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# Does iTunes shut out the iPad from business adoption?

Charles Brett, C3B Consulting Ltd.

## Management introduction

*iTunes is 10 years old. It is popular and free and an essential if you own an iPod, iPhone or iPad. Without it you cannot start to use your iPod, iPhone or iPad.*

*For the iPod and iPhone such a specific requirement — which also means that you have to possess either a Windows equipped PC or a Mac — is not to great a burden. But for the iPad (which is even more of a computer than even the iPhone) iTunes is an inhibitor preventing businesses adopting iPads as they wish. In this analysis, Charles Brett looks at how iTunes is an inhibitor, and at the business implications.*

## Tablets and the market

The number of times that vendors have tried to create a tablet computer market is legion (think Newton, Windows Tablet editions, etc.). It was only last year that the concept of a practical tablet which appealed became real — when Apple launched its iPad. This product has sold millions in less than a year — despite not being cheap (especially when compared to netbooks, which now seems demonstrably inferior, with one exception — that they behave as Windows PCs).

While Apple is undoubtedly overjoyed that its first iPad iteration, which lacks hardware features (cameras, USB ports, removable MicroSD storage, etc.) that many would prefer, it now faces enormous competition. HP has its own 7" tablet (running Windows 7); Samsung has its 7" Galaxy Tab (running Android) and CES 2011 saw more than 40 tablets 'on display' (Reference 1). In 2011 the competition will be on to win business community support.

Why should the business community be interested? Quite simply, tablets are convenient. No they do not do all that a desktop or laptop can do. But, with the appropriate software, they are capable of doing probably 80% (recall Pareto) of what a laptop can do, and in a form factor that is much more convenient for those who have to move around — whether within an office or when traveling. They are also a computer (as in data processor), a browser (as in information finding tool), a filing system, a locator (GPS), a phone

(Skype and others), an education deliverer (via videos and presentations) as well as an entertainment device. This is a powerful combination delivered in a fast-on machine that is convenient to carry and with decent (8 hour) battery life. A tablet is usable almost anywhere — on the metro, in a plane, on a boat, in a car park, in a café — as well as within the work environment. All this explains why business is interested.

## The importance of software

The big issue for business is, however, software. For the moment the iPad reigns pretty much supreme. It has an established eco-system (neatly derived from the iPhone and constantly expanding). In contrast its principal competitors have immediate problems. Android in its 2.x variety is not tablet-friendly (as Google admits); only when Version 3 (Honeycomb) arrives in mid-2011 will Android be a tablet-oriented OS. Windows 7 is oriented to keyboard/mouse support and it may not be until Windows 8 (in 2011 or 2012) that it really supports tablets. RIM has yet to produce its QNX-based tablet.

Ergo, the iPad still has a 1-2 year lead, however open is the Android Market or extensive is the vast Windows application/development eco-system. Yet, for business users iPads lack key features — which (perhaps surprisingly) have not really been addressed in the 12 months since the iPad was first announced.

The most obvious 'missing element' is good Microsoft Office support. Office — especially Word, PowerPoint and Excel — remains a mainstay of most businesses. Yes, there are pseudo-Office 'applications' available for the iPad (including from Apple itself). But these simply are not sufficient in their current iterations. It is too difficult to access or edit or share Office generated files. Furthermore, OpenOffice, which might be an acceptable substitute, has not moved to the iPad.

Then there is Outlook. Outlook remains a popular email client. While the iPad has its own email client, this is not Outlook. Outlook is more than an email client. It is a filing system, calendar, activity manager and more — and it tightly integrates into Exchange.

So, at an office productivity level, the iPad lacks key business capabilities for integrating iPads into work environments, especially for those on the move. This is a major inhibitor, as anyone charged with trying to introduce iPads into a conventional office will attest. Businesses can, of course, build their own iPad applications. Some are doing this. But integrating these into normal (non-iPad) environments is not simple.

### Then there is iTunes

Apple developed iTunes to be a digital media application for the organizing of digital content — videos, music, podcasts, etc. Whether or not you like Apple's approach with iTunes (with its integrated iTunes Store which you must sign up for) for this purpose, it is pretty good at managing consumer digital content to/from iPods, iPhones, and even iPads. But the key question is: would a business naturally choose iTunes as its 'content (including applications) organizer'?

The answer is No. iTunes is a consumer digital content manager. It was not designed to be, and is not, a business digital content manager.

