Avoiding Future Schlock

Wedge Greene & Barbara Lancaster

LTC International

Date: 1/22/2007

An extract of this article appears in
Pipeline Magazine
http://pipelinepub.com

About LTC International Inc.

LTC International provides leading companies in the telecommunications and IT sectors with a unique level of service based on true subject matter expertise. Our Business Operations Architects® each have at least ten years of hands-on experience in service provider and IT intensive companies. Our consulting team has experience in all areas of business profit optimization, wireless and wireline communications, Internet services, as well as software and hardware planning, implementation and operations.

LTC has incorporated more than 1,000 years of first hand operating company and software application experience into our Business Management Toolkit. This comprehensive set of tools, guidelines, checklists, templates and training programs is designed to remove uncertainty and accelerate success for our clients.

http://www.ltcinternational.com

Expect Results®

AVOIDING FUTURE SCHLOCK – THE REAL LIFE APPLICATION OF "GAME THEORY"

Summary: Why take chances? Change is difficult, costly, & risky. But in a world of rapid change and cut-throat competition, innovation frequently wins. In this article, we look at what's ahead – with a goal of planning for and managing trends before they become disruptive.

AVOIDING FUTURE SCHLOCK – THE REAL LIFE APPLICATION OF "GAME THEORY"

Copying what others do.

Game Theory. It's a bit dry and complex a topic for the water cooler; however, it is the subject of many engineering late-night beer fests. Altogether too often "game theory" is used by engineers to frighten management into reconsidering what the engineers consider to be a bad management choice. (By which we mean ignoring the well-reasoned conclusions of their engineers.) Wedge uses it this way, and I'll admit I have to support his view…this time. But first, in fairness to all of my good friends in telecom management, we will attempt to demystify the concept, then put it into perspective, and lastly tell you how it can positively be used.

Game theory is about making choices. Options are presented and the player attempts to make those choices which result in an outcome the player wants. Usually the desired outcome is to win some resource or state. Game theory is interesting because the game is usually played with other players. These players desire either the same resource you want or a resource which prevents you from getting the resource you want. Games get very interesting because everybody has a plan or strategy and usually everybody gets to observe at least part of what everyone else is doing. Essentially, your strategy depends on the guesses you make about the strategies of those in the game with you. And *vice versa*.

So what players do in games is "determine a strategy". The most practical outcome of game theory for non-mathematicians, is that mathematicians have identified types of games and effective strategies for winning those games. In the 1970s and early 1980s, game theory was applied to evolutionary biology with remarkable results and insight into how and why animals act the way they do - within specific kinds of environments. But best of all, soon afterwards some bright guys realized the similarity of the bio-evolutionary games with modern business.

Each kind of ecology/environment and period of time had specific winning strategies, so to use this game theory, you just need to match the biological game conditions to a comparative economic environment and period. What are today's winning strategies?

Remarkably enough, for most of evolutionary history, the best strategy is to keep doing what worked before: *Follow proven success*. Perhaps this is why so many people naturally think this way, including telecom managers. But for the game player, it is necessary to look at the overall wider game landscape, the playing field, and the other players, before picking a strategy. It turns out that 'follow proven success' strategy only wins in environments where conditions change very little year over year and competitive pressures are low. Doesn't sound like a winning strategy for today's fiercely competitive telecoms arena, does it?

Let's look at few more strategies and the advantages they present in different environments. 'Joining a herd' or 'group up and copy' is an effective strategy when there are lots of similar players with a few predators who are strong and numerous enough to attack you frequently. As a business strategy this works only if you are satisfied with a relatively identical piece of a shared resource. "Injuring the competition" is another strategy. This strategy can be a winner when the player can successfully disrupt the cycle of the other players. Another approach is "boxing in the water hole." By dominating a critical

resource in the environment and excluding it from others, you starve them. Business strategies like capturing a critical standard, or capturing a regulatory body mimic this strategy. Regional monopolies are also a kind of "boxing in of the water hole". But be warned, this strategy requires careful husbanding of the critical resource over the entire length of the game. That is, monopoly of product, concept or position works only when you keep the customers happy. And there are no other waterholes nearby.

