

# Scalable and interoperable e-commerce infrastructures: The Instant Commerce Server paradigm

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## SUMMARY

This paper asserts that to transform mainstream surfers to shoppers, we must focus on reinforcing a notion of widespread service and product availability addressing the subconscious fear that technology is for the select few. We present key requirements that our infrastructure has to address and a commercial platform that satisfies them.

**KEYWORDS:** e-commerce, infrastructure, instant commerce, networks.

## INTRODUCTION

Why did the automobile become one of the most ubiquitous artefacts of the 20<sup>th</sup> century? Because it was low-cost when compared to trains, ships and airplanes and it served well the needs of an industrialised world to transport people and, especially, goods to the doorsteps of the public. Its success, however, sparked and was supported by a whole range of infrastructures: gasoline stations, roads, dealers, maintenance garages and insurance services (not to mention the traffic police and state regulations). And, all along, the automobile industry delivered faster, safer and cheaper cars.

So, pedestrians and goods became travelers, as communications transformed the way people perceived the world during the industrial era. This is, then, the analog with today's world, as we see it being transformed by information technology: if we want people to start moving their habits on-line, we should adopt technologies and policies that demonstrate this holistic, integrated view. Note that politicians already talk about such infrastructures in the context of information superhighways.

The key to a successful on-line shopping experience is to make people perceive that everything needed for such an experience is already there, seamless and transparent, from competitive prices to security and ease-of-use. This is a key human-computer interaction (HCI) challenge. This paper discusses how a new commercial platform, the Instant Commerce Server (ICS), fits into the quest to transform e-surfers to e-shoppers.

## INFRASTRUCTURES FACILITATE PERCEPTION

Before addressing the key ingredients of an e-commerce infrastructure, let us underline that at least one of these, bandwidth, is beyond the scope of HCI expertise. Besides the obvious consideration that bandwidth (or the lack of it) does significantly affect the perception of service quality, the ultimate decision to build bandwidth is taken at a level well beyond the priorities of shoppers and store owners.

Applications, however, present an excellent opportunity for reinforcing HCI research and practise, and it is here that we claim that the biggest impact is to be made. The key challenge of HCI for e-commerce success is to underline and project the **implicit** notion of widespread product and service availability; to successfully overcome human inhibitions on trust, security and feel of comfort when shopping. We strongly feel that this is an issue of sound architectural design [1].

## A shopper's point of view

Why will a surfer become a shopper? After all, a brick-and-mortar shopper has come to expect a standard service when dealing with conventional businesses. Can an on-line experience live up to these expectations or, hopefully, surpass them?

There are three major issues that an on-line shop must address, each of which may individually be a bottleneck towards acceptance, if left unattended.

**Pricing.** The ultimate drive towards most buying decisions is a better price. It is also, contrary to Internet layman logic, the most difficult to achieve - and sustain. Traditional distribution channels are optimised for one type of business or the other; direct sales or retail or some else. The Internet mode of delivery (as of yet) is the courier postal service; when added on top of the price of a piece of merchandise, the percentage of overhead varies greatly when delivering a book or a home cinema system. Judging from the most favourite items of on-line shoppers, it does turn out that people are happier to make small payments, for which postal cost can be a significant cost factor. If a consumer is not satisfied that a shop provides a reasonably priced products list, with the

option to compare market prices, the chances are that this consumer will remain a surfer for that site.

**Security.** In the off-line world, a consumer can usually look-and-feel the goods to be bought; she may return them and substitute them or claim her money back; she can enjoy the shopping experience with the added guarantee that she actually receives what she paid for; she can be quite safe that she will not have her credit cards details inappropriately used, etc. Of course not all of these are really true, but it is the perception that counts. Cryptography for on-line credit card clearance is now a commodity and suggests that, when professionally implemented, security will be much more robust than having sales people handle paper transaction slips. Legislation for product delivery will ensure that an on-line consumer can claim her rights and, either through legislation or through technology, one can ensure a smoother on-line experience.

The interaction and perception problem, however, is a vicious cycle. When adverse publicity hits the news, and many established traditional businesses have every motive to stress such events, people expect to see even more security and guaranteed performance in on-line shops compared to off-line ones, and still they will not buy. Site owners with few sales may then find it expensive to maintain immaculate sites and problems will surface; and the cycle goes on.

