Online kiosks: the alternative to mobile technologies for mobile users

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ABSTRACT

Online kiosks have the potential to be a significant alternative to mobile technologies in retailing, information provision and service delivery. This article describes the development and use of different types of online kiosk in contexts where users are on the move and away from fixed technologies. A case study of a major UK airport terminal is used to illustrate different types of kiosk applications. Comparisons are made with mobile phone technologies. Online kiosks have a niche in allowing access to information, services and e-commerce technologies for all potential consumers. However, they also have a much wider role in self-managed, self-service delivery of information, services, goods and relationships to consumers on the move.

KEYWORDS

Online kiosks; information kiosks; mobile technologies

INTRODUCTION

Online kiosks, sometimes described as information kiosks or public access kiosks, are an alternative to mobile technology for 'customers on the move'. Appropriately located kiosks can be used by consumers as they pass through public concourses, such as railway stations, airports and shopping centres. In contrast to the other public access information arena, the Internet, kiosks have received little media, professional or academic attention (Nicholas, 2001).

Kiosks are an alternative to mobile technologies for the consumer away from fixed technology in the home or the workplace. Instead of carrying the technology with them, kiosks are located in concourses through which users are likely to pass. Kiosks have none of the disadvantages of portable technologies, such as small screen size and difficult to manipulate keyboards, so may be extremely attractive to some user groups. This article outlines the technology and applications of kiosks, drawing on a case study of kiosks. Comparisons with mobile technologies are made throughout. Kiosks are evaluated as an alternative to mobile technology for customers on the move.

The article commences with an overview of the literature and research on online kiosks. The second section compares kiosks with other e-business access technologies, in particular, mobile phones with WAP facilities. An exploratory case study based on the kiosks available to customers in a major international airport illustrates the use of multiple kiosks supporting different functions in one public concourse. Finally, a model for differentiating between applications that favour kiosks and those that favour mobile technologies is proposed.

BACKGROUND AND LITERATURE REVIEW

Information kiosks, online kiosks or public access kiosks predate the recent growing interest in e-commerce. Early kiosks, such as those reviewed by Rowley (1995), were typically uninteresting boxes with relatively simple interfaces, designed specifically to allow customers to conduct a simple transaction, such as placing an order, or locating a specific item of information. In the last two to three years kiosks are much more in evidence, and simultaneously much more diverse in the range of functions that they support.

Figure 1: Comparing early kiosks with latest developments

	Early Kiosks	Recent Kiosks
Physical characteristics	Uninteresting boxes, static displays	Eye-catching housings, consistent with corporate image. Moving images
Dialog design	Menu based access to a limited number of screens. Touch screen	Web/Windows-like interfaces, with data entry dialog boxes, dropdown lists, scroll bars, pointer and hyperlinks. Touch screen supplemented by keyboard and trackball
Location	In-store, in a corner	In store and in public thoroughfares; always centrally positioned
Philosophy	Task based	Customer service based
Originator	Service provider or retailer	Retailer, infomediary or assembler
Transaction	Single transaction	Single or multiple transactions, together with communication and information provision
Connectivity	Stand alone or connected to one proprietary database	Internet enabled for real-time information provision and communication.

Various typologies of such kiosks have been proposed. Tung and Tan (1998) suggest four categories of kiosk usage:

- Type I: Low transaction/low information;
- Type II: High transaction;
- Type III: Pure information dissemination
- Type IV: High transaction/high information.

This classification focuses on the balance in functionality between information access and transactions. Rowley and Slack (2002) extend this model to include additional dimensions in the taxonomy: interaction and relationships. They propose four main functions for kiosks:

- Inform – information provision and promotion
- Interact – information exchange between users and the kiosk

- Transact – commerce and sales
- Relate – forge or strengthen relationships between the customer and the retailer.

Kiosks may incorporate one or more of these functions. Indeed, another useful approach to kiosk classification is on the basis of the number of functions that they support. Some kiosks perform one function, such as the calculation of a mortgage of loan repayment, or the selection and sale of railway tickets, whereas others are multi-function providing, for example, ticket sales, information, maps, e-mail facilities and Web searching options.

