Adobe Experience Cloud

Adobe® Target Automation: AI-Powered Personalization

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A new era of experience optimization and personalization is shaping how brands are exceeding customer expectations at every digital interaction. Beginning at first touch and across all critical touchpoints, the ability to collect and act on contextual data to deliver 1:1 personalized content, recommendations, and offers in real-time continues to push the boundaries of customer experience. Utilizing innovations in AI-powered intelligence with fine-tuned, customized machine learning models and deeper integrations with Adobe Experience Platform, Adobe Target is the engine powering personalization at scale with exponential impact on metrics that matter to any business, including acquisition, engagement, conversion, loyalty, and revenue.

As the personalization engine of Adobe Experience Cloud, Adobe Target has all the tools to launch and deliver personalization at scale: a progressive profile, three-step visual workflow, rich content editor, highly adaptable open and flexible implementation, and AI-powered testing and personalization capabilities. Brands using Adobe Target to move from basic personalization to micro-segmentation, or more 1:1 personalization, can expect massive revenue lifts and a significant reduction in operational costs. It has never been easier for marketing, engineering, and products teams to move beyond A/B testing and manual rules-based activities; however, questions still arise when choosing the best AI-powered personalization capability for your business objectives and goals.

Ultimately, this paper helps clear the path toward using automation with optimization and personalization and provides understanding of why AI-powered capabilities are essential for growth, how they work, and the huge benefits they offer in customer experience management. In addition to using Adobe Target as a single solution engine for personalization at scale, this paper will also provide benefits and value in using Adobe Target with Adobe Experience Platform.

Calibrating AI-Powered Personalization in Adobe Target

Brands that can exceed expectations by tailoring customer experiences based on relationship, loyalty status, or interest can rapidly increase conversion and reduce friction. Adobe Target provides teams with the ability to design, launch, and measure personalization activities with real-time machine learning, profile storage, data collection, and unified delivery across any digital channel. This is a great way for teams, of any size and skill level, to start building their testing and personalization programs. For those brands looking to deliver extraordinary experiences based on each individual visitor's interests, new features and deeper integrations with Adobe Experience Platform are making companies more intelligent and adaptive at managing and delivering personalization at scale. So, what key factors influence an organization's ability to differentiate and advance their personalization programs to deliver the best experience to each visitor or customer, at every interaction? Brands advancing optimization and personalization strategies across marketing, digital commerce, and service and support use cases require:
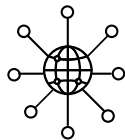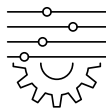
| Enriched Data | Fine-tuned Personalization | Real-Time Speed |

- **Enriched Data** - analysis and identification of high value segments for online and offline interactions
- **Fine-tuned Personalization** - custom models or algorithms within artificial intelligence activities for 1:1 personalization at each visit
- **Real-Time Speed** - faster and more intelligent customer experiences delivered in milliseconds for real-time, same page segment qualification

Every interaction a customer has with a brand, whether it happened last week or two minutes ago, should inform the next interaction. The integration between Adobe Target and Adobe Real-Time Customer Data Platform (RTCDP) is bringing together new ways for brands to personalize offers in milliseconds with enriched datasets from both shared audience segments and customer profile attributes. Consuming segments and profile attributes from Adobe Experience Platform, unlocks completely new use cases for automation with Adobe Target. First, customers can now dynamically insert Real-Time CDP profile attributes into Adobe Target HTML and JSON offers via a token replace which streamlines abilities to pull in data like membership or reward status. Making sure privacy and customer data is of top importance, Adobe Target inherits all the privacy and consent enforcement from Adobe Experience Platform to ensure all the rules are being followed in terms of attribute consent. This is another benefit of the integration with RTCDP shared profile attributes. Second, customers can bring in Real-Time Profile Attributes into Adobe Target to be evaluated within Auto-

Target and Automated Personalization activities (Target Premium). Understanding how these activities are looking at an entire profile and scoring it, using Auto-Target and Automated Personalization with rich data from RTCDP profile attributes enables more precision AI-powered personalization to the individual, for 1:1 personalization.