These last three game strategies occur in environments "under churn" and their execution requires taking on risk. A new opportunity may give the competition another place to "drink" or you may over-graze and exhaust your resource. In attacking others, you yourself may become injured or use up too much resource. A herd can grow larger, giving you a smaller and smaller piece of the winnings. When tomorrow is likely to bring change, when the environment is hazardous, when competition is rampant, even riskier strategies are attempted. All these can bring advantage over the short to medium time frame. In evolutionary biology, the long term winning strategy for environments undergoing change is "striking out in a new direction" either genetically or by colonizing new territory. In the business world this corresponds to *Innovation*. The state of business churn currently is significant and so Innovation is a strategy that all the telecom managers should consider carefully. Real innovation is tough to achieve, particularly for teams most comfortable with staying the course and continuous improvement.

Let's look at several new technologies that offer current opportunities for Innovation. The winning strategy is to get there early. This first group has all passed their trials and is ready for full business deployment. Fast followers still have a good chance of capitalizing on these opportunities:

"Out with the old" …..This is the year of…

Old	New
Old: Expensive proprietary	New: Open Source
Old: Application Servers	New: SOA
Old: Pub/sub & ESB	New: Web services
Old: configured or signaled	New: deep packet inspection
Old: an address for every device	New: universal addressing and messaging
Old: closed user groups	New: viral networks

Open Source

Today the dominate IT architecture is based on Application Servers. Today's CIOs buy them by the thousands, spending thousands per server and… hiring developers by the thousands. This is the follow the herd choice. This has not been a bad strategy, because the vendors of Application Servers have continued to incorporate most of the central advances in programming. But the scaling costs of Application Servers which require expensive cluster server environments to meet the needs of big telecom OSS/BSS places considerable pressures on these same CIOs. "Virtualization" is vaunted as the way to economically scale these environments and Open Source is gaining ground rapidly too. So much so, that open source Application Servers are appearing not just sporadically, but as the preferred choice in budget-minded telecom operators. Open source application servers are good enough today, and enough third part support

organizations exist, so that these become a safe choice for most straightforward IT assignments. Open source was a hot item in OSS/BSS planning in 2005 and early 2006 with the "Blue Group" push, but that strong wind has blown itself out.

SOA

If the task is problematic and the needs are significant, than the innovative approach is Service Oriented Architectures (SOA). SOA began entering the exploratory marketplace in the late 1990s. Implementation first gained ground in financial markets with Sun and IBM making early strategic investments. MCI developed a proprietary SOA based on extending Sun's Jini Technology. The earliest public OSS/BSS trial implementations occurred with the Finegrain NGOSS Catalyst. This was followed with early implementation projects at Telecom Italia and BT (at least these were the first announced). Meanwhile the inventive techniques of Jini became assimilated into mainstream Java. Microsoft also entered SOA with some advanced features in .NET which both expanded upon and improved RMI.

Properly implemented SOA applications have been shown to function reliably and scale quite cost effectively. One seldom hears of failed SOA development projects - indeed the "bragging rights" are often strident. But SOA using advanced RMI and **.**NET techniques while powerful, has a significant drawback. These technologies require both expert Architects and master Developers. A proper SOA must be designed from the ground up with a strong understanding of both the functional activities of the problem and the component decomposition efficiencies. Perhaps the biggest hurdle, as was shown in the work of the TMF NGOSS red team, it also requires a consistent and shared data model (and a good understanding of the *business*). So a pure SOA is the best approach when you are building green-field or undertaking a problem with specific known boundaries and scope.

Otherwise, the next best thing is ….