**Interest.** No matter how value-for-money or secure, a dull site will probably take a long time to become a success. Investing on nice storefronts, reviewing stock and offers, offering a variety of goods and affiliating with fellow merchants has always been a critical factor in gaining and retaining customers.

#### **A store's point of view: low cost is king**

The above key ingredients of consuming behaviour deeply affect how an on-line business is run. Each one of them taxes the financial and organisational resources of the business.

Added to the need to address the above consumer behaviour elements, an on-line shop owner needs to be able to set-up and maintain a store-front and the associated merchandise in a most efficient way. If we consider the currently fashionable shop-in-shop mechanisms, establishing an on-line presence within various instances of digital real estate (shopping in portals, shopping in community sites, multi-channel product presentations, etc.) is a task that may have to be performed on the scale of several times a month, dangerously taxing the resources of a maintenance team.

However, it is only through such blitz-attack presences and efficient implementation and support of affiliation

and collaboration schemes, that the feeling of everywhere, on-the-spot availability will be reinforced in the eyes of the public.

Traditional businesses have no motive to become Internet converts fast, unless an order-of-magnitude gain is there to be realised. Reality has also shown that, up-to-now, this gain has been realised by financial analysts (forecasters) and early technology developers. We shall now describe how these gains can be, at last, effectively shared by on-line shops, merchants and consumers.

#### **THE INSTANT COMMERCE SERVER**

Based on the above principles it should come as no surprise that we feel the shops to be the entities most responsible for attracting consumers to the Internet. We have therefore created a platform that can seamlessly and inexpensively assist WWW sites (or sites to be) and merchants to establish and manage a fully customisable on-line presence.

#### **Supporting on-line distributors**

Assume that you manage a WWW site that operates as the central point of a niche group of surfers, for example, amateur astronomers. The site manager has to deal with updating the members, the news, the content, and finds out that what has started as a fanzine is slowly growing and demands attention. How does one go about generating revenue to support the site's operation?

A fashionable advice, though catastrophic, would be to charge for content. Consuming digital content, however, is not a task that is yet perceived as worth paying for. A much more reasonable thought would be to decide to invest in a commercial venture, designating part of the site to act as a storefront that is full of items that amateur astronomers are known to be after.

Establishing this channel can be a win-win situation for many parties: the site owner who generates commission revenue, the merchandise owner who may not have even dreamt of selling through the Internet and the amateur astronomer who suddenly is able to buy through advertisements in the specialised (digital) press. Add to it the possibility of the astronomy site owner to fully customise the presentation of the advertised products and it turns out that the storefront of the site changes in an absolutely controllable way.

The key for these to happen is, however, the backbone. How can all the parties be confident that the business logic as well as the revenue distribution will be effective and efficient? The answer is that the Instant Commerce Server (ICS) is a platform that seamlessly integrates cryptography, click-tracking and secure user registration and payment clearance, allowing storefront owners and merchants to simply upload product descriptions and

download product presentations. Providing, therefore, **all** the infrastructure required so that sites can be e-commerce enabled without **any** infrastructure modification is the key innovation of ICS in the establishment of distribution channels.

### Supporting off-line merchants

If you have merchandise to sell, yet feel uncertain about what kind of an investment an Internet presence requires, what can you do? A key answer here is to be ready to accept that an Internet presence is an advertisement presence and that you should consider new options of advertising your products with an ad-enhancing feature: click-and-buy.

A TV or any traditional ad works by building and sustaining a sub-conscious information (over)load about a product, in the hope that, when at a shop, a consumer will remember the ad, associate with it and respond by buying. By enhancing an on-line advertisement with buying capacity, the message not only becomes clearer, it becomes intimate, direct and generates an eminent buy-now feeling.

Recognising this differentiation, ICS, as described above, provides all the infrastructure so that buy-now enhanced advertisements can be created (on-the-fly) for any products that a merchant intends to communicate. Again, the key infrastructure consideration to make is that the merchant need **not** have **any** infrastructure. This is in line with current findings that suggest that conventional businesses should be conservative in their IT investments [2] and concentrate on their labor-added value [3].