One of the most exciting new features for automation, especially after hearing feedback from top optimization and personalization customers asking for ways to calibrate AI-powered activities, is Adobe Target's custom model controls to fine-tune the data being analyzed for 1:1 personalization at each visit! A complete picture of the customer is critical to understanding them and giving them what's contextually relevant and engaging. The more data you have, the more personalized the experience can be. However, not every campaign or offer requires a full view of the customer. With new capabilities that enable model controls within Target, brands will be able to analyze only the data that's most relevant for their specific campaign or activity type. For example, a hotel may want to present site visitors who live within a 50-mile radius and have booked or shown interest in a weekend stay with a staycation promotion. In this case, customer attributes such as device type, weather, and loyalty status may not be beneficial and can be excluded for more precise personalization.
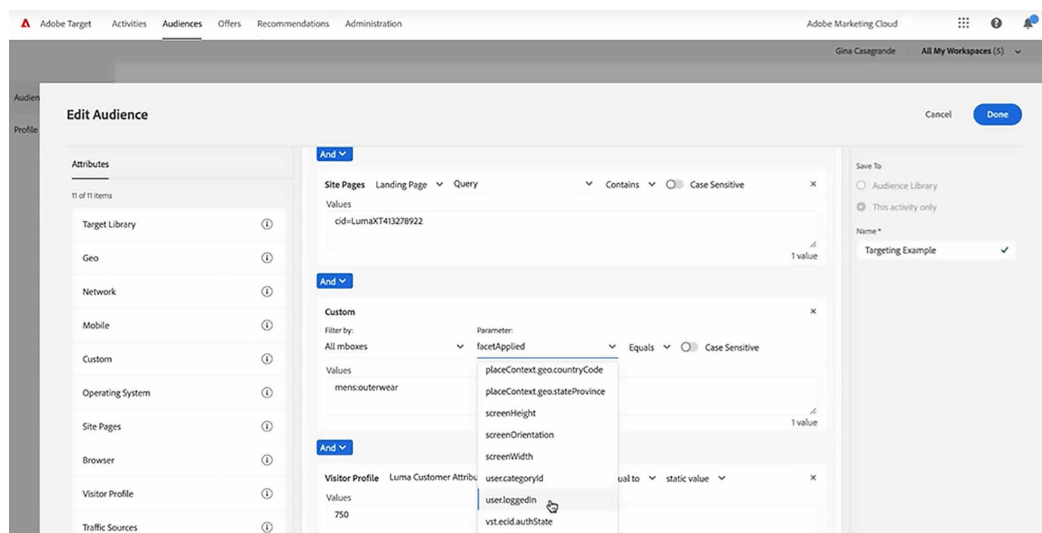
Audience editing in Adobe Target delivers the ability to edit, combine, and customize segments and profile attributes when setting up your Target activities. For enhanced data, use parameter filters to pull in Real-Time Profile Attributes from AEP.

When it comes to identifying testing significance faster for delivering the best experience for every visitor, Adobe Target provides a streamlined algorithm builder and an expanded out-of-the-box, customizable algorithm library to make customizing recommendations algorithms for industry-specific use cases faster, simpler, and more powerful. Product and developer teams can also take advantage of faster delivery speeds with the next-generation of Adobe Target's SDKs for on-device decisioning enabling near latency-free deployment for A/B and Experience Targeting (XT) campaigns. Caching in-memory decisioning without blocking network requests to Adobe Target's Edge Network offers the flexibility and most relevant up-to-date experience for enhanced application performance.

Combining historical customer data with current behaviors and in-session contextual data is a core strength of how Adobe Target is leading innovation in AI-powered personalization with online and offline interaction data, for precision same-page personalization use cases (e.g., offer suppression and personalized incentives or messaging). The challenge in executing this accurately, instantly and consistently in the past, was the availability and actionability of data from previously siloed systems and channels. Customer engagement data is collected and tied to a customer profile that is then qualified for an audience segment and delivered as personalized content – faster than the blink of an eye – for extraordinary customer experiences with 1:1 personalization.

Beyond A/B Testing: Understanding the benefits of using automation in personalization

When creating an A/B test in Adobe Target, specifically when selecting an audience on step two of the activity creation workflow, Auto-Allocate and Auto-Target (if you are a Target Premium user) provide one-click options to automatically allocate traffic between control and test variations. In addition to Manual A/B testing, these are two capabilities bringing in the power of AI-powered personalization in Adobe Target. What's the difference between these three approaches to allocating your traffic, and when should you use one versus the other?
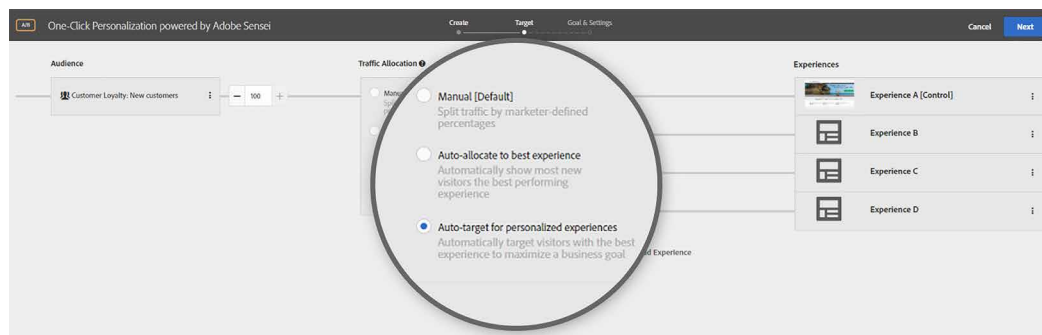
In Adobe Target, when setting up an A/B test activity, you can allocate traffic to a test using one of three different options—Manual, Auto-Allocate, and Auto-Target.

