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Taxonomy of Web-Based Shopping Systems

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Abstract

This paper attempts to address a detailed understanding of the diffusion of WBSS, introducing a classification model of WBSS, analyzing the cases of four categories of WBSS, and providing a characteristics of the four types of WBSS. A model of four types of Web-based shopping systems is suggested: (1) general-direct-sales; (2) general-intermediary-sales; (3) specialized-direct-sales and (4) specialized-intermediary-sales. On the basis of these four categories of WBSS, the paper analyses the distinguishing characteristics of WBSS, which has implications for both theory and practice. We hope that this research will mark the starting point in on-going research towards many unresolved issues on Web-based shopping systems.

Key words: Web-Based Shopping Systems, Classification Model of WBSS, Characteristic Analysis.

1. Introduction

Internet technology has evolved into a dynamic source of information as well as an extraordinary business tool that is able to reach any user [6, 14]. Internet technology also allows organizations to overcome many of the physical constraints that often prevent them from doing business [21]. Therefore, time and space, the two age old limitations of human beings, can be overcome more easily than ever today [16]. There is a growing desire to understand

electronic commerce and to utilize new technology within the Internet business [6, 10, 12, 14].

However, many organizations lack a clear understanding of how to make effective use of Internet technology as a means of new business supporting global electronic commerce [4, 15, 26]. Organizations need to plan effectively before they venture into Internet business [6, 10, 19, 20]. The aim of this paper is to answer the above questions and to provide a theoretical background of further WBSS diffusion study. In order to do so, we introduce the concept of WBSS and analyze the characteristics of each type of WBSS identified, focusing a review of cases that are utilizing WBSS. Finally, we provide the major characteristics of the four types of WBSS.

2. Web-Based Shopping Systems

Web-Based Shopping Systems (WBSS) can be described as Internet-based shopping systems for selling and buying products, information, and services [2]. According to Porter [19], "the organizations that will be most successful will be those that use Internet technology to make traditional activities better and those that find and implement new combinations of virtual and physical activities that were not previously possible." Though there will be several ways to do this on the Internet, WBSS can succeed in this regard due to its particular characteristics, which we will discuss in more

detail below. There are various types of configuration of WBSS, such as those adopted by Amazon.com, eBay.com, Del.com, Tesco.com and so on. Figure 1 provides a multi-tier

architecture for WBSS, one which is adopted for the purposes of this research.

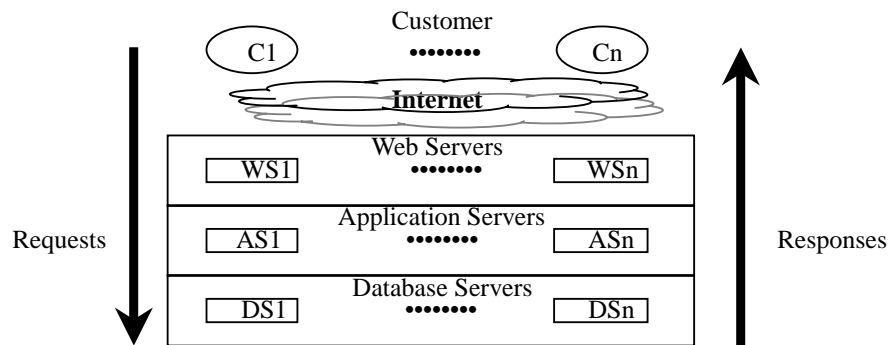


Figure 1. Multi-tier Architecture of Web-Based Shopping Systems [2]

As can be seen in Figure 1, WBSS consist of Web servers, application servers, and database servers [2]. First, Web servers support Web-based shopping between seller and buyer, merchant and customer, and manufacturer and supplier. Web servers fill the role of middleman between the back-end systems and front-end clients [12]. Second, application servers support information retrieval, personalization, transactional other management, security management, and payment management. They include shopping agents or search engine, security system, certificate system, customer relationship management (CRM) system, and payment system [2, 12]. For example, Amazon.com developed not only its Web site but also incorporates Web-based shopping applications for order processing, invoicing, payment, shipment, inventory management and procurement. Finally, database servers manage all data related Web-based shopping between WBSS and customer. For instance, eBay.com is utilizing Web and database connectivity systems to carry out its successful business process of creating a feedback and rating system for all buyers and sellers on its auction site. To sum up, Web servers, payment system in application servers and database servers are indispensable to WBSS. We might conclude that the application of WBSS promises to be a driving force for

electronic commerce by allowing organizations to create global electronic markets, increase efficiency, and lower transaction costs through digital commerce with customers and businesses around the world.

