO

This is a one-tailed test (because we square the differences there is no negative tail). Unlike the t-test which tests the difference between two conversions, here we are only measuring the converts to see if more came from one group (campaign type).

Then you will read the results in the blue box

1) If the result is "NO": Campaign Type 2 (treatment group) is NOT performing statistically MUCH BETTER than Campaign Type 1 (control group)
2) If the result is "YES": Campaign Type 2 (treatment group) is performing statistically MUCH BETTER than Campaign Type 1 (control group)