We will cover the differences between these different ways of allocating traffic to your test experiences, when you might want to use one approach versus another, and how new enhancements to Adobe Target and Adobe Experience Platform Real-Time CDP are unlocking 1:1 personalization for brands to deliver the best experience to each individual, at every interaction.

A/B testing, or split testing, allows you, whether you're a marketer, product manager, engineer or some other stakeholder, to use data to determine if one element or variation of your web page, mobile app, or other digital surface performs better than one or more alternatives. For example, if your CEO insists that different copy on a CTA on your home page will drive more visitors to click and explore a particular offer than the current copy, A/B testing can prove or disprove your CEO's hypothesis.

The most common approach to A/B testing is best described in statistical terms as fixed-horizon. Before running any test, you should calculate the number of visitors—the traffic—that must participate in an A/B test before you can conclude that the test results are statistically meaningful. One objection to this approach: for the duration of the test, Adobe Target is serving visitors alternatives to statistically winning experiences which equals less revenue for businesses. Although you may have waited for the test to conclude before serving the winning variation to all your visitors, you've likely stopped at least one test early, serving the variation that appeared to be a winner to all visitors in your test audience. But this still leaves you with some uncomfortable questions:

- If you concluded a test early because you are fairly certain you know the winner, was the winning experience really the winner, or was it a false positive?
- How do you avoid the opportunity cost from serving an underperforming experience to members of your test audience?
- Did the winning experience win with everyone in your test audience, or just a few select audiences?
- Did you call a winner too early—before the test concluded?

These very reasonable questions led to the development of two ways to allocate traffic to your test audience in Adobe Target beyond the traditional manual approach—Auto-Allocate and Auto-Target. Both traffic allocation options are powered by machine learning and artificial intelligence.

Manual allocation: When you have to know everything about every experience

In some cases, it isn't enough to know that B is better than A—you have to know exactly by how much and under what circumstances. This may be because a change has to exceed certain thresholds to be considered viable long term, or because the change is a major business or technology decision for the brand. When you need additional insight via deep analytics reporting, a consistent set of parameters for measurement, and a predictable number of visitors in every experience, you should use Manual traffic allocation.

Here's why:

Manual allocation of traffic to a test is a time tested and statistically robust way to determine the winner. Using the Adobe Target confidence calculator, you can control exactly how much statistical power and confidence to factor into the decision-making process. This translates into being able to control and calculate your risk of false positives (type I error) and false negatives (type II error). However, getting to that point of certainty about the winner takes time, and you have to be willing to take that time—otherwise you lack that confidence. In addition, it's easy to fall prey to several common issues, which are described in the very understandable terms in the Adobe Target documentation topic: 10 Pitfalls of A/B Testing.*

That said, you do have a few options to consider when setting up your test. For example, if you just want to prove that a specific alternative is the best performing, you can divert most of your audience traffic to that alternative for the duration of the test. For example, you could divert 25% to the current variation, but 75% to the alternative. Conversely, if you're not at all certain that any of your test variants will win over the control, then you might do just the opposite, pushing more traffic to your control. Note that allocating traffic in a non-uniform way will prolong the test and contains the risk that if your idea of which experience will be the winner is incorrect, it could cost more than if you had allocated the same traffic to every experience.

Manual allocation: 2 week A/B test
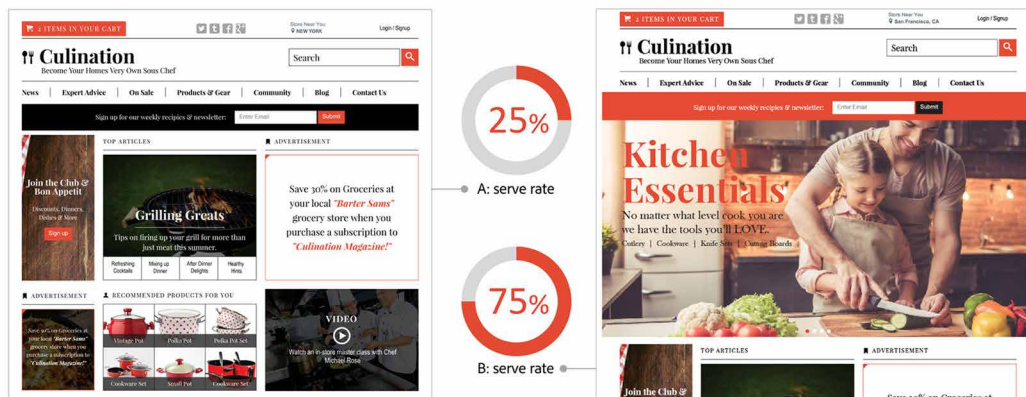
When you choose to use Manual traffic allocation in an A/B test, you specify how much traffic to divert to each experience for the duration of the test.

