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Complexity in the Business and Management of IPTV

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Voice over IP seems to be the technology platform that finally will make it possible for the Cable providers to deliver telephony services successfully. It is less clear that Television over IP will do the same for telephone companies wishing to deliver television and other video content services. With billions of dollars on the line, IPTV offers hope, fear, and opportunity – both for victory and disaster.

Complexity: The first word that comes to mind when IPTV is mentioned to an OSS specialist is *complexity*. In 2004, a European telecom with U.S. Labs was involved in launching an IPTV trial and asked for help with management architectures. The OSS Architect who investigated IPTV delivery architectures reports that it took two white boards and most of the half day meeting to draw out and describe the major systems, protocols, and network devices that were required in their trial – in all there were about 60 component parts *before any management services*. Then they mentioned having issues with provisioning services and delivering consistent QoS. IPTV is the most complex telco service product ever attempted.

Foresight, or Hindsight? The second thing that IPTV conjures up is *leaping before you look*. It is quite expensive to attack someone else's core business. Ask any Venture Capitalist (VC) if they would fund a venture aimed at stealing the business of an entrenched group of a few mature companies, all of whom use a common, working technology with 100% customer uptake. I doubt you would find even one VC that would back that play. Unless the feature set was so remarkable that customers must have it *and* the costs were at least half that of the old approach. Yet Telecom service providers have attempted to venture into TV land more than once before, and therefore have quite a body of evidence to examine.

The Value Chain: In the mid 1990's, the business vision for long distance and incumbent telecoms was to *move up the value chain* by offering services instead of just connectivity. Many services were explored, but none with more determination than video content delivery. (We wonder if this persistence is because many executives subconsciously yearn to be in the movie or TV business, as somehow more glamorous than communications…) One of the earliest and most devoted trials was built by British Telecom out of their Ipswich Labs. This was a grand experiment in delivery of higher quality TV (than cable or broadcast) via telephone systems. In addition, the TV was to be interactive with the user and to a certain extent, demand driven for some content choices. A bundle of capital was spent and this service was delivered. It was rolled out in a subsidized model to one small region for many months. Although they were confused by the interactive choices, the video service was visually spectacular and users loved it. Economically, the service, if fully deployed, might have bankrupted BT. It cost too much and customers would not pay what it cost, given alternative cheaper broadcast and cable TV.

MCI decided to get into the content delivery game in the later 1990's by partnering with Mr. Rupert Murdock, who everyone believed was a genius pointing directly to the businesses of

the future. MCI co-invested with Murdock in a new venture. It was to be the future of the company. (Meanwhile MCI's fledgling data division was doubling its business 3 times in a year and starving for capital.) The new venture paid great sums to gather licenses for content with an emphasis on sports licenses, as one might expect with Murdock as the key partner. The vision was to deliver sports events via satellites to home TV's and sport scores to phones. Software was to be downloaded via satellite to home dishes and right into home and business computers. In all this they were visionary, but too far ahead of their time. While a good idea someday, the costs at that time for infrastructure and management were prohibitive. And frankly the telecom executives did not understand the business of paying for satellites, buying reliable foreign launches, and insuring it all. This is one major element in the content distribution chain in which companies like Comcast have a distinct advantage given their experience in satellite launches. Further, partnering with Murdock is much like partnering with Microsoft: usually only one winner emerges. Eventually MCI paid a billion US dollars to get out of the deal with Murdock. We are not sure how much was lost in this venture, but it may have been double or triple that billion. Of course, Murdock, being nimble and a risk taker eventually did make money on the concept.

Chasing someone else's business: As a third cautionary example, it is important to look at the counter-incursion of the cable companies into the telecom business. As a reactive counter-strategy to the telecom TV plays, the cable companies realized that they also had wires into the home, which could be a competition to phone lines. In the pre-VoIP days of Class 5 switches, this little negative externality of the *move up the value chain* strategy cost all of the service providers big time in competition, churn, and confusion. Yet this kind of counter strategy at the macro business level occurs over and over in history. Cable companies emerged as the most viable competitor to heritage telecom, despite the fact that their POTS-switched business models never took off. Distracted by the collapsing CLECs, forcing change in the FCC rules, and designing migration strategies for their own POTS networks, only now are Telecoms refocusing on the TV business, banking on the advances brought by Next Generation Network technology.

Let's look more closely at the woes the cable companies had entering the phone business. Delivering the same service to everyone via simple encoding and broadcast was much simpler than an on demand, switched service like telephony. While maintaining the cable plant was common to both services, everything else was new and strange to the cable companies. New modems needed to be invented, new set top boxes manufactured and installed for every customer. Switches and telephony protocols must be acquired from

entrenched vendor ecosystems that by this time were rather clever and voracious. The OSS was absolutely arcane. Even billing systems needed to be swapped out in order to show detailed transactions rather than flat rate packages (hmmm…with the benefit of hindsight, this is one investment they should have avoided). Cable companies owned the content and they had access to the customer, but up-selling into the telecom's territory was expensive. And consumers were wary about obtaining lifeline services from Cable companies. Clear television signals with occasional bursts of "snow" and some complete outages met the service threshold of most consumers. "Always on" is, however, the table stakes for dial tone and few customers were willing to gamble on the ability of the Cable companies to meet that target.

