(Excerpt)

The Autonomic Enterprise™:

The Complete Guide to Integrating

Business Strategy, Processes, and Technology

by

Jack Shaw

Chapter One

Autonomic Systems

It was early morning in July 1999 — 35,000 feet over western China. British Airways flight 27 had left London's Heathrow airport eight hours earlier. Its destination, Hong Kong, lay four hours ahead.

The hundreds of passengers on board were just finishing breakfast. Little did they know that it might have been their last meal.

Until this moment, the flight had been routine. The 747 was cruising at 570 miles per hour when, suddenly, the flight control system told the pilots to dive the aircraft. As they did, they looked with horror as, out of a cloud bank not 200 yards ahead, emerged a Korean Air 747 cargo plane. It was headed straight for them; a collision was just seconds away.

Fortunately, the warning had come just in time. The Korean Air jet, flying above its normal altitude, continued climbing and passed above the diving British Air plane. The two aircraft missed each other by a distance less than their combined lengths. At the speeds they were traveling they avoided disaster by just 1/3 of a second.[1]

* * *

It's the end of the day at ABA-PGT in Manchester, Connecticut, a manufacturer of injection-molded gears. As the workers all head home, the last person leaving turns out the lights. But no one turns off the injection molding machines. The plant cranks out precision molded gears and similar parts twenty-four hours a day, seven days a week.

However, technicians supervise the operation only during the day shift. Two thirds of the time, the plant runs on its own. No humans are on site to monitor it.

One might think quality control would be a problem with no one there to check it, but not so. In fact, one customer recently honored ABA-PGT for delivering 100 million plastic gears without a single piece rejected.[2]

* * *

It's five o'clock in the afternoon at Mt. Hood Beverage in Portland, Oregon, the largest distributor of beer and wine in the Pacific Northwest — time to start picking orders for the next morning's deliveries. As each drivers return from their route, every detail of today's deliveries is stored in their handheld computer. When they download this information into Mt. Hood's computer system, things start happening.

First, the accounting system reconciles the deliveries to the payments the drivers collected. Next, the system calculates each customer's needs for the next day based on the delivery and on-hand inventory information stored in the handhelds. Third, the warehouse management system determines the optimal sequence for picking every case of each order to go out the next day.

These orders then are grouped by "form factor", that is, the size and shape of each case. This way, like cases can ship on the same pallets. This increases load stability and reduces breakage. The orders are automatically sequenced to be loaded into the trucks in reverse order of the optimal delivery route. That way, drivers don't have to move one customer's order out of the way to get at another's.

Warehouse workers pick the orders and drive the forklifts to load the delivery trucks. But no one needs to figure out what product goes to which customers. No one has to guess the best sequence to pick the orders. And no one has to decide how to load the trucks or what routes they should take.

Dick Lytle, Mt. Hood's President, says that their systems let their driver/salespeople make 15% more calls than they could in the past. Their revenues have increased to reflect that. He goes on to say, "Some distributors aren't stepping up to technology. Those are the ones we're buying!"

* * *

So what, you may ask, do these three stories have in common? The answer is: they're all examples of autonomic systems at work. Autonomic systems are systems that are essentially self-managing. However, an important aspect of autonomic systems is that they allow for outside intervention whenever it is necessary or simply desirable.

Industry leaders like Dell Computer, Wal-Mart, General Electric, Johnson & Johnson, Procter & Gamble, and Coca-Cola are moving quickly to put autonomic business processes in place. To do this well requires that businesses' underlying information technology infrastructure also be self-managing. It's no surprise, then, that every major technology provider from IBM to Microsoft, from Sun to Oracle, from HP to Unisys has a major autonomic computing initiative underway.

The concept is far from new. In fact, autonomic systems date back billions of years — to the dawn of life. Imagine how difficult life would be if you had to consciously manage all the aspects of your own human body. Suppose you had to concentrate on maintaining your body temperature, digesting your meals, or controlling your electrolytes. And whatever else you may do, don't forget to pump your heart once a second or so. You'd never get anything else done. Fortunately, we don't have to worry about these details. Our autonomic nervous systems handle them for us.