Regardless of how you manually allocate your audience traffic, you'll still have to serve the test to the number of visitors you originally specified. In other words, you run the test until it's done.

Auto-Allocate: When you want to find and exploit the winner faster

As described above, manual A/B tests are statistically rigorous, but they also come with an inherent cost—you have to spend traffic to measure the performance of each experience, and that traffic distribution remains fixed even after you recognize that some experiences are outperforming others. It can be complicated to figure out the sample size, and the activity must run its entire course before you can act on a winner. After doing all of this, you still have the chance of a false positive if you skipped any critical steps along the way, or if you or your marketer or analyst running the test lacks a foundational understanding of statistics and statistical inferencing.

For many of you, this inherent cost simply gets in the way of finding the answer to your question. What is the best experience to show my customers? Is B or C or D better than A? You need the option to serve the winning experience more often and earlier in the test while simultaneously removing or reducing the setup and calculation cost of determining sample sizes, confidence levels, and other statistical concepts. This is where the next method of allocating your audience traffic comes in, Auto-Allocate. If you're a marketer, it's also an easy first step into the realm of using automation based on algorithms, probability, and machine learning.

Auto-allocate: 2 week A/B test
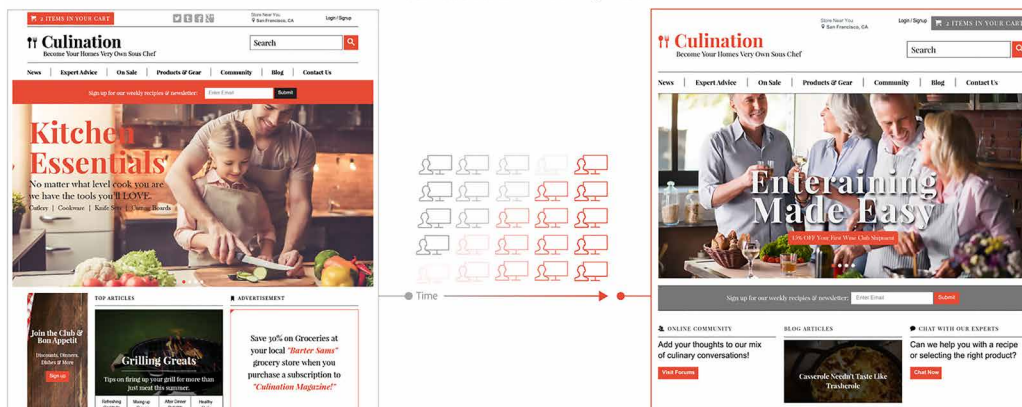
When you choose to use Manual traffic allocation in an A/B test, you specify how much traffic to divert to each experience for the duration of the test.

So how does Auto-Allocate work?

Auto-Allocate uses the principle of the multi-armed bandit. In case the term is unfamiliar, a one-armed bandit is a colloquial term for a slot machine (think Las Vegas). Visualize auto-allocation of traffic as having multiple slot machines, in this case, test variations, and starting off by pulling all handles equally. Over time, one or more machines, or test variations, might pay out more than others. When this happens, you would naturally start pulling the handles of the ones that win more often. That's what Auto-Allocate does; in traffic allocation terms,

Adobe Target will serve more of your visitors the experience or experiences that are winning more.

The upside is pretty clear: more of your visitors see the variations that perform best. And as a single variation pulls ahead, even more visitors get diverted to that winning experience. This overcomes the issue with manual A/B testing of being unable to capitalize on the winning experience while the test is still running. This can be especially critical when you're running an A/B test during a core business moment, such as a holiday, product launch, or a weather or world news event. For example, if your business thrives on a "back-to-school" period, those months are immensely more valuable than the dead of winter. Auto-Allocate both finds the winner faster than a manual A/B split, but also allows you to exploit that winner immediately—capturing upside revenue that would have been lost in the traditional manual approach.

Auto-Allocate also differs from manual A/B testing in the statistical methodologies it uses to help you find a winner. The net effect of these differences is that with Auto-Allocate, you don't have to calculate a sample size up front—it's useful to set expectations, but not mandatory because the system proactively determines the winner instead of relying on your input as to when to end a test. Auto-Allocate intelligently allocates new visitors to your various experiences until it has identified a winning experience. When it stops, there is a 95% chance that the true response of the experience it returns is within N% of the true response of the best experience. Note that auto-allocate may return any experience that is close enough to being a winner if there are multiple winners whose responses are within its relative sensitivity.

