Custom Cloud Printing Solutions from HP Labs

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Abstract

Commercial Color Digital Print has grown and matured over the last 20 years. Since its first public appearance in 1993, the technology has grown to B1 size sheets and rolls and has already surpassed offset quality. Both electrophotography and inkjet printing technologies dominated the 2012 Drupa show. So what is next for printing? In this talk, we will describe several Custom Cloud Printing Solutions and Incubations from HP Labs which may paint some color towards this future.

Introduction – Printing and Cloud Platforms

Printing ink on paper produces about 50 trillion pages annually with a growing percentage done using digital print technologies. How many of these pages will be printed leveraging cloud printing platforms? What are the advantages of Cloud Printing Solutions and who can connect and leverage such platforms? In this talk, we will look at trends and try to answer some of these questions. We will start by looking at some of HP Labs experiments and Cloud based offerings.

MagCloud

In 2008, HP Labs released MagCloud as a self-publishing solution with a single format of a letter-sized saddle-stitched magazine. The concept was to leverage the high quality digital print capabilities distributed among the Print Service Providers (PSP) worldwide and develop a centralized software or cloud service to enable anyone to reach these printing assets while minimizing investment, risk or effort. We would say, "If you have high quality content that you would like to distribute and share – upload your PDF to MagCloud.com and we will do the rest for you." MagCloud not only provides a print service in the cloud but also a distribution network, online storefront and data storage offering business publishers a suite of cloud publishing services. This simple and attractive value proposition has spread virally and created thousands of public and private publications from commercial magazines, to business promotional tools, to catalogs, education courseware and more. Within three years from launch, MagCloud has seen more new publications than the number of traditional magazine titles in the United States.

MagCloud developed and provided the publisher with an interface for uploading a PDF file, selecting among a simple set of paper types and finishing options, providing PDF validation and print ready notifications, choosing private or public sharing and setting price options. Publishers can then see statistics about their "followers" and sales of the digital and printed versions of their publications. Fig. 1 is a screen shot of the MagCloud home page.

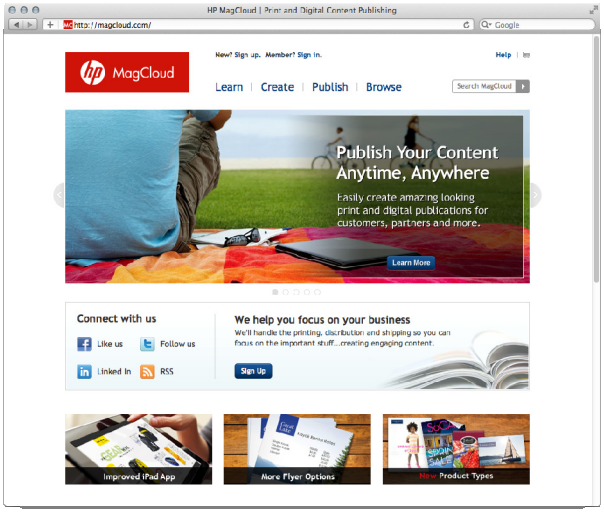

***Figure 1**. MagCloud.com home page*

For the print buyer, who is not the publisher himself, MagCloud developed a browsing and search tool so one can find publications of interest, as well as an online storefront and a variety of worldwide shipping options.

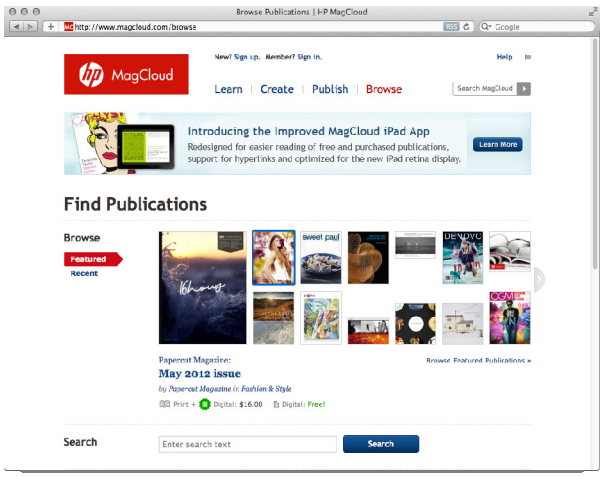

***Figure 2**. MagCloud.com - Browsing tab on website*

For the certified PSPs connected to the MagCloud service, a job manager module was developed to enable sorting and smart distribution of jobs into the PSP job queue as well as feedback on the print job status from processing through fulfillment in the print shop. The MagCloud platform, through the API interface enables either a small development team or a big publishing corporation to experiment with new types of publications and with almost no risk.