Triple Play here to stay: So history repeats again as today's *new success strategy* for telecoms is triple play. This time the telecoms are in it to stay. They do have a potentially better product with interactive content, video on demand, internet-to-video crossovers, and targeted ad delivery. They eventually, some day for sure, might achieve cost savings by overlapping multiple services on one NGN infrastructure. And the visual nature of the World Wide Web over broadband has acclimatized existing telecom customers to visual media and content coming from telecom companies. This time the cable companies are also the telecom companies, so they too join in this strategy. And it is this *convergence of vertical businesses that is the ultimate success strategy*. It is better for the content providers to merge with the content delivery companies. And that too has happened in the past. We predict more vertical mergers will be forthcoming.

Feasibility: But even if the business model is sound this time around, is it technically feasible and economically possible? Here the complexity of IPTV, the integration issues of triple play, and sheer scale in the mass of content raise a formidable specter against success. The answer is a possible yes, but not with today's OSS and BSS systems. Remember the 60 components used in a trial for just IPTV are already beyond the capability of most management systems. Try correlating alarms from hundreds of instances of 60 different agent types. Follow the *trail of blood* through ten or twelve co-planer service layers. Here we see the same phenomenon of the CLEC days: OSS vendors are woefully behind the curve. Tweaking existing platforms will add complexity, and cost, neither of which can be accommodated in the service providers' business models. Radically new OSS systems will be required to manage the complexity, scope, and scale of triple play and the forthcoming explosion of newly invented services.

Reusing the past? We cannot carry over the architectural models, the data models, and the functional models from traditional telephony into triple play. Can itemized calls in customer bills be replaced with itemized content by changing the data description? Can a circuit be redefined as a pipe for delivering a movie? It was tried in the past when POTS applications were adapted to IP. It did not work well then. It will become a costly disaster if tried here. Downloading a movie is delivering a file, not leasing a pipe. Multicast branching of a data stream is not linking to a conference bridge. You cannot reuse the conference bridge model for one-to-many video web casting; even when filtered reverse-comments are allowed.

The newly minted concept of QoS, as driven by delivering real time IP packet streams, has already lead to a rethinking of NGN around the refined IMS architecture. IMS is driven by the realization that QoS will be necessary for even simple services and present in everything. SIP is nothing like SS7 or Q.931. The management models and data descriptions of the SS7 architecture are not synonymous with anything in SIP. Even concepts like “in line signaling” and “out of band signaling” are not relevant. It is better to think of a SIP server or HSS as a broker rather than a signaling protocol or switching system.

Also the organization of traditional OSS product groups will not adapt to the environment of triple play. Current OSS product groups originated with ITU FCAPS (Fault, Configuration, Accounting, Performance, & Security). Hence there are trouble ticket products, and alarm management products, and router configuration products, and performance reporting products, and billing products, etc. These products are doing decomposed functional tasks. They are not managing either a network or a service. Even NGOSS (TeleManagement Forum’s New Generation Operating System’s and Software), does little more, *at this time, as it is being currently deployed*, than apply an ESB (Enterprise Service Bus), alias event passing, to existing products. Basically the prior model of best-of-bread applications connected via interface mapping integration has been replaced with easiest to integrate application connected via workflow orchestrated event/message passing. Integration models, however advanced, will not cut it here; the complexity is too great. For this type of complexity, the purest SOA IT architecture is a must.

And this management SOA will need a computing grid for its platform.

These new triple play enabled services will require complex interaction models, way beyond anything seen before. Multiple signaling streams will need to be coordinated. Multiple delivery targets coordinated. Often each user and each service will have separate SLAs to coordinate. Content will branch and rendezvous. Today you can view the TV episode you missed last night on your phone while commuting on the train. Tomorrow virtual communities of users will come and go, transferring between different console devices, in and out of Social Networking Service (SIS) collaborative applications; each time requiring synchronization. Provisioning a service might involve touching hundreds of different devices and taping dozens of protocols. Then this service must be delivered instantaneously and

have a life of only minutes.

Progress: But we have optimism that new management approaches will arise to fill these new needs. Certainly new paradigms and technology are being developed for users to interact with all the channels and content of the future. Take a look at Hillcrest Labs' spontaneous navigation product, developed for surfing content in IPTV. Users fly through three visual dimensions in order to navigate a set of infinite hyperlinked content dimensions. A wireless, motion sensing, hand-held remote drives the reference point thru visual hyperlinks to navigate a directory tree of content. Something like this could even navigate an alarm "trail-of-blood" that occurs when those 60 components in IPTV suddenly stop delivering 1000 channels of video to 100,000 customers – and do it in the allotted 15 minute response window. But would not *autonomic management systems* be better?

IPTV may indeed be the technology and service set that drives a leap forward in thinking about how the entire ecosystem of content, network, delivery, management and billing must work – cheaply, and incredibly efficiently. This level of complexity is in our opinion, best left to smart, machine-resident agents. Stay tuned!

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