

Foundations
for the
Ecosystem
of the
New Global Enterprise

**Business Service Networks
as
Conveyors of Value**

A whitepaper
from

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Background

The original topic of interest to the OECD meeting in December 2003 was for economic statistics. With Electronic Business Processes proliferating at a great, if not staggering pace, measuring the economic impact of them is highly necessary to get a true picture of the role of literally trillions of electronic interactions and transactions within world and various country, regional and local economies.

Overview

The subject matter of Electronic Business Processes has been part of my professional thinking for almost as long as I have been building systems—for over 40 years. As an undergraduate at the University of Pennsylvania, my first two years of programming was largely in the scientific/academic arena: inverting matrices for developing equations for guiding missiles, developing chemical information retrieval systems, and running the biomedical statistical routines against economic data for Lawrence Klein who eventually received a Nobel Prize for the work embodied in those numbers. My formal training is in physics, math and computer science, but life-long study of history, economics, music and art has gives a broader perspective that is the topic of this essay.

For the entirety of my career, the increasing pace of change in markets and in shrinking margins leads to thinking about faster, better, cheaper innovations within industries and at an ever more increasing pace. These reflections cover the past fifteen years of thinking around service oriented architectures and the electronic business processes that are created, supported and evolved using Information and Communications Technology. These are inchoate ideas, but one can readily see from public news and research about strategic partnerships, the computer industry is creating alliances and technologies for a better scalable, manageable infrastructure around Web Services layered on top of grid and utility computing. It is already happening, but in varying degrees of adoption and maturity. A great friend and colleague of mine in his three years at Cal Tech from 1968-71 heard a relevant aphorism there: “The future is here; only it’s not evenly distributed.”

This electronic business process infrastructure will support the emerging world economy of electronic business processes among the mosaic of highly interactive, integrated and semi-autonomous commercial entities.

Introduction

Contained here is a framework to describe, configure and measure how commercial entities integrate electronically at a very fine grained level of interaction. The level of granularity is micro-microeconomics or *Picoeconomics*. That is where the discussion begins. These comments will end in a discussion of the Ecosystem of new global enterprises who form value networks substantially around electronic business processes.

Most of the evidence in support of the work here is drawn from over 30 years experience in designing and building information systems for financial services and the capital markets. Additionally, extensive reading and discussion with researchers and business people further supports these ideas.

As a matter of applicability and context, the bias is to the Financial Services Industry. Financial Services are a pure information economy, and so, we are not constrained by the physical movement of goods. This is not quite true as security certificates still exist (in smaller and smaller number) and commodities are indeed a big global financial business. A naïve analysis of the difference between the global capital markets and global trade in goods and services (like tourism) leads one to postulate a 10:1 ratio in favor of Capital in pure monetary terms. Measurable Annual World Output is in the \$30-40 Trillion range. Daily trading in foreign currencies is in the \$2-3 Trillion range. Thus in a year, the Foreign Exchange Markets represent at least \$400 Trillion. Perhaps the comparison figure should be to international trade which is of course less than the total world product. However, it is the order of magnitude that is important. And, it is virtually all electronic. Foreign exchange represents the “cash payment” for international goods and services plus the movement and management of global capital. This itself is worthy of its own whitepaper, so no more time will be dedicated to this topic.

Second, with businesses transforming and globalizing at an unprecedented rate, the organizational focus of enterprises will require a slightly different construction around the evolving business processes. This new construction emphasizes services as the way to realize the business processes. Thus, (1) the concentration is on a framework to define, analyze and measure an piceconomic artifact called “Service Point,” and (2) the focus is on a notion of an organizational entity that makes up the Ecosystem and around which the analyses of electronic business processes and their constituent service points is performed.

The Ecosystems of Electronic Business Processes

Another fundamental assumption that bears calling out is that these ideas initially apply only to Free Market Economies that operate according to the 1991 Nobel Laureate in Economics, Ronald Coase.

First, in three volumes, respectively, French historian Fernand Braudel¹ posits and details three distinct layers to the World Economy of the 15th to 18th Centuries:

- That of **Favor Trading and Barter** in which money does not play a role and that is largely outside the purview of official observability—*The Structures of Every Day Life*;
- That of **Free Enterprise** where competition reigns supreme and change and transformation are mandatory to survive—*The Wheels of Commerce*;
- That of **Global Capital** wherein global trade and capital structures and arrangements are established and maintained—*The Perspective of the World*.