3. A Classification Model of WBSS

We can consider WBSS as a new business enabler with the potential to change the ground rules by which businesses interact with their clients [2, 12]. Carrying out global business on WBSS is becoming more important to many organizations. The purpose of this sections is to develop a classification model of WBSS, and suggest its characteristics to provide a detailed view of WBSS.

3.1 Development of a Classification Model of WBSS

According to Peppers and Rogers [18], “the core issue confronting business is how to achieve sales and which products to sell.” On the basis of this definition, in terms of a global business medium, it would appear helpful to classify various types of WBSS applications, therefore, by product type and sales type.

Firstly, the sales type of WBSS is examined. For instance, Amazon.com sells multiple products such as books, CDs,

and software as well as is directly responsible for the products sold on its WBSS (www.amazon.com), while Fastparts.com sells electronic parts, and is indirectly responsible for sales products in the role of intermediary (www.fastparts.com). On the basis of this observation, the sales types of WBSS are classified into two types: direct sales type and indirect sales type. As a real marketing channel, WBSS support two-way sales types between the seller and the customer. One is a direct-sales type, which is directly responsible for a guarantee of quality and delivery for the sales products [1, 18]. The other type related to indirect sales, and is indirectly responsible for a guarantee of quality and delivery for sales products [18]. That is, the indirect sales type relays business transactions between the manufacturer, merchant, distributor and consumer [25].

Another distinguishing factor of WBSS is the type of product being sold via this medium. In order to gain a meaningful insight for classifying the different product types sold WBSS, this study explore the products sold by some well-known dot-com companies. For example, Del.com and Amazon.com are selling products directly to global customers without any intermediaries. However, the product types are different from each other, i.e., Dell.com is selling only a single product such as a computer (www.dell.com), whilst there are multiple products such as books, CDs and software sold by Amazon.com (www.amazon.com). Based on this observation, the product types sold on WBSS are divided into two groups: single product type and multiple product type, as outlined in Table 1.

Table 1. Product Type of Web-Based Shopping Systems

Type	Definition	Examples
Single Product	• Single industry product	• Software, CD, Book etc.
	• Unified group image product	• Baby clothes, Sports equipment
Multiple Product	• More than two industrial products and products that are not unified into a group	• Department store products

Firstly, the single product type includes the product of a single industry such as a book, a CD, software, a flower, etc., as well as unified groups of products such as sports equipment, baby clothes and cars. Secondly, the multiple product type includes more than two industrial products, for example department store products, as well as products that are not part of a group of products.

On the basis of the product and the sales type of WBSS, a classification model of WBSS can be developed (see Figure 2). In the model, the horizontal axis displays the product type of WBSS, while the vertical axis displays the sales type of WBSS. This research thereby proposes a model which classifies Web-based shopping systems into the following four types: 1) General-Direct-Sales (GDS); 2)

General-Intermediary-Sales (GIS); 3) Specialized-Direct-Sales (SDS); and 4) Specialized-Intermediary-Sales (SIS). The general-direct-sales type means that this product type is multiple, and product sales are direct. The general-intermediary-sales type is the WBSS type selling multiple products indirectly. The specialized direct-sales type sells single products directly. The specialized-intermediary-sales type focuses on single products and indirect sales. However, not all WBSS conform to these four types: hybrids are possible for example. Nonetheless, this model serves primarily as a basic framework of WBSS for analytical purposes. In the next section, four cases are introduced in order to demonstrate the characteristics of each type of WBSS in more detail.

Classification Model of WBSS		Sales Type of WBSS	
		Direct sales	Indirect sales
Product Type	Single	GDS	GIS
	Multiple	SDS	SIS

Figure 2. A Classification Model of Web-Based Shopping Systems

3.2 Case Analysis of the Four Categories

This section aims to expand our view of WBSS and to explore the four categories of WBSS previously identified. In order to do this, we address four dot-com cases. derived from Web-sites, and then attempt to analyze each category. The dot-coms were selected because they are well-known dot-coms in each type (e.g., Hansolcs.com, Dell.com and Fastparts.com), and by searching Web-sites it seems to be well-matched with a GIS type (ShopNow.com).