Developing this theme of the functionality of kiosks leads to the identification of two distinct categories of kiosk:

- In-store – Typically located in a specific store or retail outlet, these kiosks are managed by the store and used as an alternative channel for service delivery in respect of a limited number of retail transactions. Examples include pharmacy and supermarket based loyalty kiosks, kiosks providing catalogue-type product information, and kiosks offering information on wider issues associated with products, such as gardening tips, cooking recipes, wine selection. Such kiosks often have a relatively simple and sometimes largely linear dialog so customers can conduct the transaction quickly. Successful kiosks are visible and often placed near to the entrance to the store, sometimes with evident human customer assistance on-hand to assist new kiosk users. The kiosk housing and content will continue the corporate image of the store, and opportunities for promotion will be taken. The audience is the store's customers or, at the very least, visitors. Kiosks may be used by individuals, but are also often accessed by one customer, whilst one or more members of a family or group of friends stand watching or access an adjacent kiosk.

- Customer-context kiosks (Slack and Rowley, 2002) are typically located in a public concourse or thoroughfare, such as a shopping mall, high street, hotel lobby, airport, or railway station. Such kiosks are designed to add value to the customer experience and, in particular, will often be used by customers who are waiting and have time to browse a kiosk. Such customers may be alone or a member of a travelling group; they may be travelling for business or leisure.

Customer-context kiosks are managed by a kiosk company or infomediary, on behalf of a range of stakeholders, that typically might include:

- information providers (who will be paid for this role),
- a mall or concourse operator whose primary objective in terms of the kiosk is to enhance the customer experience (possibly an airport authority, a local authority, or a shopping centre management company)
- advertisers (for example, stores, theatres, car hire companies, travel insurance vendors) who will need to pay for the promotional opportunities that are facilitated by the kiosk.

Compared with in-store kiosks these kiosks often have relatively complex interfaces and increasingly have keyboards to facilitate effective interaction.

Both categories of kiosk differ from earlier kiosks, in that the focus has shifted from task to customer. Kiosk designers are selective in the information, functions and transactions to which they provide access. This selectivity reduces the learning and navigation burden on the user and allows the kind of short interactions (say, less than five minutes) that users are likely to have with a public access kiosk to be effective. In many functions, kiosks are used as a substitute for interaction with a service agent and typically they would only expect to engage with such agents for either a transaction or information for ten minutes or less. Nevertheless, critics would argue that kiosks remain under-used.

The taxonomies discussed above use kiosk objectives and functionality as the primary dimension for classification. Task is only one of the dimensions identified by Rowley and Slack (1998; 2002) as a basis for the analysis of kiosks. They also use audience, environment and technology as dimensions that can be used to characterise and differentiate kiosks. This may lead to the question of the range of insights into the user behaviour with kiosks. Nicholas et al confirm that knowledge of user behaviour is very limited (in the public arena – kiosk operators may know more about the response to their own kiosks):

'*yet very little is known about their use and impact, despite the fact that kiosks represent a very different retrieval platform from the personal computer or the WAP mobile phone'*. (2001; p.61)

Nicholas et al (2001) describe one part of an extended study, funded by the Department of Health, that they are conducting with 70 health kiosks located throughout the UK. The aim of their study is to develop and test a set of metrics that are appropriate to the evaluation of touch screen information kiosks, and that could be generated routinely from the use logs. Their study demonstrates that aggregate use patterns give an imperfect picture because session length, page view time, and session view time tend to be skewed and the use of arithmetic means provides biased estimates. Additional measures such as print, session length and grouping of users are helpful in interpreting the data. One important feature of use that has emerged is the differences between age groups. For example, those aged over 75 years record the smallest number of page views per session. The under 15 age group records a very similar page view frequency, but a longer session length. The 36-55 age group views the greatest number of pages and has the longest session length.

The research above is complemented by a study reported by Ashford et al (2001), conducted on a kiosk in Knowlsey. That study uses a multifaceted methodology, including a significant questionnaire based survey, individual interview and focus groups to create a picture of kiosks usage. Significantly, ninety percent of those surveyed did not use the kiosk. Results summarise behaviour and attitudes of both users and non-users. Interestingly, there is a correlation between the perceived usefulness of the kiosk and the user's frequency of access. In general however there is a recognition that the awareness of the kiosk and its potential benefits is low and that promotional strategies are necessary to encourage users to explore what the kiosks could offer them. In addition, comments are made on the importance of kiosk location (this kiosk is located in the open air on a busy high street), kiosk design and maintenance. Exploration of competing service points such as Internet access through work, home PC or the local public library and personal and telephone contact with service providers highlight some barriers to kiosk use. These include technophobia, and the sense of reassurance associated with personal contact and concerns about security. The kiosk is seen as useful for less important matters such as general email, or finding information on leisure facilities or jobs. The researchers conclude that there is considerable scope for further work on the usage of kiosks. This might examine user behaviour in relation to different categories of kiosk and amongst different user

groups and also explore the relationship between kiosk use and Internet access through other channels, such as mobile technologies.

