

ATLAS public website: evolution to Drupal 8

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Abstract. Four years after deployment of the public website using the Drupal 7 content management system, the ATLAS Education & Outreach group is in the process of migrating to the new CERN Drupal 8 infrastructure. We present lessons learned from the development, usage and evolution of the original website, and how the choice of technology helped to shape and reinforce our communication strategy. We then discuss tactics for the migration to Drupal 8, including our choice to use the CERN-override theme. This theme was developed by the CERN web team to support clients like the ATLAS experiment at the LHC to develop websites in the relatively complex and non-intuitive environment of Drupal. Furthermore, CERN has encouraged usage of this theme to mitigate support and ease future migration. We present the effects that this choice has on the design, implementation, operation and maintenance of the new website.

1 Introduction

Communication of scientific goals, progress and achievements is a basic necessity of all fundamental research. This is particularly true for the large, publicly-funded international collaborations of the Large Hadron Collider (LHC) at CERN [1]. Not only does the public have the right to know how and toward what aim their resources are being spent, but they are key stakeholders of the knowledge that is being gained.

Beyond the social responsibility of scientific communication, however, lies its ability to reach world-wide audiences with messages that go above and beyond the reporting of results. These can include the tools of science and the methodology of the scientific process, the value of international collaboration, and the contributions being made to health, finance, security and other indirectly related fields. The ATLAS Collaboration takes advantage of its communication platforms to bring these messages to a variety of global audiences, thus securing support for the field through key stakeholders and decision makers, and sparking interest in the broader public and the next generation of scientists and engineers.

The primary platform supporting this communication is the ATLAS public website [2]. The site hosts descriptions of the experiment [3] and its collaboration, multimedia material for members of the media and the collaboration to use for public engagement, educational resources for students and teachers, and a variety of news channels, used to inform the public of recent activities, to translate complex scientific publications to lay audiences, and to give the collaboration a platform to share their personal experiences in the experiment. The public website also provides access to the other key communication platforms, such as social media, image and video hosting sites, local visits and virtual visits.

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This document describes lessons learned from usage of the current site, the motivation behind the decision to migrate to version 8 of the Drupal [4] content management system, improvements to design and implementation expected for the new site, development plans and process, as well as a few of the glitches, challenges and solutions found along the way.

2 Development and Evolution of the Existing Site

2.1 History of the Development

The current ATLAS public website was designed in 2015 and released in March 2016, using version 7 of the Drupal content management system. The decision by CERN and many of its experiments and projects to turn to Drupal followed discussions dating back to 2010, with the creation of the ENTICE Task Force [5]. Priorities for many of the public CERN-based websites were determined to include: reliable content management, well-developed and well-documented open source libraries, security, and integration with existing tools, such as the CERN Document Server (CDS) [6].

CERN underwent a complete redesign and implementation of its own internal and external websites over the next several years, then offered the experiments and other CERN-based projects Drupal 7 infrastructure and technical support to follow their lead. After preliminary studies in 2014, ATLAS became one of the first large-scale sites to do so by re-developing its public website. A complete description of that development was presented at CHEP 2015 in Okinawa, Japan [7].

The site's general structure was based on analysis of data from surveys of the public and collaboration members using the existing public website, as well as interviews with key stakeholders planning to use and/or contribute to the new site. These included collaboration members active in communication and public engagement, scientists and educators from outside the collaboration, members of the ATLAS management, and experts in web user experience. The structure comprised three main pillars: descriptions of the experiment (Discover), access to relevant material (Resources) and current activities (Updates).

An external web firm [8] worked closely with a small team of collaboration members, using fast prototype iterations, to create the initial design. Following approval by the steering committee and ATLAS management, another external firm [9] completed implementation, delivering a Drupal 7 theme, complete with design elements and structure components built on the existing CERN core infrastructure. The content was developed by the ATLAS Education & Outreach team and/or imported from existing websites. Content population overlapped with development, in order for the ATLAS team to gain an understanding of the Drupal 7 infrastructure and to be able to maintain and develop the theme. Only a few contacts with the external firm were necessary in the year following the release, before the ATLAS team could carry on maintenance and development independently.

2.2 Evolution of Content and Design

Several additions and adjustments of the design have been implemented by the ATLAS team since the public release. For example, shortcodes were extended to allow more flexibility in the design of Update pages, such as the introduction of two and four-column layouts, in addition to the existing ones. Shortcodes are a user-defined mark-up language designed to give instructions to the template code (PHP) and the style files (CSS) to control layout of the relevant nodes. They supplement the functionality of the existing editing tools and are necessary, as Drupal 7 does not have a graphical front-end comparable to other content management systems, such as WordPress [10].