3.2.1 General-Direct-Sales (GDS)

Hansol CSN is a cyber department store, which does not have any physical shop and sells several kinds of products that are identical to those of an actual department store. Therefore, the product prices in this category are cheap because goods can be sold directly to the customer without a salesperson, and intermediaries such as suppliers can be cut out. In doing so, Hansol CSN can reduce the transaction costs of selling products on WBSS (source: www.hansolcs.co.kr).

In addition, Hansol CSN provides one-to-one marketing, based on customer management databases that store customer information to analyze their characters, needs and preferences. Moreover, CSN carries out differentiation strategies such as one hundred percent exchange/refund, quick delivery, membership management and a variety of other services. One hundred percent exchange/refund is a customer satisfaction system that exchanges or refunds a purchase when a customer is not satisfied. Furthermore, it is claimed that this cyber department reduces traffic

congestion and avoids parking difficulties, because it does not have physical stores or car parks, so that customers are directly able to access product information and order from home (source: www.hansolcs.co.kr).

3.2.2 General-Intermediary-Sales (GIS)

ShopNow.com is a leading electronic commerce marketing company that helps businesses participate in Web-based shopping business. Based on its full suite of e-commerce solutions, ShopNow.com claims that it helps customers and merchants safely and easily buy and sell merchandise online. The ShopNow.com WBSS provides millions of products and services from more than 40,000 merchants. Customers can rapidly and efficiently search the variety of products by comparative shopping functions on ShopNow.com WBSS (source: www.stores.shopnow.com).

ShopNow.com not only supports technology and outsourcing services to retailers, manufacturers and other businesses, but also launches and manages the Web-based shopping systems on their behalf. Shoppers can purchase desired products and services from merchants located around the world. The major strategic option of ShopNow.com focuses on the global community. Hence, an International Business Division was recently established to expand ShopNow.com into Western Europe and Asia. From North America, this is led by individual divisions, each with a good knowledge of the international marketplace. By pursuing strategic alliances and partnerships in other regions of the world, ShopNow.com is hoping to accelerate its goal of becoming a pre-eminent Internet business service

provider worldwide (source: www.stores.shopnow.com).

3.3.3 Specialized-Direct-Sales (SDS)

Dell.com is one of the best examples of the specialized direct sales type of WBSS. Dell.com sells computer equipment directly to its customer on the WBSS. Dell.com currently sells more than \$14 million in PC products over WBSS each day. Its Web-based shopping business has over 25 million visits per quarter. By the year 2003, the company expects to handle half of all its business, ranging from customer inquiries to orders and follow up services, through the SDS type of WBSS (source: www.dell.com).

The chairman of Dell.com has claimed that Web-based shopping business as a new business model would facilitate a dramatic drop in costs and destroy old competitive advantages. The advantages of the Dell.com model are claimed to include near-zero inventory, less risk of obsolescence, more state-of-the-art products and a favorable cash flow [11, 18]. Since March 1999, Dell.com and Amazon.com have agreed to offer linked cyber shops and provide customized contents for their respective customers. Dell.com and Amazon.com can therefore offer mutual customer services, competitive prices, and ease of navigation (source: www.dell.com; www.amazon.com).

3.3.4 Specialized-Intermediary-Sales (SIS)

Fastparts.com trades in electronic components and equipment. Fastparts.com is an e-commerce systems provider that enables electronic manufacturers to deliver trading exchange, auction and shopping venues. The company provides an Internet based trading exchange and marketplace for the electronics manufacturing and assembly industry, as the leading business-to-business provider (source: www.fastparts.com).

Fastparts.com WBSS has sold \$140 billion in electronic parts and hundreds of millions of dollars in manufacturing

equipment. Fastparts.com serves as a 'spot market' where OEMs, contract manufacturers, distributors, and part makers buy and sell electronic parts at market-driven prices, providing franchised supply service. In addition, FastParts.com periodically offers various inventories to sell its members' products on Internet auction. Auctions are pre-announced to all members, and bidding is generally open for two or three days. Though anyone can use the FastParts.com shopping architecture to access information on parts, price and availability, the actual bidding, buying or selling of parts requires membership. There is no charge to become a member. All members must agree to abide and be bound by the FastParts.com operating rules and protocols (source: www.fastparts.com).