ISSUES: KIOSKS OR MOBILE TECHNOLOGIES

The choice between kiosks and mobile technologies can be represented by the choice between ownership (of the Internet access device) and access on demand. The relative price of each of these options for different levels and types of use might be a significant factor in determining the respective roles of each channel. Many proponents of mobile technologies would argue that mobile phones are so ubiquitous that the battle has already been fought and kiosks have lost. Palazzo et al (2000) report the development of worldwide coverage by both mobile communications and mobile computing and indicate that management of the data needed for both terminal and personal mobility will become increasingly complex. As mobile devices become more portable there is a view that working processes (and possibly, leisure processes) will change, but it is seen (Lipperts and Park, 1999) that there is an equal need to ensure user mobility and independence from specific devices.

However, the technological landscape is dynamic and other battles remain to be fought. The plethora of current developments in mobile technologies, from bandwidth enhancement to fold out screens and keyboards, bear sufficient witness to the recognised limitations of mobile technologies for Internet access. Further, it is always wise to remember that industry leaders can make projections that users can conspire to prove to be inaccurate, to such an extent that revenue models have to change. For example, few foresaw the importance of text messaging on mobile phones; and early revenue models were based on annual subscriptions, whereas pay-as-you-go has become a much more popular payment option with consumers. In addition, however high penetration of specific technologies may be, they rarely hit 80 percent, let alone 100 percent. This leaves a significant niche group disenfranchised unless other options are available to them. All of these factors mean that it is sensible to keep kiosks on the agenda for communication with customers, consumers and the general public and to seek to understand the unique contribution to ‘mobile’ communication that can be made through kiosks.

KIOSKS AND MOBILE TECHNOLOGIES: A COMPARISON

This section first explores kiosk technology then, using a range of factors that affect the use of specific technological channels, compares kiosks and mobile phone technology.

The kiosk is normally a computer located in a stylish box with a screen fixed at a level that is convenient for users who stand by the machine. The computer may either be stand-alone or, more commonly, networked to provide access to organisational databases and/or Internet resources. Typically interaction is through a touch screen interface. The user touches 'buttons' on the screen and selects specified transactions. Some kiosks also have:

- card readers, possibly to support payment,
- keyboards, for more complex data entry
- printers, to print extracts from a database that represents the response to a query (such as a map, or tickets, or a receipt for travel).

Our empirical observations have identified the following factors, sumarised in Figure 2, as determining penetration and application of competing mobile technologies and kiosks:

- *Lifestyle* of the market segments – are people on the move? Where are they located? When do they want to collect information or conduct transactions? Kiosks may have a particular role in providing general public access and targeting customers or the public in specific locations.
- *Penetration of technology* – both within specific countries and within specific segments. For mobile technologies this penetration is partly due to the promotional activities of the industry and partly controlled by consumer take-up. For kiosks, retailers and others responsible for public areas can control the situation.
- *Bandwidth* and other characteristics of connections. Lack of bandwidth may be a particular inhibitor in the delivery of multimedia applications.
- *Cost* of the equipment and the ongoing cost of the use of connections.
- *Reliability*, with problems most likely to be associated with connection.
- *Size of display*, which affects the information and interaction options that can be made available at one time.

- *Input options*, ranging from touch screen, keypad, to full function keyboard and, ultimately, voice.
- *Integration* with other functions, such as calculations and the creation and storage of local databases and documents.
- The opportunity to maintain a *print record* of any transactions or information.