You do have to make a tradeoff when using this auto-allocated approach—although it does find and exploit your top performing experiences, it does not guarantee that you'll see notable differences between your lower performing experiences. That's because the relative differences between your top performers are amplified due to the higher traffic levels they receive. The converse is true for your lower-performing experiences—the differences between them will be so much less pronounced that you can't really detect differences reliably. If it's important to rank the performance of all your experiences, then manual A/B testing is the appropriate test approach.
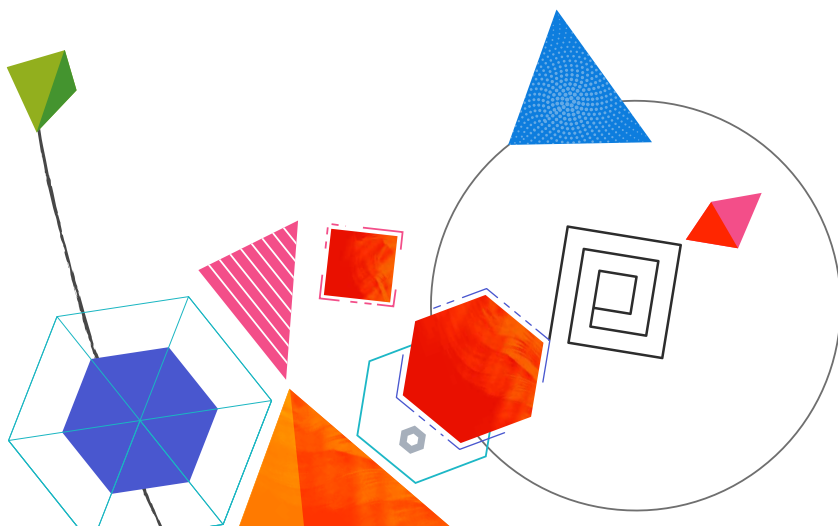
Auto-Target: When you want each visitor to get the experience that wins for them

Each time you serve a visitor the experience that's not the winner for them, you know you're sacrificing the opportunity to convert them. In most cases that means lost revenue. You probably always have the feeling when you run an A/B test that while it proves one experience as the winner, that experience couldn't really be the winner for every visitor every time. Maybe some visitors actually prefer the variation that came in second place. Others may actually prefer the original control.

Obviously the best approach to this dilemma is to give each of your visitors their own personal winner from among the available experiences. In this case all experiences have the potential of being a winner with someone. Although segmentation can solve part of this issue, it can only take you so far. What if you failed to consider or didn't even know about certain segments or combinations of segments? Consider the manual and tedious process of finding these segments and assigning them experiences. There must be a better way.

One-click personalization with Auto-Target provides you with the ideal solution to this problem. This approach to A/B testing uses every bit of information provided by your visitor in the visitor profile, such as geo-location, device information, new or returning visitor, and past visit patterns or behavior, to determine what's most predictive about your visitor at that moment and deliver the best variation for that visitor for that visit. It's essentially a perpetual testing and personalization machine. Auto-Target leverages what it knows about your visitor to deliver the right experience in the moment, and unlike the Auto-Allocate and Manual traffic allocation options, these experiences can change over time. In a no-single-size-fits-all world, Auto-Target finds the best fit for each of your visitors.
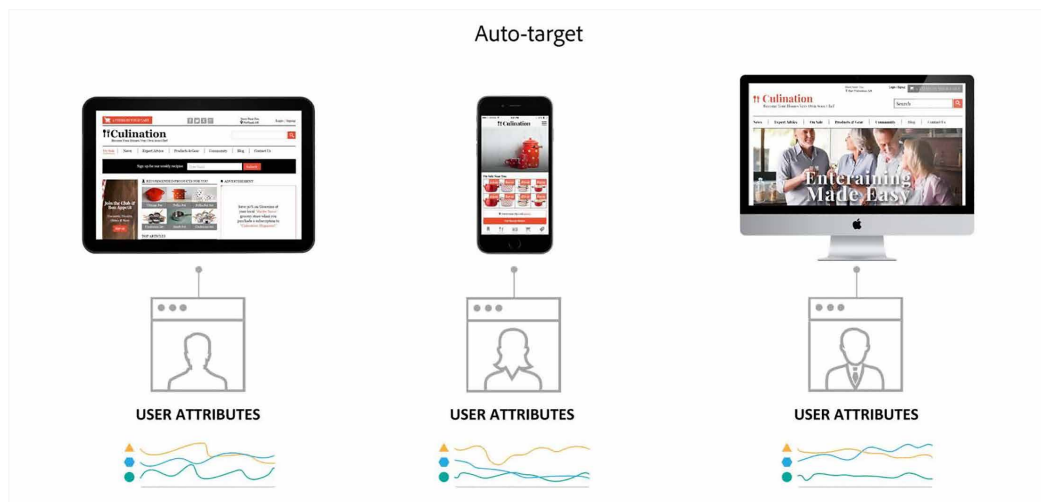
Adobe-Target delivers the experience to each visitor that wins with that visitor for that specific point in time using all the visitor profile data it has for that visitor.