4. Characteristics Analysis of The Four Categories

We can analyze the distinguishing characteristics of the four categories of WBSS as follows. Firstly, the relationship between seller and WBSS is examined. For example, some sellers are themselves owners of the WBSS, whilst others are a lessee or brokerage within the WBSS [5, 14]. The second focuses on the number of sellers [24, 25]. The third considers product type [11, 18], and the fourth, the responsibility of guarantee for the product sold [25, 18]. Based on these analyses of each type of WBSS, a suitable firm that is well-matched with the four types of WBSS is suggested [11, 25]. Next, we illustrate the strength of the four types of WBSS [14]. An attempt is then made to analyze the strategy type of each WBSS, in accordance with the strategic options suggested by Wiseman [27]. These are: differentiation, cost, innovation, growth and alliance. Differentiation is defined as making a distinction between product and service in comparison to a competitor's. Cost is a competitive advantage that is achieved through an increase in competitors' costs, or a decrease in one's own

cost. Innovation is the act that renovates the product or the service. Growth is achieved through product variety, the expansion of marketing areas, and the increase in the number of business transactions. Alliance gains competitive advantage through firms joining together, inter-organizational agreements, and joint investment. Finally, we consider critical success factors to continuously maintain the competitive advantage of the four types of WBSS. Critical success factors (CSF) are defined as “the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization” [22]. According to the eight analysis domains defined above, detailed characteristics of four types of WBSS are investigated.

4.1 General-Direct-Sales (GDS)

The general-direct-sales type is applicable to direct sales and multiple products. This type uses the WBSS to sell many products that are identical to those of an actual department store. As can be seen in the Hansol CSN case, this type is itself an owner of the WBSS as well as the only seller, selling several kinds of products to multiple buyers in the world. The GDS type is therefore directly responsible for the guarantee of the product sold. As seen in the Hansol CSN case, these types of WBSS are in keen competition with each other. Therefore, a differentiation strategy will be well-matched with this type, with a new to gaining a competitive advantage through differentiation of service or product, in comparison to other competitor WBSS.

The strength of the GDS type is that it provides a cyber warehouse which needs less initial investment expense and staff requirement, in comparison to actual department stores. Therefore, the GDS type can not only make high profits due to a reduction in maintenance and other costs, but it can also solve traffic and parking problems, because customers do not need to leave home to go shopping.

The CSF of this type of WBSS are achieved by utilizing customer information and by having a creative design of WBSS [3]. Firstly, the application of consumer information increases customer satisfaction, which itself facilitates a successful competitive advantage of this type. This is because utilizing customer information can reduce a customer’s search time, through a quick response of product and service based on the customer database accumulated by Web-based shopping [24]. Secondly, customers indicate that they prefer new and attractive features of WBSS, which create a feeling of shopping at a real department store. Thus, this type of WBSS needs a creative design based on the latest information communication technology (ICT); such as virtual reality, multimedia, being three dimensional and intelligent agents [24]. For example, multimedia and virtual reality types of architecture are able to present the customer with an interesting experience, somewhat similar to shopping at real department stores.

4.2 General-Intermediary-Sales (GIS)

The general-intermediary type of WBSS is suitable for indirect sales and multiple products. This type includes many shops such as book stores, computer shops, gift shops, wine stores, sports stores, and so on. This type of WBSS sells customers various kinds of products via several different cyber shops. In the case of ShopNow.com, there are many sellers dealing in several types of products for a variety of customers in the global electronic market. These sellers are lessees within the GIS. Thus, the GIS itself has an indirect responsibility for products sold, because individual sellers within the GIS are directly responsible for the products.

This type of WBSS provides a strategic opportunity to small- and medium-sized enterprises, which are faced with a shortage of funds, human resources and technical

expertise in comparison to larger companies. This is because this type of WBSS allows relatively easy and low-cost entry of small- and medium-sized enterprises into Web-based shopping business areas. Namely, those small- and medium-sized companies that have never carried out traditional online business can undertake Internet business thereby extending their marketing territory [24].

