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**Author(s):** Myllymäki, Mikko; Hakala, Ismo

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# OPEN BADGES IN HIGHER EDUCATION

**M. Myllymäki, I. Hakala**

*University of Jyväskylä (FINLAND)*

## Abstract

Open Badges is an open source code concept developed by the Mozilla Foundation to identify the learner's knowledge and skills and to display them in a modern way. Although the concept was originally meant to display informal learning, it can also be applied to formal education. Indicating competences electronically makes it possible to display competences for which traditional certificates are unsuitable. It also enables completely new features such as a restricted validity period for a certificate. The Open Badge concept also can make education marketing more effective, and it might be thought as a future solution for identifying competences acquired earlier when moving from one study level to another. The Master Studies in Mathematical Information Technology at the Kokkola University Consortium Chydenius participates in the Open Badge Factory project consortium launched in 2014. The consortium is developing an application that will enable the creation, management and issuance of skill badges in accordance with the Open Badge concept. The consortium is also piloting the application and the Open Badge concept in connection with higher education. This paper briefly describes the Open Badge concept and introduces the OBF project consortium. Above all, the paper highlights the observations and challenges that emerged in piloting that took place in a higher education institution.

Keywords: Open Badge, Digital Badge, Skill recognition, Higher Education, Research project.

## 1 INTRODUCTION

Life-long learning plays a significant role in rapidly changing societies, and its role is emphasized also in the EU's strategies. Constant change in society necessitates continuous learning, which has become a central process for humans and communities. Learning takes place everywhere, a lot of it also in parallel with the objectives of the learning plans registered along formal education.

In addition to the actual substantial competences taught, the competences required by business in the future include many so-called general skills that the employers expect from graduated students. In connection with the education that is in line with the curriculum the students accumulate quite a few of these kinds of skills as a side product of regular education. Examples of these kinds of general competences accumulated over a long period with other education include skills to use various technological tools required in different studies, skills and competences such as project skills, team skills and production of technical documents that are related to the working methods accumulated during the courses. However, these skills have neither been registered as learning targets nor included as such curricula. Therefore, the skills are not displayed in degree certificates, either. The certificates attached to the student's portfolio tell about competences acquired traditionally through education. However, the results of learning not reaching the portfolio either are left out. In addition to job search situations, making this kind of competence visible would be of importance for example in identifying competences acquired earlier in connection with the interchangeability of studies.

Making hidden learning visible poses great challenges. That learning is hard to identify, and by its nature it is cumulative, having been accumulated in small pieces as a side product of many regular courses. One characteristic of hidden learning is the change with time in the matters that are the objects of learning. Recognition of competence while taking into account its restricted validity should also be made possible.

In a modern society, it would be useful in many situations to be able to display competences and skills also in an electronic format. Traditional paper certificates cannot be added as parts of electronic portfolios or CVs or openly distributed through various network channels such as virtual social networks, for example.

As a solution for the challenges presented above, we need a new way to acknowledge smaller competence sets. The solution must be such that the acknowledgement and presentation of the competence displayed would be easy. A modern solution essentially requires that competence can be demonstrated in various contexts to potential employers, educational institutions, colleagues and social communities. The solution should also pay attention to the requirements related to the restricted validity period for competences.

To meet these challenges, the Open Badge concept could be the future solution. With the help of virtual learning badges, the concept makes it possible for educational institutions to bring out and acknowledge also other competence areas, not just those that accord with the curriculum. In practice, the badge is a kind of virtual learning indicator with which a person can manifest his/her competence or skill on the web. The badge contains, among other things, a description of the skills learned by its earner, the name of the issuer, the date of its issuance and its validity. Moreover, the concept includes solutions for example to verify the validity of the contents of the badge and its issuer. The Open Badge technology makes it possible, with the help of the validity period, to take into account the restricted validity of a learned skill. According to the concept, the student can display the earned badges on the websites frequented (Facebook, LinkedIn, etc) or for example in his/her ePortfolio. Once the ePortfolio has been supplemented with the Open Badge technology, the portfolio will enable the display of competences accumulated during the process of qualification but not visible in the certificate.

The Open Badge concept also has possibilities from the viewpoint of marketing. As the concept becomes more widespread and the number of those with a badge attesting to the completion of training increases, also the awareness of the trainings will increase. From the marketing viewpoint, therefore, also acknowledgement of education other than that which has remained hidden is useful.