Braudel describes these as interacting of course, but the layers exist in their own autonomous right and provide much insight into how the world economy operates yet today. Electronic Business Processes operate primarily in the World Free Market

¹ Fernand Braudel, the late great French historian, produced a magnum opus in his three volume publication: **Civilization and Capitalism, 15th-18th Century**., English translations by Sian Reynolds published 1981, 1982 and 1984 by Harper Row.

Economy. In fact, they make this Economy ever more efficient at an increasing rate as we have come to see over the past 30 years.

Second, the 1991 Nobel Prize in Economics went to Ronald Coase for his relatively brief works in 1932 and 1937 in which he considers “The Nature of the Firm” and how non-zero transaction costs and how contracts create an orderly, efficient economic world. This work forms the intellectual underpinnings of the then emerging economic phenomenon known as the Internet and the World Wi

Service Point: The Picoeconomic Artifact

The **Service Point** is the central artifact to define and measure. Collections of Service Points yield the Business Services that implement the tasks of Electronic Business Processes.

Function Point, Precursor to Service Point

In the 70's when writing COBOL/CICS applications, we would measure, *a priori*, the amount of work in a system development based on a notion called "function point." A function point was either a function call or file interface. There was one platform, several mechanisms and a few environments to deal with. Life was relatively simple as there was not a lot of choice of how to implement our systems and IBM provided great engineering information on how to make the operations more efficient and manageable. This is NOT true in today's world of Information and Communications Technologies.

Service Point is a further abstraction of Function Point with other capabilities added. There is the idea of both supply and demand with respect to the functionality provided by a Service Point. It is obvious but worthy of noting that economies are primarily governed by supply and demand. If one is to have an effective artifact to measure economies of electronic business processes that use business services, then aspects of both need to be included in the abstraction.

Attributes of Service Points

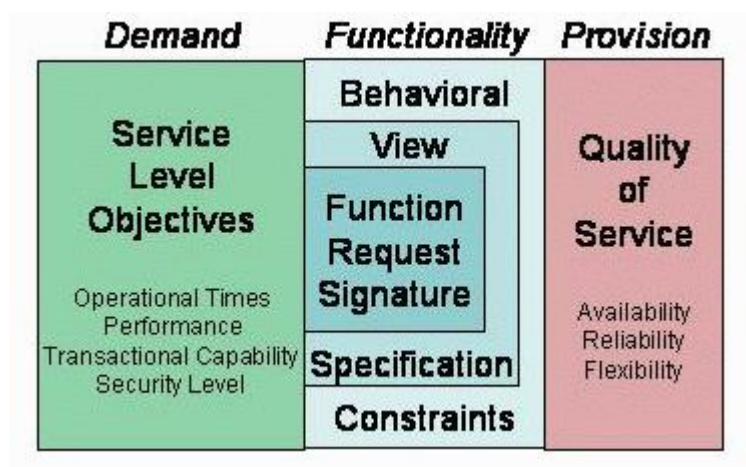


Figure 1: Relationships of Service Point Attributes

A Service Point supplies:

- An interface to request the service containing a name and list of parametric variables called the **function request signature**;
- A delineation of the data/information needed/provided called the **view specification**;
- A semantic specification of constraints on how the functionality is achieved in terms of input state (preconditions), operational state (invariants) and outputs

(post conditions)—borrowed from the field of programming by contract—called **behavior constraints**.

This is the functionality defined by the service point particularly when a formal business vocabulary exists to support the semantics of the constraints. It defines the computational requirements.

A Service Point needs to deliver on the consumer's requirements for Service in terms of

- Service Level Objectives
 - Operational Times: When is the service required to be enabled and operational
 - Performance: How does the service need to operate—e.g., transaction per second, user response times, data capacity and transmission rates
 - Transactional Capability: e.g., Best Efforts, No More Than Once, Once and Only Once, Fire and Forget
 - Security Level: e.g., Public, Client, Partner, Representative, Agent, Administrator

- Quality of Service
 - Availability: requirement for up-time
 - Reliability: error rates tolerance
 - Flexibility: time to change and test to meet competitive and evolving demands

Implied in this measure is substantial instrumentation, monitoring and operational data gathering and integration. Development of standards and reformation of firm system architectures are required to measure service points. Both are formidable undertakings. All this said doesn't mean we should not encourage it to happen. It is essential and necessary for us to really get our arms around the problem of measuring electronic business processes.