MagCloud is already used by content owners to reach and communicate with their audience in several different ways. In some cases the content owner or publisher uses the service to order in printed copies in bulk, while in other cases the publication is uploaded to the MagCloud site and the audience pulls and orders the publication when and where they need it. A third use case is a "push" of the publication by the content owner to predefined recipients to create awareness or to a predefined subscribed group.

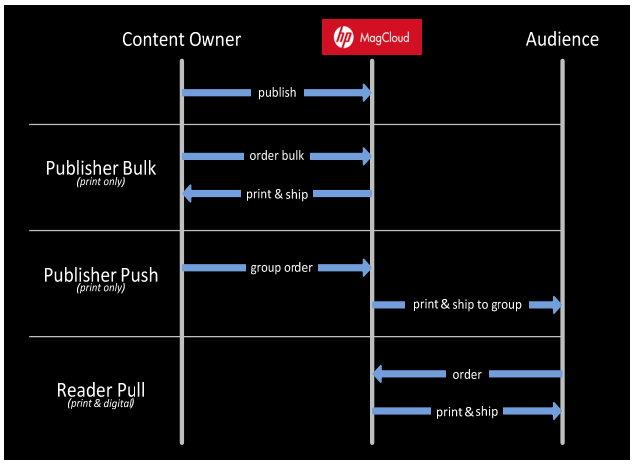

***Figure 3**. MagCloud.com – "Push" or "Pull" models*

Whether it is used in a push, pull or hybrid mode, the content owner has the option of publishing the digital content on the tablet as well.

What are future opportunities for these type of services? How will consumers "want to be publishers" and marketing campaign managers use the capabilities and functionality that these cloud platforms enable? Lookout for more high quality printed magazines and sophisticated multi-channel campaigns in the near future.

***Figure 4**. Link to MagCloud by scanning this QR Code.*

Color Connect

Another experiment from HP Labs is a cloud service to sense, analyze and match colors, called "Color Connect." The idea is to leverage the cameras on our phones to collect data and overcome the non-calibrated sensor issue by calibrating the scene with a pocket size calibration chart. With this simple concept, HP Labs has developed the algorithms and mobile applications to identify the calibration charts and interpolate the measured color patch to the color space coordinates.

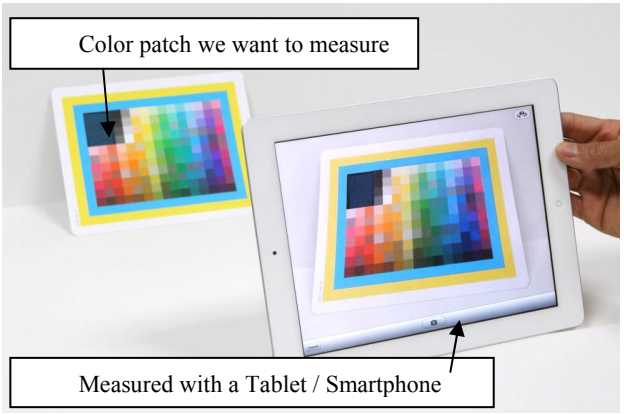

***Figure 5**. Color Connect – calibrating the scene with a color chart*

The system is comprised of algorithms on the smartphone (or tablet) in the form of an app and algorithms in the central cloud server. Figure 6 shows a screenshot of the results page from the app. In addition to showing the nearest fan deck color [5], the app also suggests combinations of CMYK, CMYKOV or CMYKOVG ink amounts that would best match your color of interest. These are supported by ΔE values to assist in determining the benefits of using more than 4 primary colors to accurately reproduce the color.