The (OBF) project consortium was launched in Finland in the autumn of 2013. The goal of the consortium is to develop a cross-platform cloud-based service named Open Badge Factory and pilot the use of the service in different environments. Service enables organisations to create, issue, and manage open badges. The project consortium involves a companies and educational organisations.

This paper introduces the Open badge Factory project consortium and the objectives and activities of the subprojects. The paper also presents the challenges and opportunities related to the Open Badge concept and the preliminary results already achieved, mainly from the perspective of higher education.

## 2 OPEN BADGE CONCEPT

Open Badges is a system-independent, open source code standard developed by the Mozilla Foundation in 2010. It was created to identify the learner's knowledge and skills and to display them in a modern way. In practice, Open Badge is an electronic image with attached metadata (Fig. 1). Important things that can be described with metadata include an accurate description of the skills learned, issuer of information, date of issue and a possible expiry date for the badge. The expiry date, in particular, is proving to be a useful feature because, with its help, the limited validity period characteristic of the learned skill can be taken into account. Also more detailed evidence of the learning can be attached to the badge. This kind of evidence could consist of, for example, learning diaries or practice work produced during learning.



Figure 1: Metadata of a badge conforming to the Open Badge concept.

The concept does not have limitations on how the badge is issued. Thus, it is possible for example to create functionalities for the applications developed for earning a badge and then apply for a badge from the issuer on the basis of these functionalities. In addition, badges can be chained, in effect

creating so-called metabadges. A metabadge is automatically issued once the earner has obtained for him/herself the part badges defined by the issuer.

The Open Badge concept is linked to three roles: issuer, earner and displayer. The issuer typically is an organization that arranges education. The earner is a learner who can, if he/she so wishes, accept the badge issued. Badges are stored as a default in the personal folder of the Mozilla's cloud-based service called Mozilla Backpack. The Open Badge concept, however, does not place restrictions on where the badges are stored. This allows the application developers make their own storage places, for example for their industry-specific badges. This is the practice in Finland in applying learning badges to the needs of industries. The earner of the badge can group the badges in the way desired, depending on whom he/she wants to show the badges at any particular time. The approach is more like presenting one's skills, rather than that of displaying one's academic achievements [1]. Earners may display their badges in their own social networks (Facebook, Google+, LinkedIn, etc.) or for example in their ePortfolios. Sharing can also occur in websites or for example in the earners CV. Fig. 2 shows the Open Badge concept.

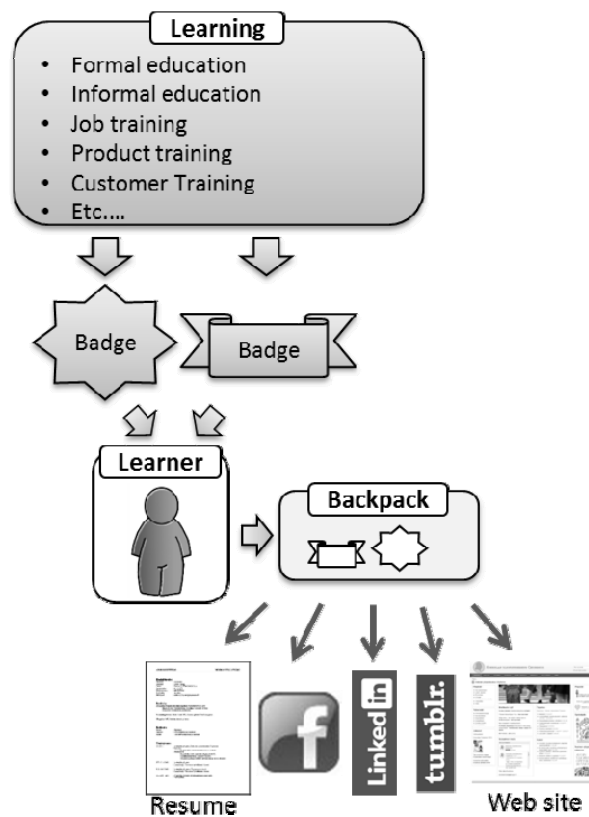


Figure 1. Open Badge concept

### 3 OPEN BADGE FACTORY PROJECT CONSORTIUM

The Open Badge Factory (OBF) project consortium funded by Tekes was launched in Finland in the autumn of 2013. Tekes is the most important publicly funded expert organization for financing research, development and innovation in Finland. The project consortium is funded by Tekes Learning Solutions Programme. The Learning Solutions Programme funds and fosters development of new learning tools for the 21st century. Learning is seen as a lifelong process that takes place in formal education but also in informal context. The objective of the programme is to develop internationally important learning solutions in cooperation with participants in the sector, to develop new operating approaches, create new skills and develop products, services and comprehensive packages for international markets.