Our autonomic nervous systems manage the sub-conscious functions of our human bodies without our ever having to think about them — most of the time. But, if a problem needs our attention, our autonomic nervous system lets us know. So, for example, if our cells run low on fuel, we feel hungry, and we eat. If we have an injury, we feel pain and take corrective action.

Furthermore, within limits, we can intervene into the functions of our autonomic nervous systems. We do this when we hold our breath while jumping into the deep end of a swimming pool. In a more esoteric example, advanced devotees of yoga can even control their heartbeats.

The autonomic nervous system is perhaps the original example of an autonomic system. But there are many other kinds of autonomic systems. Many of the simplest are what we can call autonomic devices.

A dishwasher is an example of an autonomic device. When I was a child, we had no dishwasher in our house. Well, perhaps I should clarify that. As the oldest of six children, I was the dishwasher. However, by the time I was a teenager, much to my delight, my parents had purchased a dishwasher.

As we all know, a dishwasher washes, rinses, and dries dishes. Some, in fact, are now quite sophisticated. They heat the water to the proper temperature first and can even decide how long to run the wash cycle by determining how dirty the dishes are. All of this is done without human intervention being required. Nonetheless, if we wish, we can intervene by putting in a cup or spoon after the cycle has started or by pulling out a dish to rinse by hand rather than waiting for the cycle to end.

As a small boy, I delighted in the aroma of baking bread when I visited my grandmother's house. The high point was when she pulled the warm loaf of bread out of the oven for us to enjoy. I think that part of the reason I enjoyed my grandmother's fresh-baked bread so much was that we so rarely had it at home. With six kids going in six different directions, even a stay-at-home Mom like mine had little time to bake bread.

Think about it. She'd have to mix the dough, set it aside to rise, and then come back to knead it. Then she'd have to let it rise again and knead it again. Next she'd have to check back and make sure it had raised enough before putting it in the oven. Finally she'd have to watch it carefully while it was baking to make sure it baked completely without burning. Who had time for all that?

Certainly not my mother — which explains why, like so many of my generation, I grew up on a steady diet of Wonder Bread and Parker House Brown 'N' Serve rolls.

In my home now though, I bake fresh bread regularly. This is not because I have any more time than my harried mother did nor certainly any greater devotion to my family. The difference is, I have an autonomic device — a bread machine. All I do is dump a pre-mixed package of ingredients into the machine, add water, and press a few buttons. Three hours later we have a perfectly baked hot loaf of bread.

But again, if I so choose, I can intervene into the process. For example, if I'm making banana bread, I can program the bread-maker to let me know when to add nuts at the last minute to top the loaf.

Far more sophisticated autonomic systems are the autopilots on military and commercial aircraft. In fact, what we commonly call the "autopilot" is referred to in correct aerospace engineering terminology as the "autonomic flight control system".

The true story at the start of this chapter illustrates the value of autonomic systems in a real life or death situation. The autonomic flight control system continuously monitored its surroundings for problems. When its radar detected the Korean Air jet on a collision course, it immediately sounded the alarm. But it did more than that. It didn't simply tell the flight crew there was a problem. It recommended what to do.

In fact, if the flight crew hadn't responded promptly, the autopilot would have attempted to take evasive action on its own. But, in this case, the flight crew was able to respond before the autopilot needed to initiate any further actions.

Autonomic systems, the autonomic nervous system, autonomic devices, and even autonomic flight control systems have been with us for years now. They've improved many aspects of our lives. But our businesses have long lacked any similar such systems to manage their day-to-day activities. And so we waste valuable time and resources simply maintaining the status quo in our organizations.

Until the advent of the Internet and the technologies it spawned, we could do little more. However, now it's become clear that the Internet and e-business, rather than being ends in themselves, are actually steps on the path to autonomic business processes.

Driven by the demands of e-Commerce and e-business, over the past several years sophisticated technologies have evolved. These enable us to design and implement self-managing, or autonomic, business processes and the systems to support them. Recently, innovative organizations have implemented autonomic processes, with astounding results.

Like Mt. Hood Beverage, they've improved service while cutting costs. And, they've made huge gains in market share and profits. Some companies are actively implementing autonomic processes throughout their business. As they succeed in doing so, the next few years will see the rise of a new kind of organization — the Autonomic Enterprise™.