ICT vendors are beginning to move in the direction of providing technologies and services to provide the capabilities of instrumentation, monitoring and operational data gathering and integration. Now is the time for the ICT buyers to follow suit and buy them. This discussion is an essay to show both buyer and seller where the value is now and going forward.

The Role of Service Points in Electronic Business Processes

From an economic analysis point of view, Service Points are the substrate for implementing an Electronic Business Service. Important in this is the fungibility of different services to realize the same service points. This is the key characteristic that allows a true free market in Electronic Business Services.

Costing Service Points

While there are qualitative considerations in one firm using business services from another within Electronic Business Processes, employing the regimen suggested here goes a long way in understanding a firm's quantitative economic incentives to use or provide an Electronic Business Service. On the supply side, the cost structure of the Business Service (a set of cohering service points) can be measured by the cost to provision all the service points for each activity in a Business Process. The cost for benchmarking purposes should be "at the money" meaning there is no inherent discount or premium in the cost. Included also should be the "cost of carry" for the funds needed to do the provisioning. These cost of carry funds should be set at a benchmark rate based on the providing firm and the expected life of the ICT assets needed to do the provisioning. In short, this is the cost structure of the firm specific service utility that provides the Business Service based on the service points.

Finding the Value of Services Points

The hard part is in assessing the value of the Business Service to the consuming firm. Proposed here is a method that should give a good first approximation of such firm relative value of a service. Very few firms have the same pattern of client usage of a Business Service. Thus, each firm will have a different "loss of business cost" based on outages, both in terms of duration and time of occurrence. Second, as errors always occur, either machine or human, the "cost of error correction" is another dimension of determining a first approximation of value that is firm specific as well. Third, the hardest of these three dimensions of determining relative value is assessing market opportunity costs from competitive pressures to change a firm's business process. Inherent in this is the notion of opportunity cost based on time to market.

An initial approach is to look at sets of business services and the embodied cohering set of service points that define the Service Network around a larger set of Business Services. Competitive changes occur in two ways: feature enhancements for short-term changes and functional enhancements for longer-term changes. Delving deeper into this approach is the subject for yet another all-day discussion. So we leave it open for now and continue on in the interest of time.

Using Service Points as Measurement Device for Economic Value

Let's return to the level of the Business Service analysis and how two or more firms would establish business service agreements in the sense of Coase. We will consider the bi-lateral case as the multi-lateral differs only in some details. One should be able to see this when the bi-lateral case is done.

The Method

The method for determining economic value is at what we are calling the pico (i.e., micro micro) level. This would be to look at the listing of key capabilities (essential business processes) for two firms A and B. For all the Business Processes (BPs) of each firm respectively, measure the service points of the BPs according to the regimen just previously outlined. Next determine the nature of the BP relative to each firm: in terms of Geoffrey Moore's approach, Core—a competitive competence of the firm, and, Context—important but not considered a competitive competence.

The Coase Economic Value (CEV) is determined by enumerating all the inter-firm A and B business service agreements which make "sense" to contract out. By "sense" we mean "where the contracted out BP is Core to the contractor firm, but Context to the contracting firm." The CEV is then just the service point values minus the service point costs, for each service point in a firm's list of BPs. The bi-lateral service agreement economic gain/loss is the CEV of both firms without the bi-lateral agreement minus the CEV with the bi-lateral service agreements.

It is important to note that the contracting firm only gains value around the service points used from the contractor firm. Chances are if a BP is a firm's Core competence, they will have a richer set of service points than for a firm for whom the BP is just Context.