The OBF project consortium consists of five part projects. One of the part projects is developing an application with the help of which organizations can use open badges. The development work will be

led by Discendum Oy. Discendum is a leading Finnish producer of learning environments. In four other part projects, the concept is piloted from different viewpoints. The part projects are implemented by a university (Kokkola University Consortium Chydenius), companies (Raisoft Oy, Ilona It) and a nationwide adult education institution, which acts as an umbrella for non-governmental organizations (Ok-opintokeskus).

In addition to piloting, the Kokkola University Consortium Chydenius carries out research in its own part project. The research helps in the examination of the usefulness and effects of the deployment of the Open Badge concept from the viewpoints of all the participants in the project consortium.

## **4 OPEN BADGE FACTORY: THE OPEN BADGE MANAGEMENT SYSTEM**

In the main subproject of the project consortium, a service which enables the creation and administration of Open Badges is being developed. The practical side of the development is being carried out by Discendum Oy ([www.discendum.com](http://www.discendum.com)), who have long traditions in the development work of learning platforms. Discendum released the first version of the Open Badge Factory (<https://openbadgefactory.com/>) for piloting purposes in early 2014. Open Badge Factory is an Open Badge management system that provides a centralized and simplified quality framework for Open Badges. It's a cloud-based platform that provides the tools for organizations to create, manage and issue badges.

A badge can be issued for a certain accomplishment, in which case the badge will be sent to the learner once the course has been completed. A badge can also be issued based on the learner's application. With the help of an application, the issuer can create a web-based form by which the user can apply for the badge. The issuer can use the questions in the form to ensure that the earner knows the contents for which he/she is applying the badge. In future, evidence, such as files, to indicate acquired learning can also be attached to the form.

In its next stage of development, OBF will also support metabadges. These enable the linking of several badges to each other. With the earning of those badges, a metabadge is automatically generated and a hierarchy is created between the badges.

One of the main features of OBF is the ability to build a client application with the help of an open interface. The client applications for the Optima and Moodle learning network environments and the Mahara application were developed in connection with the project. A client application enables an operation model where badges are created and administered centrally in a single location but can, nevertheless, be issued from the client organization's own system such as any of the existing learning management systems.

Additionally, OBF offers an extensive reporting system through which the issuer organizations can monitor the way their badges are being used. In many cases it is important to be able to evaluate how those badges have been received and used by the target groups.

## **5 OPEN BADGES IN HIGHER EDUCATION**

### **5.1 Application targets in higher education**

From the viewpoint of the implementer organization, as a side product of education a lot of learning that is not included in the curriculum or in the actual learning objectives is produced. This kind of competence, so-called hidden competence, accumulating for the students is therefore not shown in diplomas, either. According to an earlier research [2], in any case for example companies hope from graduating students exactly the skills created by this kind of education, in addition to substance competence. Hidden learning indicated by learning badges makes the correspondence between education and working life easier to see and, therefore, increases the competitiveness of that education.

Examples of these kinds of general competences accumulated with other education include skills to make use of various technological tools required in different studies, skills and competences, such as project skills, team skills and production of technical documents, which are related to the working methods accumulated during the courses. There is thus a clear need for making hidden learning visible. Often the characteristics of these kinds of skills are such that it would be desirable to be able to attach the validity period of the topic learned to them.

Displaying learning acquired earlier and recognizing its validity for the study is a very topical issue for different levels of education. Learning badges issued by the organization providing education might bring some solutions to this topic. Often it is very difficult to find out from traditional certificates what competencies there are behind individual courses. With the help of a badge conforming to the Open Badge concept, the student would always have at his/her disposal a very accurate description of the competence acquired.