Auto-Target lets you leverage powerful artificial intelligence to make these decisions— powered by a patented and proprietary ensemble algorithm approach from Adobe that takes advantage of the latest in machine learning capabilities. The algorithm factors the entire visitor profile into its decision trees, including any data shared from other Adobe solutions like Adobe Analytics or Adobe Audience Manager. It also employs multiarmed bandit testing as a "backup policy" to act as a form of lift-insurance, reducing the likelihood of negative lift. Auto-Target offers you sophisticated personalization that, with a single click, turns any A/B test into a data-driven personalization activity. Adobe Target customers leveraging the integration with Adobe Experience Platform, can now bring in the real-time customer profile attributes – with rich data from online and offline interactions – and use AI-powered algorithms to evaluate all segment and rich profile data within Auto-Target activities.

While Auto-Target sits next to Manual and Auto-Allocate options in the test setup workflow, testing tells you only half of the story of this feature. Both Manual and Auto-Allocate seek to find a single best winner that fits the majority of your visitors overall. Auto-Target, by contrast, seeks to find a winner for each of your visitors on every visit so that every experience is the winner for some of your site population. However, all three traffic allocation approaches—Manual, Auto-Allocate, and Auto-Target—allow you to personalize entire customer experiences, not just a banner or a button. For example, experience testing can involve testing conversions for the entire experience of your visitors adding an item to a shopping cart. This experience can involve your visitor simply clicking an Add to Cart button from one of your product landing pages, but it could also involve providing your visitor a popup offer while they're on your product page that entices them to add the item to the cart and having them click to add it from the offer.
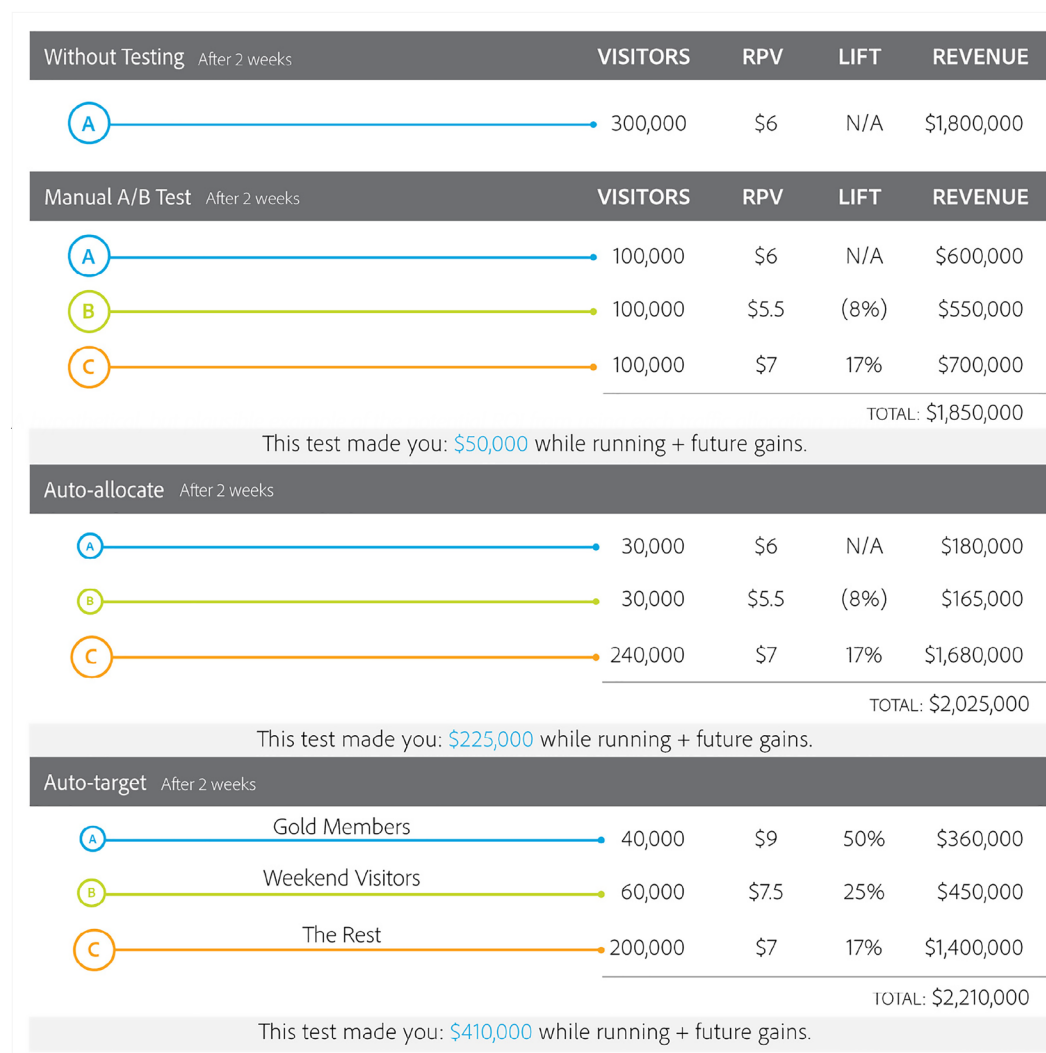
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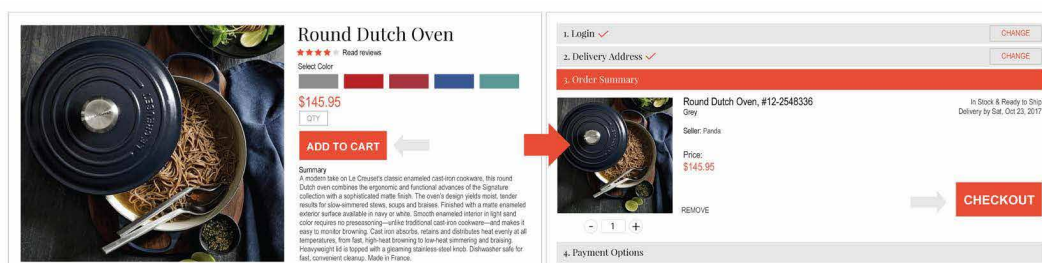
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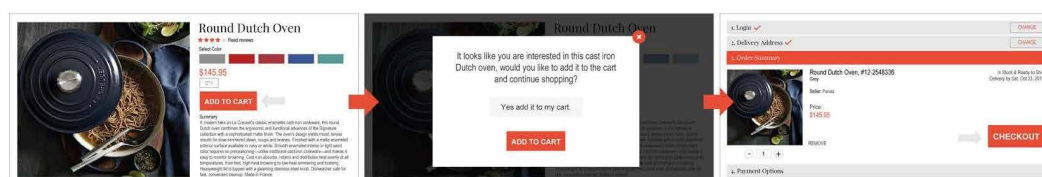
Regardless of the traffic allocation method you choose, Adobe Target lets you test entire experiences, not just a single page or element of a website page, mobile app page, kiosk, and so on.