Figure 2: Comparing kiosks and mobile phone technology

Characteristic	**Kiosk**	**Mobile Phone Technology**
User Lifestyle	General public, travellers, shoppers	Young, upwardly mobile, young professionals, students
Penetration	Under control of kiosk provider e.g. retailer	Varying between countries and market segments
Bandwidth	High	Lower – awaits enhancement
Cost to User	Depends on business model – may be free	Handset and ongoing contract fees or call charges
Reliability	Good	Depends on 'network' coverage
Size of display	Large	Small, unless enhanced
Input options	Touch screen, full function keyboard	Keypad dominates
Integration	Database and functions controlled by kiosk provider	Information may be downloaded to PC (Information provider may have difficulty controlling downloading)
Printout option	Tickets, maps, receipts, information (e.g. recipes), vouchers, coupons	Constrained by user's installation – often no print option.

CASE STUDY: A MAJOR UK INTERNATIONAL AIRPORT

Detailed observation of a number of online kiosks located in a British international airport terminal was carried out. The kiosks described are all located in contexts in which the customer is 'on the move'. All of these were encountered on the land side; air side facilities were confined to self-service vending machines. The kiosks have been analysed by their environment, audience, task and technology and the case study forms a foundation for proposals for further research and application development in this area.

This is an environment in which self-service machines are common. Airline passengers are waiting or moving through a concourse and a variety of machines are available to support the completion of the tasks that travellers need to perform. Examples may be: the car park pay station, a self-service photograph machine, soft drinks and confectionery vending machines. Kiosks, therefore, are a natural addition to the array of facilities available. Some of them are task based and are an alternative to a human service agent. Others enhance the user experience either by offering the opportunity to complete transactions that would otherwise not be possible (taking out last minute travel insurance, sending flowers for a special occasion), to communicate with friends and relatives, or to search for local, regional or global information.

Description of kiosks

Lufthansa Quick Check-In

Two Lufthansa Quick Check-In kiosks are located just through the main entrance to the departure lounge, a few metres away from the check-in desks. The potential audience is passengers holding a Lufthansa ticket; this is a relatively significant, but restricted segment. The kiosks allow customers to check in or to purchase a ticket for travel using a credit or debit card. The kiosks are dressed in Lufthansa colours of yellow, orange and grey and carry the Lufthansa brand logo. There is information attached to the kiosk housing indicating the items that passengers are not permitted to take on board, or to carry inside their luggage and there is an illuminated display at the top of the kiosks to attract attention.

BA self-service check in

There are eleven ‘e service’ kiosks located in the main British Airways terminal. The potential audience is passengers holding a BA ticket, or wishing to fly with British Airways. The kiosks allow customers either to check in or to purchase a ticket by credit or debit card. The kiosks are large and grey, in an unattractive old-fashioned housing. (They also hum noisily, which reminded us of old mainframe computers!)

Internet Kiosk Co

A number of these kiosks are located in various parts of the departure lounge, typically in close proximity to seating. For example, two are along the wall at the back of a café area. In all cases they are visible, but discreet. The target group for this kiosk is travellers who would like to conduct transactions, communicate or collect information. However, the user group is restricted because to use the kiosk it is necessary to be a member. Members merely need to enter their user name and password to activate a connection. Non-members need to connect, and then to quit, follow on-screen instructions for registration and then to quit again to re-launch the Web browser. This is somewhat tedious and may be a deterrent to the casual user. Extensive use is likely to depend upon these kiosks being widely available, so that there is a large group of registered users. The kiosk provides access to the Internet, including e-mail and the user has to pay £1 to activate the kiosk for 10 minutes of Internet access. The kiosk has a blue and grey housing that is consistent with the adjacent grey floors and pillars, and merges well into the environment.

Radisson Hotel Internet kiosk

Two kiosks are located side by side in the lobby of the airport’s Radisson Hotel. The potential audience is anyone entering the hotel, either as a visitor or guest. An on-screen banner announces “View emails, latest news, keep in touch and up to date” together with today’s date. The kiosk provides access to MSN and BBC Internet services at a cost of £1 for 10 minutes. The kiosks match the environment in a blond wood and metal housing, with co-ordinated seating.