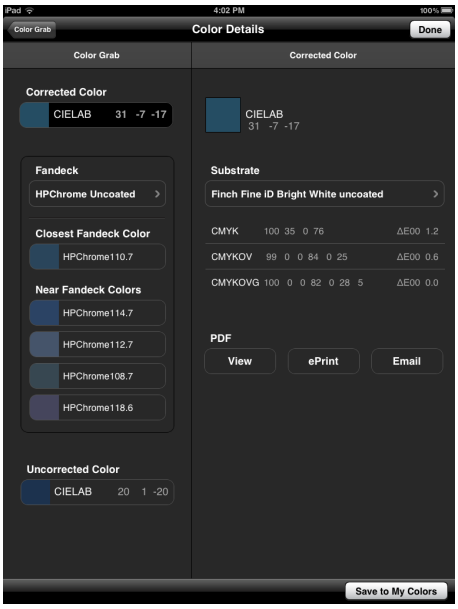

***Figure 6**. Color Connect – Color Details page showing nearest fan deck colors*

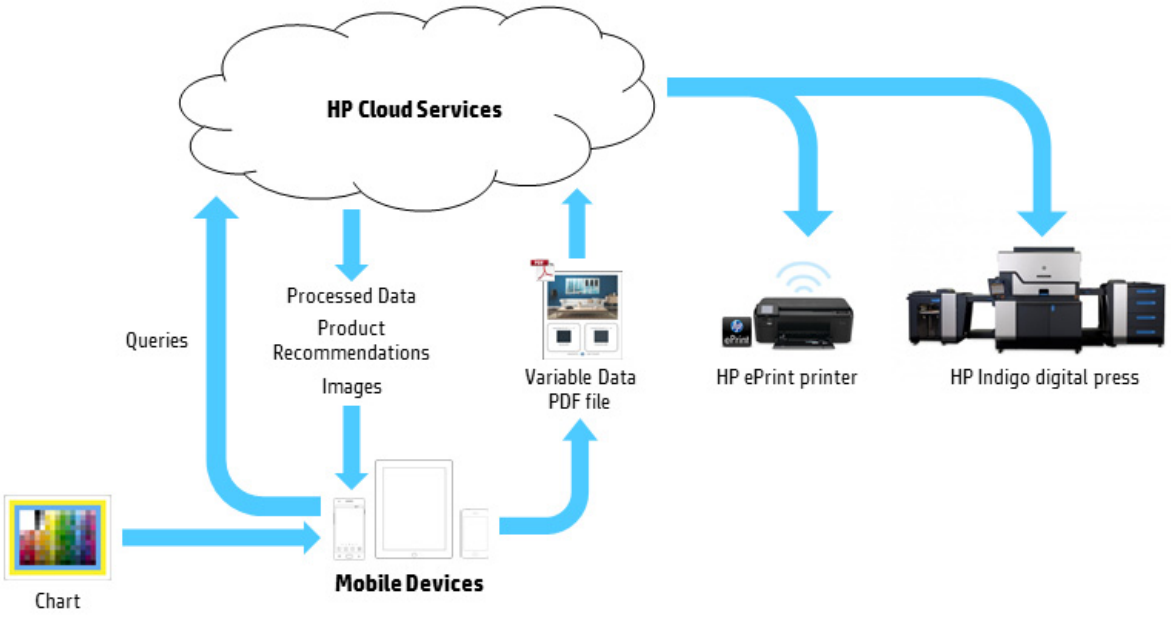

***Figure 7**. Color Connect – Custom Cloud Service*

It is well known that personalized and customized content are of higher value to consumers and brand owners so with new cloud services such as "Color Connect" one can imagine multiple use cases which we may want to try out on our Smartphones soon.

References

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Author Biography

Udi Chatow received his B.Sc. and M.Sc. degree in Physics from Tel Aviv University and his MBA from Kellogg / TAU. Udi joined HP-Indigo in 1988 and has held several R&D positions among them Project Manager, Ink Department Manager, R&D Materials Section Manager and since 2005 is creating and leading incubations in HP Labs.

Kok-Wei Koh earned his B.S. with distinction in Computer Science from the University of Washington in 1994, and his M.S. in Computer Science from Stanford University in 2002. He has been working in the Printing and Content Delivery Lab of Hewlett-Packard Laboratories in Palo Alto since 2000, where he helped develop HP Indigo photo and gray inks and the MagCloud self-publishing web service. He is currently serving as associate editor for the Journal of Imaging Science and Technology (JIST).

Nathan Moroney is a principal scientist at Hewlett-Packard Laboratories in Palo Alto, California. Previously, he worked for the Barcelona division of Hewlett-Packard and at the RIT Research Corporation. He has a Masters Degree in Color Science from the Munsell Color Science Laboratory of RIT and a Bachelors degree in color science from the Philadelphia University.