Why not? Ignore the audio/video content and consider some 'defects'. There is no equivalent of Windows Explorer with iOS. Content is associated with applications, not with the device. While there are justifications for this, it does not make an IT manager's job any easier when taking responsibility for the content on a plethora of business iPads and for their applications and data. Furthermore, it is not easy for the iPad user to find what he or she is looking for.

These problems go deeper. iTunes is a personal application, not a corporate one. Furthermore, iTunes keeps just one copy of what is on the iPad — not the multiple incremental versions that businesses prefer. Indeed, the relationship between backup and syncing between iTunes and an iPad is so tortuous as to present additional problems. Even backing up a backup of iTunes is a problem. With 10 or 100 (never mind 1000) iPads, iTunes is not suitable (and these are only a selection of how iTunes restricts business use).

Does this mean that would-be iPad-using businesses must write their own utility software? If it does, that is a hurdle that IT will smartly decline. The simple reality is that iTunes is not appropriate for a business environment. Yet, because iTunes is required, this means iPads lose much of their attraction.

### Is the answer a cloud?

Apple has been making inroads with its Mac computers into business. If it wishes to sustain its growth it must expand into the business community. With the iPad it has that opportunity.

What Apple needs is an 'iBusiness' or an 'iOrganizer' — an iTunes-similar application specifically oriented to supporting 10s to 1000s of iPad (and iPhone) users. Will it do this? It seems unlikely.

Another possibility is to create something in a cloud (but not MobileMe) that exploits the iPad's connectivity. This could have many attractions, including bringing Office capabilities to the iPad (via a browser). Again, whether Apple will act is not clear. It shows little sign of understanding, or wanting to understand, what businesses need.

### Management conclusion

*If Apple is not to cede its opportunity for the iPad to penetrate business to Windows and/or Android it must urgently rethink. iTunes is a key part of the limitation. iOS, albeit to a lesser extent, is another.*

*Should Apple do its usual 'we know what is best for you' party trick this will give Google, Microsoft and RIM, with Android, Windows or QNX equipped tablets, precious time to catch up and surpass the iPad as far as corporate IT is concerned. The iPad is good but not perfect for the organizational user; iTunes weakens it further from the IT perspective.*

*In 2011, the initiative lies with Apple. But past history suggests that Apple will choose not to understand — to Google's, Microsoft's and RIM's potential glee.*

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# When elephants dance, change comes to the systems industry

Amy Wohl, Wohl Associates

## Management introduction

*In the past year, the systems industry has rearranged itself. HP has added much more services capability and additional software (to say nothing of a new CEO). Oracle, by purchasing Sun, has transformed itself from a software vendor to a systems vendor. IBM has reorganized by placing Software and Systems under its former software chief, Steve Mills (while continuing its software acquisitions binge).*

*As Amy Wohl describes, these suggest substantial changes for the entire information processing industry. Users, as well as other vendors, need to be on their toes.*

## Assessing the impact

All three of HP, IBM and Oracle market to similar customers and deploy products and solutions through both their own efforts and those of a now substantial business partner ecosystem. The latter matter. While initially the focus on partner ecosystems was to fill in missing holes it was also to encourage significant business partner investments (in building product expertise). As part of those original initiatives, the big three systems vendors often reserved specific parts of the overall market just for their chosen partners.

However, as growth continued throughout the 1980s, 1990s and then 2000s, all three of these vendors made considerable software acquisitions (References 1-3):

- HP made 90
- IBM made 115
- Oracle made 60.

As a result of these acquisitions, strategies and relationships with business partners have had to change. For example, when Oracle acquired Sun Microsystems in 2010, it quickly notified those Sun business partners which sold to very large accounts that it (Oracle) would now directly handle these accounts. The effect was to send many of Sun's erstwhile partners scurrying for new relationships to replace the potential lost

revenue derived from both hardware and software and from associated services. IBM, for example, welcomed them.

In some senses as the discussion of each (below) will show, all three of these 'elephant' system vendors are now aiming in the same direction. Their revised aspirations are to:

- create an integrated, seamless stack of software and hardware for customers who want complete on-premise solutions
- provide public and private cloud solutions so that customers who are ready can take advantage of the economics and opportunities that clouds represent.

The reality is that their target markets are changing. Their means of reaching these is also evolving ...

## HP

HP is, in some ways, the lightweight even if it is the biggest by sales. HP is now trying to acquire more systems software and enlarge its services organization — hence the EDS acquisition — to compete better in the services (mainly systems integration) business.