The Open Badge concept also has possibilities from the viewpoint of marketing. Students can distribute badges in their own networks. Learning indicated by badges can be made visible in the student's own networks, which increases the recognizability of the education and promotes the marketing effort. As the concept becomes more widespread and the number of those with a badge attesting to the completion of training, also the awareness of the education provided will increase. In addition, when the student adds the badge to his/her own social networks, a wide peer network will be created amongst the students. From the marketing viewpoint, therefore, also acknowledgement of education other than that which has remained hidden is useful.

## **5.2 Piloting environment**

The Kokkola University Consortium Chydenius is a university unit specialized on adult education. It provides adult education and has developed several different models that are suitable for the purpose. An adult education model for the master's degree education in mathematical information technology is one of the solutions that has functioned well for a long time at the university consortium. The education model is based on a cost-efficient and flexible blended model, which combines various teaching methods making good use of information and communication technology. The learning platform developed by Discendum Oy plays a very central role in the education implementation.

The master's degree education in information technology functions well as a research and development environment, while forming a part of the Open Badge Factory value network, for the learning of academic adult students. Working practices and solutions applicable to degree education are being investigated within the framework of the education programme. The research on education technology carried out in the unit is typically case-type rapid-cycle research which produces research results fairly fast and reveals the development needs for the models. Therefore, it is quite suitable for the implementation of projects of this type.

## **5.3 Piloting targets**

During the project, the badges are piloted for three targets in connection with higher education. In all the piloting targets, learning is automatically accumulated with normal education activities; thus there is a good reason why the learning is not assigned credit points. The piloting targets have been chosen in a way that the learning indicated by badges accrues in them in very different ways.

The first piloting target is the planning of university studies. An information event is currently arranged for the students at the beginning of their studies: practices related to education are reviewed and guidance for the use of the applications employed in the education is provided. In addition to the information brief, the student will have at his/her disposal plenty of written guidance and material about the practices of the Learning Management System currently in use. The students in the study programme are adult working students who live around a wide geographical area. The teaching arrangements enable distance study and flexible participation in the study. Consequently, it has proved challenging to make students attend information events organized in a traditional fashion. The aim of the piloting is to design the information event and other information material so that it forms meaningful packages for the purpose of distance study. Here the education organizer must carefully think about and accurately analyze the education module indicated by the badge. For example, the information event contents can be implemented as short instructional videos, the viewing of which would be one of the requirements for earning the badge. The students will be issued with a learning badge in accordance with the Open Badge concept once they have familiarized themselves with all the components of the information material. To make the badge meaningful, it must be possible to accurately define the information that the student should assimilate.

For the education provider, the benefit of the badge is clear. Once the badge is deployed, it will motivate the education provider to organize the education and, if necessary, overhaul it and create clearer modules of the material. After the issuance of the badge, the education provider can be sure that the student who earned the badge has assimilated the practical information required by the study. As a requirement to earn a badge, it is possible for example to define that the earner should take

certain tests, among them the learning style test. There have been some difficulties in motivating students to take these kinds of tests at the beginning stage of their studies. However, both the education provider and the student will derive benefits from these tests. The badge might also motivate the student for participating more in the planning of his/her studies.

A badge earned right at the beginning of training would also automatically familiarize the students with the badge approach and ease the acceptance of badges at the later stage of their education. On the other hand, if badges are applied to the beginning of education, the challenge will be the acceptance of those badges. Will the students regard the badge so important that they will accept it? This threshold can be lowered by requiring that the badge should be earned before drawing up one's personal study plan.

In the second piloting target, the basis for issuing a learning badge is competence accumulated in certain courses. This competence will become more complete with the hidden competence accumulated within several courses during training. The students study technical and scientific writing in courses designated for the purpose. This is also the learning objective of those courses. In addition, during many other courses, the students gather practice in familiarizing with scientific texts, searching for scientific publications, producing scientific and technical text and using tools that facilitate the production of those kinds of texts. Thus, other courses create, as side product, competences that supplement the courses that teach the actual subject matter.