The strength of the GIS type of WBSS is that it provides various cyber malls that customers can choose according to their needs and preferences. This kind of selective buying can serve as a major attraction to customers, as compared to other types of WBSS. However, it is important for shops within GIS to maintain a high quality of products and services, because this can influence customer satisfaction, which in turn affects the successful diffusion of GIS.

Other types of WBSS cannot establish the variety of shops, nor provide the range of products that the GIS type can, due to limited capability such as systems management, operating costs and human resources. Therefore, GIS has a competitive advantage over other types of WBSS, and has a greater capacity for growth, through its ability to provide a diversity of products, a high quality service, and many kinds of shops. Thus, the most suitable strategy for the GIS would appear to be a growth strategy.

As seen in the ShopNow.com case, there are many shops and varieties of products within the GIS type. When customers visit this type of WBSS to make a purchase, they can have difficulty in finding the product best suited to their preference. Therefore, by providing a comparative shopping function based on intelligent search engines [23, 24], the GIS type of WBSS can support the customer in finding the best priced or highest quality products without spending considerable time searching for several cyber stores. Thus, the CSF of this type of WBSS is its effective comparative shopping function, which in turn will increase its advantage.

4.3 Specialized-Direct-Sales (SDS)

The specialized-direct-sales type is a specialized WBSS dealing with direct sales and single products. As can be seen in the case of Dell.com, the seller is identical to the owner of the SDS system. Thus, the seller is a single seller as well as an owner of the SDS type of WBSS. As a result, the SDS itself bears direct responsibility for the product sold.

This type of WBSS provides opportunities for global marketing to manufacturing companies and smaller shops, which have limited capital and business resources. For example, manufacturing companies can sell products directly to the customer without any intermediary. Also, this WBSS type will help smaller shops to become 'Giants of marketing', competing with giant corporations, because physical size is not an important factor in determining market strength.

The strength of the SDS type lies in its ability to provide a specialized cyber shop. Organizations that have limited resources can efficiently focus their capabilities in selling a specialized single product. The initial stage of Dell.com is a major example of this type of application. The SDS type needs to concentrate on a cost strategy, as in the case of Dell.com, since it is necessary to maintain low prices for specialized products, in comparison to other types of WBSS, which sells various kinds of products. Through the lowered cost of selling products, these kinds of WBSS will have a competitive advantage against general types of WBSS.

A CSF for the SDS type of WBSS is specialization. The focus is on one top priority out of service, cost, quality or speed related to the Web-based shopping business, in order to have a competitive advantage with other WBSS. In addition, people are under considerable time constraints in this day and age. If customers discover that this type of WBSS makes it easier to purchase the hard-to-find-products they prefer [8], customer satisfaction is likely to increase.

This is a major advantage of this type of WBSS.

4.4 Specialized-Intermediary-Sales (SIS)

This type of WBSS sells single products indirectly. This type of WBSS can be thought of as a basic level of a virtual organization that links people, assets and ideas to create and distribute products and service [13, 9]. This is because buyers and sellers can negotiate and trade products, services and information in real-time, based on a specialized-intermediary-sales shopping architecture. As can be seen in the case of Fastparts.com, there are many sellers, selling a single product, within SIS. These sellers take on the role of broker. Thus, the SIS type itself has an indirect responsibility for the product sold, because individual sellers within the SIS type of WBSS are directly responsible for the product guarantee.

The SIS architecture can offer a significant opportunity for auction market, in particular, and acts as an intermediary between seller and buyer. Therefore, the SIS type needs to be kept up-to-date to provide the most recent data on products and services, because companies may want to access the latest information related to their market. The strength of the SIS type of WBSS is that it plays the role of cyber agent, able to support business-to-business electronic commerce. Its role as cyber agent between businesses is a basic form of virtual organization, because the key attribute of a virtual organization is strategic alliances or partnering [9].

As can be seen in the Fastparts.com example, the successful diffusion of this type of WBSS will depend on alliances and tight co-ordination with various WBSS. Therefore, an alliance strategy is well matched with this type of WBSS in order to gain a competitive advantage, because firms can negotiate directly with each other and trade products and services with other types of WBSS.