The potential ROI and best uses for each traffic allocation method

It might seem clear by now that Auto-Target stands to provide you the greatest ROI—after all, if you deliver the experience that wins to each visitor, those visitors are far more likely to convert. That means you're far more likely to see greater ROI from the test activity. Similarly, you'd expect Auto-Allocate to deliver greater ROI than manual A/B testing, but less than you'd gain from Auto-Target. The image below gives a hypothetical, but realistic example of the relative levels of ROI you could expect from each method. But before you jump in to use Auto-Target, you need to understand when it's best to use one method over another and the tradeoffs with each.

Without Testing After 2 weeks		VISITORS	RPV	LIFT	REVENUE
A		300,000	$6	N/A	$1,800,000

Manual A/B Test After 2 weeks		VISITORS	RPV	LIFT	REVENUE
A		100,000	$6	N/A	$600,000
B		100,000	$5.5	(8%)	$550,000
C		100,000	$7	17%	$700,000
				TOTAL:	$1,850,000

This test made you: $50,000 while running + future gains.

Auto-allocate After 2 weeks					
A		30,000	$6	N/A	$180,000
B		30,000	$5.5	(8%)	$165,000
C		240,000	$7	17%	$1,680,000
				TOTAL:	$2,025,000

This test made you: $225,000 while running + future gains.

Auto-target After 2 weeks					
A	Gold Members	40,000	$9	50%	$360,000
B	Weekend Visitors	60,000	$7.5	25%	$450,000
C	The Rest	200,000	$7	17%	$1,400,000
				TOTAL:	$2,210,000

This test made you: $410,000 while running + future gains.

A hypothetical, but plausible example of the potential ROI from using each traffic allocation method.

You've learned about a few of those tradeoffs already—with a manual A/B test, you must determine the sample size before you launch your test and run that test for the time it takes to reach that sample size. You also have to determine the statistical confidence and power that you want for your test. Most importantly, you may be losing conversions because you can't deliver the winning experience to your entire audience until the test completes. But when you need complete control over your traffic allocation and risk tolerances, Manual is the method to use. In addition, Manual allocation allows you to dig more deeply into your test results to identify valuable segments and metrics in Adobe Analytics.

But what about the uses for and tradeoffs with the two options powered artificial intelligence — Auto-Allocate and Auto-Target?