Adjustments were also made to improve the portability of content to various size screens. Much of this work was handled through the tuning of parameters in the style files, although some coding was needed in a few of the existing templates. New content types, such as Glossary Terms and Job Postings, were added, as were new views of content. This added the ability to browse all Updates or any one type of Update on a single page. New categories of Updates, which are implemented as taxonomies, were developed, including Features and Portraits. These allowed the team respectively to highlight longer in-depth articles on specific physics topics and to develop biographical articles on members of the collaboration.

Many of the style and functionality changes were made in response to user feedback, others to simplify and improve usage of the site by the content providers. Social media tabs [11] were implemented for sharing content and a feedback tab brought users to a form soliciting their input. Drupal infrastructure upgrades were handled by the CERN core web team, although several modules were added to the site for additional functionality, including image handling, Google analytics [12] and PDF creation, for example.

2.3 Website Usage

Figure 1 presents the readership evolution of the ATLAS public website in terms of page views per week from its first publication in July, 2016 through October, 2019. There has been steady growth over three and a half years with occasional spikes corresponding to publication of key events and physics results. Current readership is around 30,000 page views per week.

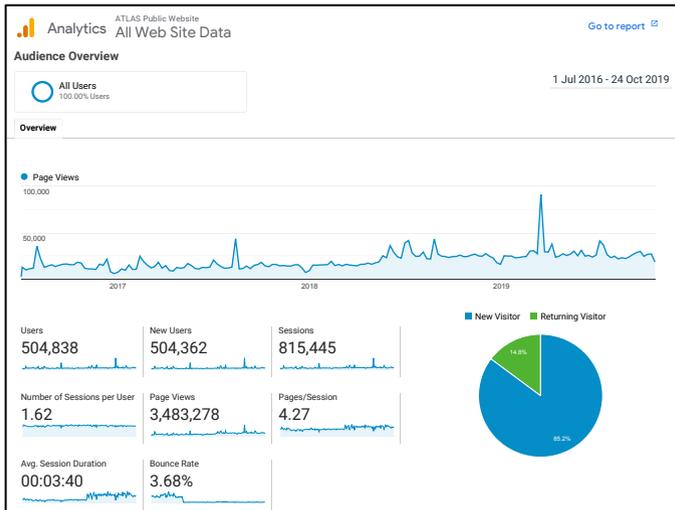


Figure 1. Visit evolution of ATLAS public website in terms of page views / week.

3 Migration to Drupal 8

3.1 Introduction

The Drupal content management system underwent significant changes with the release of version 8 in 2015. It was billed as the “biggest update ever” according to their press release, and included features such as improved content modelling, mobile-first response, and improved PHP standards. With the majority of content viewing shifting to the usage of mobile devices, the change from version 7 was considered important and desirable.

The migration, however, required a substantial effort, as much of the back-end infrastructure, such as template software, would need to be built using the TWIG PHP template language [13]. The lack of forward compatibility meant that a simple turnkey update would not be possible. CERN installed the Drupal 8 infrastructure in 2017 and began migration of its own website.

During the CERN migration, the development team prepared a new CERN theme, based on the public Bootstrap [14] toolkit, and used it to implement a design and structure for all of the central web pages. Sites such as ATLAS that rely on the Drupal infrastructure were provided access to this theme, as well as a theme called CERN-override, which would allow for variation in the look and feel of their sites. These sites were asked to migrate to Drupal 8 by the end of 2019, when it was planned to drop support for Drupal 7. This was later delayed to mid 2020, due to the need for the developers to learn the technicalities of the new version and/or to hire support.

3.2 ATLAS Migration Plan

The ATLAS team supporting the public web pages undertook a critical assessment of the effort required to migrate its relatively new site away from Drupal 7. After consultation with the CERN web development team and an evaluation of other existing content management systems and Drupal 8 themes, it was decided to prepare a migration plan based on the usage of the CERN-override theme.

This decision was built on several key factors:

- Although WordPress provides access to many easy-to-use graphical interfaces for content providers, it was not yet supported by CERN;
- Drupal was and still is considered to be more secure and capable of handling sites with large quantities of data, and is already well-integrated with CERN systems, such as Shibboleth [15] and CDS;
- The ATLAS team already had experience developing and maintaining Drupal, and was promised significant support from the CERN team for migration;
- The existing ATLAS site worked well and was growing in popularity, so the migration would primarily involve adaptation to the new infrastructure, as opposed to large changes in the overall architecture.

Given its current expertise, the existence of Drupal 8 training courses at CERN and the willingness of the CERN team to provide consultation, the ATLAS team chose to undertake the migration in-house.