The CSF at play here is risk management. For example,

this WBSS type mediates business transactions between businesses, so that the SIS type requires strong risk management against electronic fraud or theft that can occur in business-to-business transactions [17]. If the SDS type reduces the risk associated with Web-based shopping, customers will trust this architecture to provide a safe and secure service. Such trust can lead to a strong competitive advantage for the SDS type in comparison to other architectures.

5. Conclusion

In these relatively early days of electronic commerce, WBSS are offering organizations new opportunities to undertake Web-based shopping around the world. However, in spite of this, many WBSS are disappearing from the Internet business world, whilst other organizations such as eBay.com, Amazon.com, and Tesco.com, are growing in global electronic markets, providing a new business model. Successfully utilizing and upgrading WBSS to survive in the e-business world is still far from easy, apparently. Hence the need for research of the kind described here.

WBSS are diffusing rapidly across national boundaries. A growing number of companies are taking advantage of WBSS by selling products, services and information, ranging from groceries to department stores, from SMEs to large firms, and from young organizations to established organizations. WBSS not only increase the ability of organizations to trade with customers, but also offer firms a new opportunity to reach millions of global clients worldwide. In addition, WBSS have the potential to radically change the way businesses interact with their customers. The traditional roles of manufacturers, distributors and suppliers are blurring as a result of WBSS. Within the Web-based shopping environment, customers should be the ultimate winners, because they can quickly compare products and prices from a global range of seller

faster and more easily than ever before, putting them in a better bargaining position.

Given this as background, this research has attempted to develop a classification model of WBSS and to analyze the characteristics of four types of WBSS. In building this model, we have classified WBSS into the following four types: 1) general-direct-sales (GDS); 2) general-intermediary-sales (GIS); 3) specialized-direct-sales (SDS);

and 4) specialized-intermediary-sales (SIS). The classification model provides what is hoped to be a useful theoretical background for further studies of WBSS.

We have analyzed the major characteristics of the four types of WBSS utilizing appropriate examples from practice. As a result of this analysis, specific characteristics are synthesized in Table 2.

Table 2. Characteristics of the Four Types of WBSS

Analysis Domain	Types of WBSS			
	GDS	GIS	SDS	SIS
Seller Character	• Owner	• Lessee	• Host	• Brokerage
Seller Number	• Single	• Multiple	• Single	• Multiple
Product Type	• Multiple	• Multiple	• Single	• Single
Guarantee of Product Sold	• Direct	• Indirect	• Direct	• Indirect
Suitable Firm	• Department store	• Small-medium Enterprise	• Shop • Manufacture	• Auction
Strength	• Cyber Warehouse	• Cyber Malls	• Cyber Shop	• Cyber Agent
Strategy Type	• Differentiation	• Growth	• Cost	• Alliance
CSF	• Dynamic information • Creative development of WBSS	• Diversification • Support of comparative shopping	• Specialization • Easy buying of hard-to-find product	• Connection • Risk Management

As shown in Table 2, the four kinds of WBSS have different characteristics, with each having their own strengths and weaknesses as an enabler of new business. As such, the development of new business processes, strategic planning, and system architectures should be necessary for success. The characteristics of the four categories of WBSS provide insight for researchers investigating new research subjects related to Web-based shopping and Internet business, and potentially helpful guidelines for practitioners seeking ways to gain sustainable advantages over their competitors from e-business.

However, since this research is an exploratory study on WBSS, the number of cases analyzed to explain each type is limited. Therefore, it may be fruitful for further research to analyze more cases to test the utility of the proposed

model, in particular focusing on certain types of WBSS architecture. In addition, there are like to be some examples that do not fit the four types of WBSS identified. For example, Amazon.com is well known as a specialized book selling dot-com company. However, Amazon.com is actually selling other products such as CDs, software and so on. Thus, it is necessary to be cautious in applying the model.

It is hoped that this groundwork, and the subsequent results generated by this paper, can provide both theoretical and practical contributions. From the theoretical perspective, this study proposes a model of WBSS classification and characteristics of four types of WBSS. It can therefore be utilized in research related to Web-based shopping and electronic commerce by providing theoretical basis for

further study. From the practical perspective, since organizations around world are interested in the Internet business, there is hope that this study will pave potentially guidelines for organizations looking for appropriate ways of undertaking Web-based shopping business.

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