As discussed earlier, if you need to know how each experience performed relative to the others, Auto-Allocate can't do that. In this case, Manual allocation is your better option. But if you want to expose more traffic to the winning experience earlier, then Auto-Allocate is a great choice.

Auto-Target is ideal when you don't plan to change your content and experiences too frequently—that fails to give the algorithm sufficient time to refine its understanding of your visitors and their preferences so that it can deliver the best experience. Compared to Manual and Auto-Allocate, in which each test has a definitive beginning and end, Auto-Target can be considered to be "always on." With Auto-Target, you have no one best winner, so you don't need to stop the test while it is optimizing personalized experiences. For this reason, Auto-Target may not be the best fit if you know that operating costs or brand considerations may necessitate your stopping a test activity. Barring these two situations, though, Auto-Target can deliver incredible results and is worth trying out.

Automated Personalization: When you want the perfect offer for each visitor every time

Delivering multiple winning experiences to individuals that adapt over time based on changing visitor behaviors and interests is certainly valuable when personalizing the entire experience - content to UX, UI, functionality, layout. However, when looking at targeting specific offers, how can you leverage AI-powered personalization to deliver the perfect offer for each visitor every time? Automated Personalization in Adobe Target shows the right offer or message to the right person at the right time.

Similar to Auto-Target, Automated Personalization, an additional feature in Adobe Target Premium, uses a Random Forest algorithm to determine the best experience to show a visitor, which provides value during the discovery phase of testing. As the machine learning models understand behaviors and interests of those engaging with your digital touchpoints,

the most effective content will be shown to each individual visitor based on this behavioral data. Automated Personalization is thus finding the highest likelihood of conversion (or highest revenue per visit) for each specific visitor - automating personalized content or offers. Another consideration of using Automated Personalization in Adobe Target is when you might not be confident among several variations of what the most effective rules should be for targeting a diverse population of visitors.

Automated Personalization models adapt to changes in visitor behavior and automatically collect information about visitors to build the personalization models. Referred to as 'always on' personalization, the algorithm is continuously self-learning over time to optimize what is most predictive for the profile visitors its analyzing to improve performance. The ability to customize the machine learning models for fine-tuned AI-powered personalization offers the unique capability to focus on the model attributes you know you want to run tests on with Automated Personalization. A number of use cases and industry specific needs can now be tailored with these customized models to evaluate segments from Adobe Target standalone, or with Adobe Experience Platform and the unified profile attributes.

Recommendations: When you want to recommend personalized content or products for each visitor

Recommendations in Adobe Target helps you optimize and customize real-time suggestions across channels - web, mobile apps, email messages, and more - to increase engagement and conversion while reducing overall friction in the customer experience. Algorithmic decisioning with personalized suggestions (such as articles, videos, products, fact sheets, and more), can encourage visitors to consider other products similar to those purchased, increase the time visitors spend on media by recommending content similar to what they are watching, or even suggest specific offers to customers from recommendations like 'people who viewed this also bought' criteria. In Adobe Target, criteria for recommendations are rules that determine which products or content to recommend based on a predetermined set of visitor behaviors. Criteria can be based on popular trends, a visitor's current or past behaviors, or similar products and content.

Pro Tip for using Recommendations in Adobe Target:

You can test multiple recommendation types against each other by adding multiple criteria and you are able to include recommendations activities inside an A/B test (including Auto-Allocate, Auto-Target, and Experience Targeting (XT) activities), called "Recommendations as an offer".

When using recommendations, you have options to choose from several OOTB different algorithms based on your industry and the page type that allows you to customize and optimize suggestive based algorithms for greater conversions or average order values. Another great benefit in setting up recommendations is being able to use the easy three-step guided workflow in Adobe Target to deliver the most relevant, personalized content to your audiences.

Bridge the gap between testing and personalization with Adobe Target

Adobe Target is a powerful optimization and personalization solution that lets you choose how much or little you want to let data and automation drive the content and experiences that visitors see and have on your site. Use Manual traffic allocation for complete control of how much of your visitor traffic sees each test variant and for customization of the statistical thresholds that are relevant for your business. Take a first step into AI-powered automation with Auto-Allocate, letting Adobe Target dynamically decide how much traffic to serve each experience; you'll get more conversions and increase ROI as your tests run. Finally, with Auto-Target, let Adobe Target analyze all the data you have about each visitor and use it to make AI-powered decisions about what experience to serve each visitor for the best results possible.

Top brands from Financial Services and Insurance, Travel & Hospitality, Media & Entertainment, Retail, and many other industries are using Adobe Target to power their testing and personalization programs to drive increased engagement, conversions, and revenue. Unlocking new use cases, capabilities, and deeper integrations with Adobe Experience Platform, companies are now delivering personalization at scale to exceed customer expectations and embracing new opportunities for customer loyalty and growth.

For more information

https://business.adobe.com/products/target/adobe-target.html