I've spent the last 30 years learning how businesses use technology. In the mid-1970s, as a Treasury Systems Analyst for Swift Meats, a $5 billion multinational food company, I had the opportunity to participate in the design and implementation of one of the first sophisticated telecommunications-based cash management systems.

One of the keys to this system was the use of Mohawk tape transmitters to send daily bank deposit information from hundreds of branches around the country to Swift's central bank in Chicago at the then unheard of speed of 300 characters per second! Pretty primitive technology by today's standards; but that electronic transmission enabled the redesign of the system in such a way as to add $5 million per year profit to the bottom line for Swift!

The lesson wasn't lost on me. Use the most appropriate current and emerging technologies as enablers to redesign business processes in ways not otherwise possible, and organizations can gain tremendous strategic benefits. I've spent the subsequent 30 years refining these concepts.

After spending five years applying technology in business, I decided to move full time into the Information Technology field joining the then-largest software company in the world, MSA. At MSA, I had responsibility for product design and marketing for all supply and demand chain management systems. My job was to understand the business processes and needs of clients and prospects in dozens of industries and ensure that they were addressed in the designs of MSA's systems.

During this time, I learned of the work underway to develop standards for Electronic Data Interchange — EDI. Seeing its promise for the application of business technology to interenterprise business processes, starting in 1982 I got actively involved in the standards development processes and in speaking and writing about this earliest form of what later came to be know as e-Commerce.

In 1985, I left MSA to start my own business speaking, writing, and consulting on business strategy, process and technology. Since then I've consulted with dozens of companies in numerous industries. I founded and sold a newsletter, and I've written three previous books.

When the time came to write this book, I recognized that it wasn't going to be enough to simply talk about the latest emerging business technologies and their implications. It was clear that the Internet boom/dot com bust of the late '90's and 2000 was not an end in itself. I wanted to step back and look at the big picture from a long-term perspective.

Drawing on my 30 years' experience in business strategy, processes, and technology, I asked, "Where have we come from, and, more importantly, where are we going? What exactly is it that business has been trying to do with technology over the past 30 years?"

The answer was clear to me. Business was not simply trying to automate. Instead, with halting steps, business was moving toward the development of processes that were self-managing. Processes that were not totally independent of human input and control, but that would call for help when they needed it and that would always allow for authorized people to take direct control when they chose to. But processes that didn't require human involvement to simply manage the routine activities of everyday business. In short, processes that worked very similarly to the human body's autonomic nervous system — autonomic processes.

As I recognized this trend, I also saw that in every industry leading companies were applying the concept of autonomic processes across their organizations. In doing so they slowly were evolving into the first of what will emerge as Autonomic Enterprises™.

This book is a guided tour of the Autonomic Enterprise™. It is written as a practical guide for senior management to understand why and how businesses are becoming more autonomic. It is intended to show the reader some of the best practices in autonomic strategies, processes, and technologies and to help the reader better understand and plan for the evolution of their organization into a successful Autonomic Enterprise™.

The rest of Part I discusses the still-accelerating evolution of information technology and shows how emerging new tools and technologies are enabling new and dramatically improved business practices. Part II is the heart of the book because business processes are the heart of any organization. This part examines nine processes critical to most organizations. It describes how businesses can make each process more autonomic with examples of organizations that are doing so.

Part III shows how organizations in eight major industries are using autonomic processes to improve service, increase quality, maximize productivity, and gain competitive and strategic advantages in their markets. This part of the book devotes a chapter to each of these eight

important industries. Each chapter in Part III contains 2–3 “mini-case studies” —examples of organizations in that industry who have implemented one or more highly autonomic business processes.

Finally, Part IV shows the reader the steps their organization must take to successfully evolve into an Autonomic Enterprise™. This is an evolutionary, not a revolutionary process. Most organizations will take from three to seven years to complete the transformation. However, this evolution is taken in small steps — each of which is both justified in terms of its own costs and benefits and helps to build the foundation for the Autonomic Enterprise™.

[1]BBC Online Network, July 11, 1999
[2]Wall Street Journal, November 19, 2002

Table of Contents
for

The Autonomic Enterprise™: The Complete Guide to Integrating Business Strategy, Processes, and Technology