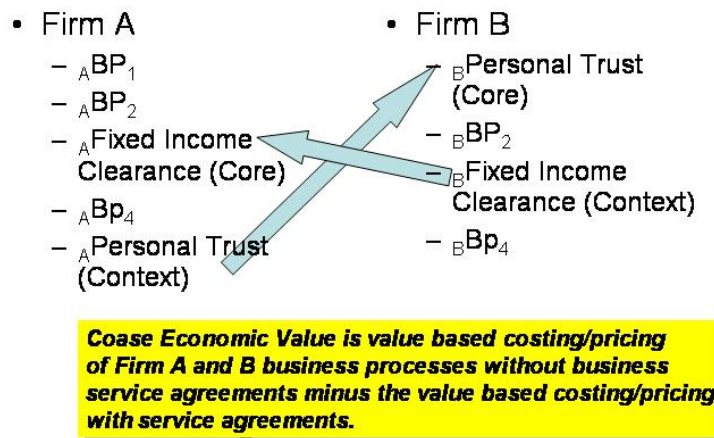


Figure 2: Outsourcing Context Business Processes

An Example

As an illustrative example, in Figure 1, consider two firms, A and B, with five and four business processes, respectively. Among their business processes are two common ones: Fixed Income Clearing and Personal Trust. For Firm A, these two BPs are Core and Context, respectively, while the opposite is the case for Firm B. This gives rise to a bilateral service agreement where Firm A provides Fixed Income Clearance as a Business Service to Firm B and vice versa on Personal Trust.

In this case one needs only to calculate the CEV for the Business Processes in the bilateral service agreement, to wit, Fixed Income Clearance and Personal Trust. Again space does not permit a deeper development of the example where the service points for each firm's relevant BPs would be enumerated and then the detailed calculations carried out. This is left as an exercise for the interested reader.

For the multi-lateral case, follow the direction of all agreements and include the common entities that will usually exist to provide service to many firms. In the case of the financial services industry, clearance corporations and depositories have this characteristic. Increasingly, Electronic Communication Networks (ECNs) and Exchanges can be seen in such a light. These entities are standardizing on IP as the means of connection and on XML-based protocols as the means of exchanging instructions. This is tending to make them more flexible and thus more easily interchanged. Moreover, many firms have multiple arrangements for business services like execution as a matter of flexibility and to overcome liquidity problems in various pools of assets associated with specific exchanges or ECNs. In the US, the market structure landscape is in great flux and I cannot make any more of a definitive statement.

The Inter-prise as Ecosystem Entity

What is the appropriate organizational structure in which the electronic business process economic activity will occur? We believe that one needs a slightly different construction than legal entity/holding companies as we know them today.

What is an Intrer-prise?

With the continual divestiture and acquisition activities among firms, a firm/legal entity/holding company frequently has multiple subordinate enterprises that duplicate business processes. So the entire analysis could apply to wholly or partially owned enterprises as well for autonomous entities in free markets. In this situation, there is great managerial focus and incentive to make the conglomerate and commercial network more efficient economically. Thus for the method of measuring value in the entities as we have described, we need a name that covers all situations of entity ownership and relationship. This is called the “**Inter-Prise**” to emphasize that these service agreements cover **Inter**-actions among Enter-**prises**, regardless of degree of independence. And so for all the discussion herein, the Inter-Prise is proposed as the unit of measurement. This is because this is where the opportunities are found for gaining Coase Economic Value in a Business Service Economy.

Some Concluding Thoughts for Further Development

As a postscript to the discussion today, note that there has been no accommodation for the existence of intermediary enterprises. All entities become a possible intermediary for other firms based on specific business processes. So Firm A with a great client base can now decide how to expand services to its clients—either build the capability or buy it via business service agreements.

In their still relevant book on the Internet Economy, **Blown to Bits** (Harvard Business Review, 2000), Philip Evans and Thomas Wurster posit that in information economies, because of the low barrier to entry and cost in creating business services, only two types of firms will remain: (1) the Client Facing Enterprise that assists consumers in navigating, analyzing and consuming the offerings of (2) the Large Producers of Products and Services. Intermediaries can exist for only short periods until their arbitrage advantage disappears via market efficiency.

Look at the case of CommerceOne which attempted to be such an intermediary. They are now on the brink of bankruptcy as they have been disintermediated from the very markets they tried to intermediate and arbitrage. On the other hand, the big US auto firms have established an e-commerce intermediary that is thriving through their combined buying power to encourage their suppliers to participate. So, the Old Economy powerhouses seem to glean great benefit from the New Economy.

One final question is how large a sector are pure Intermediaries and what are the qualitative factors that support their emergence, growth and sustainability or non-sustainability and death. This question is relegated to the big minds as I am consumed with figuring all these little details of inter/intra-firm business process integration via business services as measured by **Service Points**.