WAM World kiosk

The kiosk is part of a unit that incorporates a moving text display at the top, with two television screens below this and then an illuminated display showing the information

on the kiosk and, finally the screen and the keyboard at normally standing operator level. The keyboard is inset into a shelf, which is useful for placing a purse on or making a note of information. Underneath the shelf there is a card slot and a printer slot. These components are not very effectively integrated, since there is no overall kiosk housing, although they are all mounted on a central pillar. The kiosk is designed to attract passengers in transit and waiting for departure (Rowley and Slack, 1999) who may show an interest in any activities that make their wait pass more quickly. This kiosk is free to users, offering location information within the airport terminals for travellers who are unlikely to be familiar with their surroundings. It also offers a number of other services of value to travellers, such as instant travel insurance at competitive rates. The main screen uses simple touch screen buttons and a keyboard is essential for a number of applications. However, on testing, this keyboard has poor response characteristics, with several attempts being necessary to type a single character.

Boots Advantage Kiosk

The kiosk is located in the entrance to the Boots store on the main airport concourse. The customers of Boots the Chemists, primarily a female audience encompassing all ages, are users of this kiosk. To activate a kiosk the customer has to swipe their loyalty card through the kiosk. This allows the user to print coupons for special offers and to collect loyalty points on the card. A white housing with Boots corporate branding identifies the kiosk.

Access to public access kiosks such as those described above may meet the needs of customers on the move, without them resorting to the use of mobile devices. Figure 3 identifies these case study kiosks by their function and category.

Figure 3: Kiosks by function and category

Function	**Category**	**Kiosk**
Inform	-	-
Interact	Customer context	Internet Kiosk Co Radisson Hotel Internet

		WAM World Kiosk
Transact	Customer context	Lufthansa Quick Check-in BA Self-service Check-in
Relate	In store	Boots Advantage

[HYBRID CLICK-AND-MORTAR STRATEGY HERE? BROADER ONLINE/PHYSICAL STRATEGY?]

Analysis

Environment

All the kiosks in this environment are normally located in the line of view of users, but may be set against the wall or to one side so that they do not interfere with passenger movement around the terminal building. They are clearly visible and in locations where people would need to pass them. For example, one kiosk in a concourse area is neatly tucked in front of a pillar. This is possible because, unlike many kiosks, this is slim and less than 2 metres in height. People can walk past on both sides of the kiosk, but the pillar lends a location in which a user could pause and make use of the kiosk without obstructing other passengers.

Audience

The audience for transact kiosks such as those of Lufthansa and British Airways is likely to be frequent travellers who wish to avoid queues at the normal check-in desks or are on short European routes when baggage does not need to be checked in.

The target group for interact kiosks would include both business and leisure travellers, people travelling alone, in family groups or with others. Nationalities and native languages will be mixed in this environment so these Internet kiosks can provide information in a variety of familiar formats.

Task

The kiosks in this environment perform a number of tasks depending upon their function. Transact kiosks allow customers to purchase goods or services, such as airline or rail tickets, or to complete a purchase already booked online or by telephone. In an airport, this may be a ticketless electronic check-in facility.

Internet and other interact tasks will include searching for and obtaining information, accessing email accounts, news-gathering, even making e-commerce transactions if the kiosk has secure Web links. In some locations these kiosks are free to users; in other cases access may be provided at a small cost.

Relate kiosks are free to use, but the customer must possess a loyalty card for the store. Access is then provided to special offers, money-off coupons and other marketing messages designed to give the user a sense of community.

Technology

Transact kiosks frequently have touch screen technology and, in the examples seen here, have on-screen buttons to allow the selection of the language of the dialog (typically, English, French or German) and the number of passengers travelling. This is particularly important in the European environment. A credit/debit card slot enables payment to be made or confirmed and a printer may provide vouchers if necessary.

Interact kiosks tend to have keyboards and trackballs to assist users in searching and interacting with the Web based technology. In some cases cash and credit/debit card slots are provided for payment facilities and a printer facility may also be present.

Relate kiosks are, at present, rarely linked to Internet technology and, typically, are stand alone kiosks. They would normally employ touch screen technology, with a loyalty card slot or swipe reader and a printer slot for the production of coupons.

Summary

It can be seen that kiosks offer the potential for information and service provision in an environment where many people are on the move. One constraint on the use of mobile technology in this environment is its range. Travellers who might use a mobile device in their own country may not always be able, or may not choose, to enable that device while abroad – the local network technology may be incompatible or the cost of connection may be too great. This is one example of the continuing existence of national boundaries. Whilst it might be anticipated that such boundaries will gradually dissolve to support transactions across the developed world this process is likely to be much slower across other parts of the globe. This, in turn, strengthens the role for kiosks as an alternative to mobile technologies for mobile users.