A migration plan was presented to the collaboration in late 2018, proposing to develop the existing site in Drupal 8, using the CERN-override theme. It was also proposed to use lessons learned from the current site to make improvements to style and content, making the site more attractive, more extensive, and more responsive to mobile devices. The choice to use the CERN-override theme, rather than to develop a new ATLAS theme based on the Drupal 7 ATLAS theme, was driven primarily by considerations of long-term maintenance. The CERN development team agreed to provide significant support for that theme, which would then free the ATLAS team to shift its efforts away from technical support toward the development of improved content, functionality and style.

The collaboration approved an ambitious schedule, targeting completion of the new ATLAS public site by the end of 2019. Various technical difficulties in the CERN-override theme, as well as lessons learned from first attempts by ATLAS and other CERN-based developers, shifted the deadline for CERN Drupal 7 support, and subsequently for the ATLAS migration, to mid-2020. Current development is on track to reach this deadline, with an alpha release scheduled for Spring 2020.

3.3 ATLAS Migration Process

3.3.1 Surveys

The first step of migration was the posting of collaboration and public surveys in summer 2018, to obtain a clear picture of current and expected usage for the public site. These surveys were similar those taken in 2015, at the start of development of the original site, and were designed to complement that information, rather than to provide extensive data sets. The results, for the most part, confirmed what had been learned in the original polls. A few key conclusions are that the collaboration:

- comes to the public site to read news and to obtain educational material,
- expects a broad range of audiences to visit the site,
- would like even more educational material made available in the future;

while the public:

- identifies as university students, scientists and general public,
- seeks the latest news and to learn more about ATLAS and particle physics,
- visits fairly frequently, using a variety of screens (mainly mobile phones).

These results confirm the navigational structure of the public site (divided into three primary areas: Discover, Resources, Updates), indicate a need for more educational material and in-depth descriptions of the experiment, and the desire for responsive, quality viewing on phones and tablets, as well as large screens.

3.3.2 Drupal Structure and Appearance

The CERN-override theme provides tools to modify basic parameters, such as font, logo and colour palette, so the ATLAS design guidelines [18] could be applied to the new site without great effort. Other more detailed changes, such as the look and feel of the header, main navigation menu, search bar and footer, required significant changes to the CSS style files on the website's server. This is relatively straightforward, but careful checks need to be made on each page for all expected screen sizes to avoid unexpected effects. The need for these modifications drove the decision to adopt the CERN-override theme, as maintenance of a distinct visual identity is a necessary aspect of public communication.

The structure of a Drupal site comprises content types, views, blocks and taxonomies, which allow for the development and structured presentation of the individual pages or nodes. These needed to be rebuilt from scratch in Drupal 8, but were primarily copies of the same components on the Drupal 7 site. Improvements were implemented, based on experience from usage of the existing site. In addition, the flexibility of the new Drupal 8 components allowed for a reduction of the number content types and views, simplifying both development and maintenance. The Landing Page content type, for example, was used to replace several dedicated content types from the existing pages, and allowed deployment of new layout components implemented by the CERN development team. Figure 2 presents a potential home page video layout in Drupal 8 based on the Landing Page content type.

3.3.3 Large-Scale Migration

Although landing pages, views and blocks can be translated by hand, there are a few thousand nodes of content that need to be ported in a more automatic manner. These include Updates and Job Postings on the existing public site, and Virtual Visits on a different Drupal 7 site. The CERN team provides infrastructure for the large-scale transfer from database to

database, but the content fields need to be mapped correctly and adjustments often need to be made to the final layout.



Figure 2. Potential home page video layout using Landing Page content type.

In order to preserve the existing Update layouts, a dedicated module has been written to interpret embedded shortcodes in a manner similar to the current site. In addition, the Update content type will include a new field that allows for usage of the Bricks package [19], so that new content can be developed using visual layout tools, rather than shortcodes.

This is an important point to note. Considering the multitude of themes, templates and modules developed by open source teams around the world, the front-end graphical layout environment of Drupal 8 is still relatively rudimentary. Even Bricks, currently in a preliminary release, does not provide an environment suitable to professional graphical layout. Shortcodes are a temporary solution employed to ensure old Updates can be viewed correctly, so it is important that more mature versions of Bricks or an equivalent tool become available soon.

4 Summary

The ATLAS Education & Outreach group is well into the process of migrating its existing public website from version 7 to version 8 of the Drupal content management system. The team is building the new site using the CERN-override theme and is receiving significant support from the CERN web development team. The new pages will build on three years of experience with the existing site, present more in-depth content and feature a more dynamic layout with reactive response to varying screen sizes.

Some of the more significant challenges being faced include implementation of a look and feel that is distinct from CERN and based on the ATLAS visual identity, usage of a reduced number of generic content types to simplify maintenance, large-scale porting of a few thousand nodes of existing content, and the development of a user-friendly front-end layout environment for content providers. Solutions appear to be in place or attainable for most of these issues and development is on track to be completed by the end of CERN Drupal 7 support in mid-2020.

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