Web Services

In the mid-nineties, message bus technology appeared as an implementation of the publication/subscription approaches being pioneered in the IETF. At that time service providers were beginning to feel the poison of stove-pipe approaches to products and accompanying OSS. Also, using System Integrators to build custom interfaces was getting outrageously expensive. Architects and managers understood that applications needed to be linked-up and coordinated both vertically and horizontally. As early implementers and strong proponents of the massive benefits to be reaped from solving these issues, we both attacked the problem: Wedge creating the first NGOSS architectures that were based around message buss technology coupled with work-flow managers, and Barbara using multi-threaded applications and clustered data stores. Both approaches did work.

However, neither worked as well as expected. Integration still involved costly matches of applications. The message buss products were fraught with troubles and were so over sold that support was difficult to come by. While pub/sub was standards based, the implementations were quite different and practically the choosing of a message bus vendor was a long term lock in to a single source infrastructure. Over time, and through many vendor mergers, this industry re-invented itself as Enterprise Service Bus (ESB). This did mean that tool products worked together and the bus infrastructure could be managed. However, lock-in and expense are still big problems. Yet today, ESB is the dominate paradigm for business integration.

But as frustration with bus technology increased, another technology was coming out of the W3C and the IETF. Web services extended the migration of internet-based technology into IT. Adopted early on by both IBM and Microsoft, web services had strong research and standardization budgets. It is easy to see that IBM and Microsoft quickly promoted web services over traditional SOA because web services (like the promised but unrealized wish in buss technology) promised a simple external interface that could wrapper existing products and "integrate" them to the whole world. It would not be necessary to re-engineer big applications since web services could provide a gateway from the application to all the other web service enabled applications. And better than SOA, since a universal data model was not required. In practice, web services had a rocky early implementation history. Web services had no managed or guaranteed delivery of messages between applications; and to get it managed, you had to select one single vendor. But the size and importance of the problem meant that the community needed to solve these problems and most early issues are now things of the past.

Perhaps one of the greatest strategies adopted by the web service community was their open-mindedness, and ability to move past the Not Invented Here syndrome – they became great borrowers from other promising technologies. They adopted the management architectures originally developed in enterprise Jini and ESB. They co-opted in some application servers, issuing the hybrid concept of application web servers. They always had the user interface side pegged with strong HTTP integration.

…and in with the new

So today, the innovative but well proven strategies are:

- Moving stable, unchanging applications already implemented in J2EE to open source servers
- Wrapper-ing entrenched and difficult to replace applications with enterprise-managed web services
- Building the applications which will provide core business functionality and competitive differentiation on pure SOA (and yes, you do need to invite those telecom managers to the design sessions to really understand the business functionality…)
- Linking to users, customers, and supply chain partners via standardized web services.

Trends to be designing for right now

Several on the horizon technologies should be the new product development efforts in 2007. These are working but getting them into the mainstream will require the most sophisticated and advanced OSS/BSS that can be developed:

1. Deep packet inspection and Applications/content level routing
2. Single logical user identity
3. Viral VPN or social communities

1. **Deep packet inspection** began as a way of counting and forking internet traffic riding on high speed transports. Deep packet inspection is reading past the standard routing header of an internet packet and inspecting the application and port information usually used at the destination of packet transit. Then, decisions can be made on treatment of the packet. This is similar to how firewalls work, filtering based on deep inspection. If you can do this fast enough, you can use the information to differentially place packets in QoS queues or on VPNs. Devices are commercially available today to do this at all standard access speeds (but not at the highest speeds used in backbones). So today, you can purchase a customer access gateway which can prioritize all your VoIP traffic, your video conferences, then your oracle transactions, all separate and above FTP and file sharing. You can then route them out virtual circuits with specific traffic handling and shaping. The best of these devices are autonomic, discovering and linking up and creating virtual paths based on pre-defined policy. This is the same stuff promised in the most advanced 3GPP standards and IMS. At potentially must less overhead. If service providers do not adopt and deploy this, then end enterprise customers will, rendering service providers to nothing more than being the transit pipes.
2. **Single Identity:** Consumers and business are sick and tired of all these separate address identifiers. Business travelers want one number that can economically used anywhere in the world and the first service provider to really deliver this will win massive inflows of business. Consumers are interested in the same universal mail boxes that business service customers can have – one place for voice mails, emails, mobile messages. Combining universal addressing and integrated messaging (one number, any medium, anywhere in the world) may be the next “killer application”.
3. **Viral VPN:** Closed user groups were a big part of the commercial success of Advanced Intelligent Networks (AIN). MCI’s “Friends and Family” extended this concept to social networks (and billing). Today social networking is a part of the life of the youth culture and making headway in business communities via applications like LinkedIN. These social networks extend past traditional corporate and social groupings. The internet as a self-publishing medium is well established – but with file sharing technologies proliferating into voice and video real time services, both the core provider and the web farm are being replaced by community data grids. The next, not yet here, “killer application” will be Viral VPNs, social networks, and enabling everyone as a content provider. But this product is not yet invented – or still lies in some startup’s research phase.