### Supporting mediators at-large

The on-line distributor and the off-line merchant are the two key strongly disjoint entities that benefit from the operation of the ICS platform. However, as in the off-line world, the transport of goods to a consumer gets a whole chain of service providers rolling, so, here too, we can identify some other players who benefit. Again, we cannot state too strongly that we feel scalability of a service to relate not only to computing capacity and efficiency but, also, and quite as importantly, to the ability to smoothly integrate the different players of the service value chain, efficiently and effectively. This is what we term as **user-perceived scalability**. Having said that, ICS treats technical scalability as *sine qua non* [4].

The first category is a mixture of the above: merchants going on-line can utilise the platform to create product descriptions and customised presentations, for their own use, without requiring to invest in infrastructure. Actually, the platform guarantees a smooth transition towards in-house infrastructure, should such a decision be taken.

The other category, ISPs, is a breed of the Internet itself. An ISP can utilise ICS as a backbone to develop packaged e-commerce solutions for its hosting clients at a very competitive rate. The key consideration here is that existing and new sites can be effortlessly maintained through standard medium-level programming effort, while the transaction logic is seamlessly being handled by the ICS platform. This is also in line with the observation that application service provision (ASP) is emerging as the key outsourcing decision to be made in businesses moving on-line [5, 6].

One can now start enumerating features that the platform may already or should (at a later point) possess: profiling tools, cross-selling and cross-presentation tools, service hierarchies for merchants, customer relationship management targeted both at consumers and merchants and a battery of business enabling services that can be conceived and deployed when interested parties are able to establish network relationships. However, the fundamental structure does not need to change (see Figure 1 for the current architectural layers of ICS).

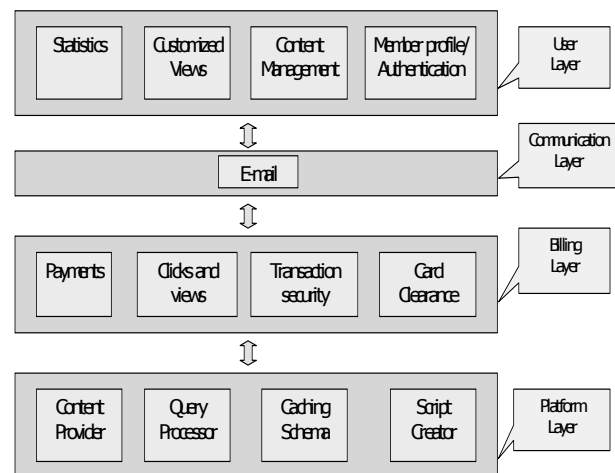
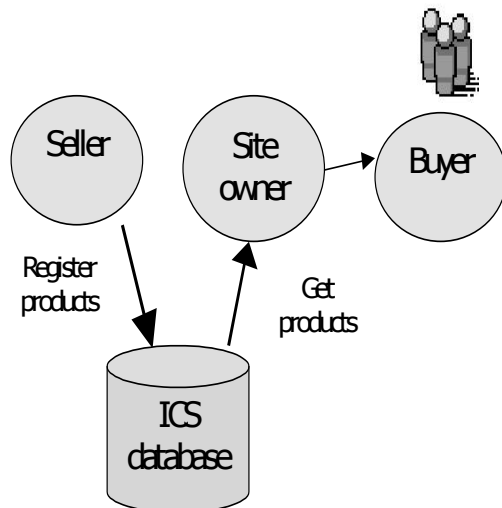


Figure 1: A coarse architecture of the ICS platform.

### The consumer's point of view

By providing minimal integration overhead requirements, the ICS platform promotes scalability and interoperability at a few "clicks" distance. This allows ICS-enabled sites to easily conform to emerging standards, should integration with marketplaces be required [7].

The consumer is, then, subjected to efficient presentation of secure buying features, with virtually unlimited product bundling and aesthetic freedom on the part of merchant sites. It is this ubiquity (see Figure 2 for a descriptive picture of how product descriptions are distributed through ICS) that sustains a feeling of a vibrant market, and it is a vibrant market that drives surfers to become shoppers.



**Figure 2:** Streamlining of product distributions.

### EPILOGUE

Supporting the supplier-consumer chain is what e-commerce is all about. Building tools that attempt to enforce a partial model of conducting business is not an option any longer. Integrated approaches that do not devalue existing infrastructure investments and can scale up on demand are definitely valuable and this paper has described an **existing commercial system** that adheres to these principles. The service is available at [www.icommerce.gr](http://www.icommerce.gr) and, at the time of writing this paper, the Instant Commerce Server platform is a globally unique solution.

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