According to an earlier research [2], some employers expect that students graduating from a higher educational institution would have competences related to technical and scientific writing. Aided by the badge, the student can, if he/she so wishes, indicate the existence of that kind of competence and the criteria used in acquiring the competence. Thus the benefit the student derives from the badge is apparent. The characteristics of this badge are such that the use of so-called metabadge would be applicable to it. Reading and refereeing a scientific text could yield a first level badge, whereas at the other extreme a higher level badge could be earned for example with a refereed scientific publication accepted to an international conference. In other words, the higher level badge would typically be relevant for the postgraduate studies only.

In the third piloting target, badges indicate competences that are automatically created for the student in connection with study-related practices. The competences of this piloting target clearly are hidden competence which is not shown in the diploma. The teaching in the Master's Education Programme in Mathematical Information Technology at Kokkola University Consortium is multimodal. The possibilities of information and communication technologies are made good use of in the teaching. A great portion of the students in fact study by other means than with the help of face-to-face teaching. During training, very strong competence related to education technologies and distance study is spontaneously acquired by many students. This kind of competence is not included in the curriculum. Nevertheless, being able to indicate competences like these may be useful for the students in job search situations. Innovation in teaching technology applications is fast. It is characteristic of the competences in this piloting target that they are typically valid for a limited duration. Therefore, the possibility to indicate limited validity period with the learning badge would be the needed solution.

In addition to the pilots implemented at this stage, the intention for the future is to issue learning badges for example for international involvement, project competences and competences related to certain software.

## **6 DISCUSSION**

Already at this stage, even though the project has not been concluded, many challenges and observations related to the Open Badge concept have emerged. These are primarily related to the deployment of the badge and the properties expected of them. We will attempt to answer these challenges, which were noticed at the initial stage of the pilots, as the project advances.

Taking the badges into use is not a simple process. At this stage of the project already, it has been noticed that there are many issues to be considered in the introduction of the badges. It is very important to consider the benefits derived from the badges by the education provider and the student alike. Already, it has become clear that one big challenge is related to how the earners of the badges can be made to put the effort to earn the badges issued. The student must feel that the badges are useful, otherwise they will not make the effort to earn them.

The contents and the criteria of the badges must be appropriately described. When we examine the practicability and usefulness of the badges, one of the most important factors is that the competence descriptions contained by them are sufficiently accurate and informative. With each badge, it is worthwhile to consider whether the competence indicated by the badge is of limited validity by duration or whether the competence acquired is permanent.

When planning the introduction of these badges, it is also important to examine the practices the badges require. Badge creation in itself is a one-off operation that doesn't require much work. On the other hand, verification of the competence created and issuance of the badges might require special kinds of practices. Especially when learning is created in connection with a course, the challenge is to verify the resulting competence. This requires not only the development of practices related to the issuance of badges but possibly also development of some kind of tool integrated to a learning management system, the tool allowing each responsible teacher to verify that the earning of a part of the badge has been completed. In some cases, it may also be appropriate for example to modify teaching in such a way that it will become easier to acknowledge by means of badges. In practice, this might mean perhaps some kind of pacing in teaching.

Applying for and earning badges should technically be a very easy process. Similarly, issuing of badges should be as simple as possible. If that were not the case, the badges wouldn't be used or issuing of them wouldn't be seen as bringing sufficient benefits. The language employed might in some cases prove to be a problem mainly to the earner of the badge, especially in environments where the English language is not normally used. However, from the viewpoint of higher education this is not a significant problem. Solutions for the challenges related to the language and earning of badges can be sought by building customized field-specific displayers to store the badges and improved versions of the Backbag for badges. A storage solution for badges that would be suitable for the needs of students in particular could be built for example for educational institutions. Own implementation will give the end user more opportunities to login to the system (e.g., using the Facebook account) and makes the earning of the badge simpler. Here multilingualism can also be supported, and the user terms can be modified to make them appropriate for the local needs.

When dealing with a big organization, such as a university, it is worthwhile to consider who the issuer of the badge is, i.e., is the badge issued by the university or for example a university faculty or department. This, naturally, is important information for the person who sees the badge. If the issuer of the badge is a university, the use of the badge as a marketing aid will be more challenging. On the other hand, the fact that the issuer of the badge is a university may increase the perceived value of the badge. If the issuer of the badge is a big organization, it should be ensured that the reporting tools of the system used will nevertheless make it possible to receive departmental reports.