Looming problems: where do all the packets go?

Perhaps the single biggest problem facing tomorrow's service providers is controlling where all the packets go with very fine resolution. It is more than a technical problem – the technical parts are mostly solved and nearly commercial. The big problem is policy and legal boundaries. Simply put, this problem meets headline today with whether access will be open, whether Skype and Vontage can be blocked by a big facilities provider. Ultimately we believe this will need to be solved by economic methods. A great thinker once said economics always wins in the long run. Diseconomies of scale cannot continue in a viable, stable marketplace. Everyone eventually must pay for transit and for content.

The best approach is to bill for traffic and to charge for traffic based on QoS priority and handling. But this is diametrically opposite of the one-price, anything, any amount pricing strategy which is current in the USA. It is also qualitatively different from the pre-pay of Europe and Asia. What is needed is a pay-as-you-go approach – a micro-payment system capable of accounting for, and charging for, all those differentially treated traffic flows. This will require a transaction system scaling to transaction volumes that make the credit card networks and the phone calling networks look small.

Coupled with this will be the pressures to implement very fine-grained security. Un-encrypted content will be sifted by type, source and destination. Encrypted traffic will be pre-validated or else blocked or stored for decryption. Governments and providers will cooperate - in enlightened countries with the cooperation and consent of users; but nevertheless, cooperation will occur. And with the size of networks, and the immediacy of need during threats, this must become highly automated. Also, priority access will be given to first responders and civic utilities. This will be deeply integrated with disaster recovery projects and graceful-fail-and-recovery technologies.

Plan ahead for tomorrow

Many promising horizon technologies are in development and bear directly upon the issues above. While not yet ready for prime time, the *Innovative* service provider or vendor will be monitoring these technologies. We recommend having a presence in the standards groups or forums; perhaps conducting an early market feasibility analysis. The potentially productive, promising technologies and social movements include:

- Network resident grids and anywhere/anytime hosting of applications
- Extrapolation of 911, 411, etc into life watch services
- Micropayments joining service providers to banking networks
- IPv6, the internet everywhere, everything addressed, and the intelligent toaster
- Complexity theory and management of complex network systems
- Pandemic networking and pervasive computing
- Autonomic networks (self configuring and self healing)
- Network aware software applications
- Fusion of network terminations into composite endpoints (the mixing of connectivity and services from multiple specialized networks at the point of use).
- Soft terminals (Bio-resident or bio-enhanced)

Just Rewards

In all this, what remains unchanging? Where is *stay the course* the right strategy? Keeping your focus on satisfying your customer is of course the right answer. If we actively listen to our customers (remember – good opportunities exist in everyday life: our friends, neighbors, children and co-workers), we stand a good chance of hearing about dissatisfaction early, and having the time to fix it. Many avenues are available to make today's services more appealing; today's technologies more cost-effective and today's processes more efficient. There are lots of dollars to be eked out of today for sure.

As we've shown, there are also many new products just waiting for realization. Like a sculptor teasing the image out of the stone, today's technologist, architect, planner, and business development specialist should be working closely together to define the products and services that will yield real value. *Collaboration* is the essential strategy to having all parts of the product definition, launch, operation and management environment in place to win the futures game.

- End -