

# Missing Ingredients of Mass B2Bi

Introduction to Transactional Cascade® Technology Papers

Ivan Klianov, Managing Director & CTO



Published in June 2005 | Updated in March 2011

Copyright © 2011 Transactum  
All rights reserved

## B2Bi-Capable Infrastructure Exists for Years

To fulfill its functional requirements, any application for electronic Business-To-Business Integration (B2Bi) must be supported by infrastructure capable to enact the following features:

- **Concurrent sessions of stateful interactions**
- **Concurrent business process instances**
- **Concurrent complex transaction**

These features could have been built with application servers available on market for more than a decade. Even though, B2Bi has not yet become part of everyday business environment. Apparently, there is a barrier preventing this from happening.

We identified some common characteristics of business applications performing multiple sessions of stateful interactions, processed with execution of complex transactions (those updating multiple aggregations). When executed on mainstream workflow-capable middleware, these characteristics are:

- **Expensive application throughput**
- **Fluctuating response time**
- **Inefficient scaling**

In our opinion, these are the barriers. B2Bi will hardly become a natural, instead of exotic, way of integration before the mainstream market adopts workflow-capable middleware that eliminates these barriers by providing:

- **Maximized utilization of middle-tier hardware**
- **Maximized transactional parallelism**
- **Scaling with no marginal costs**

### What prevents mass B2Bi so far

- (1) Scaling inefficiency of the mainstream workflow-capable middleware.
- (2) Fluctuating responsiveness of business process applications.
- (3) Scaling limited by the marginal costs barrier

## Missing Ingredients of Mass B2Bi

### Maximized Utilization of Middle-tier Hardware

Mainstream workflow-capable middleware runs in virtual execution engines – Java Virtual Machine (JVM) or on .Net with Common Language Runtime (CLR). Consequently, it cannot efficiently scale the number of running process instances (implemented as workflow instances) in a constant hardware with multiprocessor architecture. Thus, a business process can increase its throughput by running additional process instances on additional middle-tier hardware.

Scaling out entails large budget for hardware, software licenses, and energy expenses. As a result, B2Bi applications projects hardly ever go beyond feasibility study.

#### Required

Workflow-capable middleware with capacity to provide high business process throughput with reasonable amount of hardware, software licenses, and energy.

### Maximized Transactional Parallelism

When the number of concurrent users is higher than the throughput, applications queue the excessive requests until free processing capacity is available. This increases the requests processing delays, thereby deteriorating the application responsiveness.

Initially, scaling solves the problem. Further scaling, however, gradually degrades the responsiveness to unacceptable levels. With scaling, the process latency increases faster than the application throughput and, eventually, reaches a point where the delays of individual user responses become higher than the critical level.

The major bottleneck of business process applications is the serialized execution of transactions. Any degree of transactional parallelism will make the process bottleneck appear at a later stage of scaling. Parallel execution of complex serialized database transactions might be achieved with implementation of algorithms of transaction chopping.

#### Required

Workflow-capable middleware that can coordinate execution of chopped transactions in a way enabling preservation of business process data consistency.

## Scaling with No Marginal Costs

Application throughput cannot grow in line with the increase of process instances. With the mainstream workflow-capable middleware, costs of scaling increase faster than the increase of application throughput and reach a point where scaling beyond is not economically justified.

In contrast, scaling with middleware that creates high volume of new business process instances with constant hardware and software licenses has zero marginal costs. Consequently, as scaling does not experience (and it is not restricted by) marginal costs barrier, it can continue up to the point of maximum acceptable process latency, which appears at a considerably later stage.

Scaling with no marginal costs saves huge infrastructure budgets and energy costs. It eliminates the economic efficiency barriers that so far prevented transformation of enterprise applications into Internet-scale applications. Moreover, it enables a new breed of conceptually feasible Internet-scale business processes to become economically feasible application projects.

### Required

Workflow-capable middleware with no marginal costs of scaling - to trigger mass creation of new breed of Internet-scale applications.

## No More Missing Ingredients

With the missing ingredients in mind, we created the Transactional Cascade® set of technologies. These technologies are the core of Transactum Process Engine. It pioneers the execution of Internet-scale business process applications in a hardware efficient manner. Individual aspects of this set of technologies are presented in the following concept papers:

**[Higher Hardware Performance via High Concurrency](#)**

**[Interactive Responsiveness and Concurrent Workflow](#)**

**[Scaling with Zero Marginal Costs](#)**

TRANSACTIONUM PTY LTD

Tel: + 61 2 9567 1150

Fax: + 61 2 9567 1160

[WWW.TRANSACTIONUM.COM](http://WWW.TRANSACTIONUM.COM)

PO Box 324, Brighton-Le-Sands NSW 2216, Australia