When we consider the displaying of competences acquired in the past and recognizing their validity for the study, we should consider whether badges with their competence descriptions should be issued for all the study programme courses. A better alternative would perhaps be to put the matters studied in some kinds of modules that would contain several courses. In connection with the metadata presenting the badge's criteria, it would then be possible to present, on a more general level, the competence descriptions of the courses that the badge includes. An example of this kind of compiled module would be perhaps a programming badge which would gather together all the courses related to programming and software production.

A typical question about the Open Badge is how to avoid badge-generated inflation if badges are issued in great numbers. Here, the earner of the badge has a decisive role to play. The earner must filter into view the badges which he/she wants to display each time, to make them align with the target audience and context. For example, when seeking for employment, it wouldn't be a good idea to display all the badges possible but only those that indicate the relevant skills for the job.

The value of a badge is determined by the significance attached to the badge by the badge issuer, badge earner and those seeing the badge. The viewpoint of the badge issuer is important, but also it is very important that the metadata contained by the badge is useful from the viewpoint of the earner of the badge. For this reason, attention must be paid to the metadata and especially to the criteria which express the competence indicated by the badge.

The validity period accompanying the badges plays an important role in many situations. The validity period is more important than university education when we move to examine further education. With the help of validity period, it is possible to make the students participate, within certain intervals, in the courses connected to further education. To make efficient use of the validity period, the badge can be defined in some way to make it notify about its approaching expiration sufficiently early. Instructions



for the renewal of the badge could be given with the notification. Another important badge feature is the possibility to chain the badges into so-called metabadges. In these cases, several smaller badges together form one larger badge. This feature enables the addition of gaming features to the acquisition of badges. The students can try to obtain a larger badge by completing smaller parts.

Finally, we should draw our attention to that the outward appearance of the badge has great significance from the viewpoint of marketing. The badge should somehow already from the start express the identity of the issuer and the competence indicated by the badge. The outward appearance can also emphasize the hierarchy of badges. For example, the Open Badge Factory under development in the project consortium does not provide tools for creating the image for the learning badge. The idea is to motivate organizations to put some effort in the design of a professional graphical look.

## **7 CONCLUSION**

Although the learning badges in accordance with the Open Badge concept were originally designed to display informal competence, they also have great potential in connection with formal education. From the viewpoint of higher education, virtual learning badges provide an opportunity to highlight, for qualification purposes, smaller components which otherwise are not included in the courses' learning objectives. This kind of activity is very useful from the standpoint of students. By making the added value, which is provided by the education, visible to employers, students' chances for obtaining employment will improve. Making the competences –which remain hidden but are needed by industries– visible, also increases the correspondence between education and working life. When students distribute badges in their own networks, also the education becomes better known. From the viewpoint of higher education, applying the badges for acknowledging competences acquired in the past is an interesting thought.

Up to this point, widespread use of learning badges conforming to the Open Badge concept has been limited by the lack of tools that would make the design, management and issuance of badges easier. The Open Badge Factory project consortium has developed an application to solve this problem. The consortium's part projects pilot from their own starting points the applicability and usefulness of the application and the learning badges. Constant development work for the application is being carried out, and the piloting stage will continue to the end of 2014 within the framework of the Open Badge Factory project consortium.

In the planning of the introduction of the badges, many issues raise their head: e.g., why to produce these badges, how various parties would derive benefits from these badges, for what competences these badges will be issued and what practices are needed for the introduction of the badges. In particular, the benefits afforded by the badge to its earner must be clear. Otherwise, no effort is made to earn the badge. Naturally, it is also important what kind of significance does the party to whom the badge is shown by the student attaches to it. The role of clear competence descriptions for the badges' usefulness is great.

If we want the Open Badge Concept to be functional and practicable in the future, we need, above all, information and communication about the features and possibilities that the badges provide. Communications must target, in addition to the issuers of the badge, also the earners of the badge and those to whom the badges are shown by the earners.

It is easy to see potential applications for Open Badge not only within higher education but also elsewhere. From the viewpoints of companies providing education and companies organizing it, the concept has great potential. In connection with the Open Badge Factory project consortium, the badges are being piloted from the perspective of education packages of various levels and from the perspective of industries. The Open Badge Factory will run until the end of 2014. Within its framework, research will be carried out from the viewpoints of the effects of the concept and its applicability in many different environments.

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