FUTURE TRENDS

The development of kiosks over the last five years seems to indicate that within the next decade kiosks will be found in all retail outlets, in order to extend customer service, enhance product lines, facilitate special orders and improve the retail and communication experience. Already local governments and health authorities are experimenting with public access kiosks as a way of providing information and public services to all members of the community, whatever their status in terms of access to either fixed or mobile technologies (Ashford, 2001; Nicholas, 2001). Online kiosks in locations where people are mobile will offer an alternative medium for information, interaction, transaction and enhanced customer relations to all sectors of the population.

Further advances in kiosk use to enhance both retail and e-commerce experiences are even now being developed and tested. We have heard of (but, sadly, not yet experienced) a kiosk which allows sampling of perfume and ordering of the goods by size and product required (*eau de parfum*, cologne, body lotion), to be delivered to the address requested by the customer. Yet another kiosk takes measurements by sensor, offers designs and produces a T-shirt 'while you wait'. Both of these examples enhance e-commerce by placing the kiosk in a tactile environment. We can also see a future for kiosks using digital photography technology to deliver e-postcards. These developments are much closer for kiosk technology than for mobile phone technology.

One of the gulfs between online kiosks and mobile devices is that kiosks can be and are location and environment specific. Therefore retail and information providers can utilise their position for promotion of goods and services. We offer the following model (Figure 4) to illustrate how the functions of an online kiosk can be used in applications that favour a location specific task.

Figure 4: Applications which favour an online kiosk

Technology	**Online Kiosk**	**Mobile Phone**
Inform	Context specific information and marketing	General messages

	messages	
Interact	Searching and retrieval of information	Limited functionality
Transact	Commerce - an effective supplementary channel – location specific for coupons etc. E-commerce, but delivery requires an address. Example: Buying insurance using a kiosk can find information, form contract, make payment and print schedule.	WAP phone - can be used to order goods and services but there is no easy delivery method. Insurance can be done by phone, but delivery of schedule may be problematic
Relate	Customisation, community, loyalty. In-store there may be assistance with kiosk	Possible, but may be an 'individual community'. No assistance with WAP phone.

We believe that further research into the practical implications of online kiosk development would enhance the experience of mobile consumers in the environments described in this article. Aspects such as information mapping, understanding and matching information needs to user experience, evaluating different categories of information needed for different applications, are all areas that demand further study. Even seemingly simple issues such as the marketing messages used in online kiosks require systematic analysis.

Commercial and public organisations have been using first stand-alone and then online kiosks for a number of years. It seems that they wish to hide their technology from the public, and since 1995 we have seen kiosks come and go with no apparent strategic purpose. Now some of the major national stores in the UK are beginning to install kiosks and are discovering, to their surprise (it seems), that they are being used.

A major study of such kiosks, their users and their strategic development would be very timely.

CONCLUSION

Most of the online kiosks we have described in this article have been free to customers at the point of use. Kiosks that offer public services, tourist information, leisure and travel facilities such as check-in or rail tickets are unlikely to charge for the services they provide. Their business is selling transactions or dissemination of public information. This is not a competitive business for mobile technologies and so may well continue in its present form although, we hope, much improved as the technology develops.

The comparison here is really between mobile technologies and the Internet kiosks that require a payment in order to access their services. These are the competitors for the mobile technologies of WAP, Internet searching and emailing. Internet and telecommunication kiosks charge for email and Web access and for certain types of information because this is their business. Their service provides an alternative channel to the mobile phone and PDA.

In terms of the interface, that of the mobile phone is relatively constant; kiosks, however, are all different. A steeper learning curve is required by users, unless the kiosk is embedded in daily life, such as the use of the FastTicket kiosk for regular purchase of rail tickets (Rowley and Slack 2002). There is a niche for online kiosks in the mobile community and any kiosk that allows transactions also provides information. Information may be gathered at the time of the transaction or beforehand, in order to make a decision. So, in the sectors where payment is not required, certainly where nothing is paid up front, all potential customers can gather information and make decisions. The key issue is that no-one is disenfranchised from using an online kiosk. In a mobile age online kiosks are the technology for mobile users.

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