It is too soon to tell how its new CEO Leo Apotheker might change the company's focus. The smart money says that, since he is a software person (he previously served as CEO at SAP), HP is likely to move toward more of an enterprise and software focus.

HP needs to do this if it wants to position itself as being able to compete with IBM and Oracle. It needs to make itself less obviously the very successful vendor of low-margin printers and high-margin inks. Perhaps, in an indication of direction, it is rumored (but not yet confirmed by HP) that HP's CMO Michael Mendenhall has left the company and Bill Wohl, previously vice president of public relations at SAP, will be joining HP as its chief communications officer.

HP was a long-time Oracle ally — with over 25 years

of experience and more than 140,000 shared customers. But that alliance seems to be unraveling. While both companies continue to claim their long-time partnership continues, sharp remarks like the following one from Oracle's CEO Larry Ellison, make continuation seem ever less likely:

*"Make no misunderstanding — there should be no misunderstanding: we think the HP machines are vulnerable; we think they're slow; we think they're expensive; we think they're vulnerable in the marketplace; and we're gonna go after them." (Reference 4)*

Yet HP is the biggest systems vendor by revenue — \$125B and counting. While half of this comes from its printers and printer supplies, another substantial part comes from its vast PC business (the equivalent of which IBM disposed of when it sold its ThinkPad brand and business to Lenovo). HP is less heavy-weight in enterprise computing than its revenues suggest, an area it needs to rebalance.

## IBM

Quite simply, IBM is doing well:

- its Smarter Planet strategy is being broadly and globally adopted: this has been particularly popular with governments at every level, creating systems that can predict and avoid problems (such as utility maintenance and crowded streets), rather than solve them after the fact
- its continuing practice of acquiring significant software companies and incorporating them into IBM's Software Group (SWG) has been very successful: features from technology acquisitions are constantly being incorporated into IBM products and IBM is cross-selling IBM products to customers of its software acquisitions and new products to existing customers — often leading to enhanced revenues and deeper relationships with customers
- it is the leading player in the private cloud marketplace, providing both enterprise clouds for large companies and community clouds for governments and others.

IBM provides tight integration within its infrastructure services. It offers both a tightly integrated stack and an open stack. Customers are able to pick and

choose, using both IBM or products from other vendors.

Furthermore, IBM exploits this services stack as the basis for vertical market offerings. These are founded on frameworks that, in turn, are based on IBM's deep industry expertise, especially as encountered and developed from within IBM's services group. IBM then uses this experience to create the underpinning for both public and private cloud offerings.

IBM also claims not to be in the applications business. In the past this was true but with all its software acquisitions it is sometimes hard to tell. IBM's Steve Mills argues that the line between system software and applications software is becoming ever 'fuzzier'.

In 2010, IBM decided to bring its Software Group and its Systems Group (hardware and technology offerings) under that single executive, Steve Mills (who had previously headed SWG). This now enables IBM to think more broadly about combined hardware/software products — like appliances and pre-configured servers. Mills had long lobbied for such an organizational structure, believing it would give IBM more flexibility to create the products customers for which customer are looking. Now he has the opportunity to deliver.

Even so, IBM is not limiting its approach to enterprises. It believes it can find whole new sets of customers in the mid-market (typically it defines these as companies with 100-1,000 employees) — where traditional IBM sales methods are hard to justify based just on the size of each potential sales. In consequence IBM has been building its business partner network and trying to encourage its partners to move up-market — from being hardware and software resellers to functioning more like focused Systems Integrators. To facilitate this IBM offers skill certifications and it rewards those business partners which invest in skills development and in understanding multiple IBM specialties (for example, across product categories and vertical markets expertise) with marketing assistance.

This program has done so well that IBM is now opening a new Small Deals program where Business Partners are incentivized to pursue deals under \$50,000. These could be in deals with smaller customers, proof of concept projects and pilots with middle sized ones or targeted projects occurring in larger customers. IBM finds that these deals frequently grow in size,

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even before they are implemented. It is using this approach as its way to reach into 'white space' accounts that typically have not been IBM software or hardware customers.

## Oracle

Oracle finally concluded its purchase of Sun (after considerable and prolonged discussions with the European Commission). It is now busily capitalizing on its new assets.

As previously mentioned, Oracle has decided to take Sun's larger customers under the wing of its own direct sales organization, even though this has meant losing certain business partners.

In addition, Oracle has also:

- moved combined hardware/software offerings onto its Sun/Oracle platform: this mainly disenfranchises HP which had previously been Oracle's preferred system supplier for such offerings
- finally joined the cloud parade — if mainly for private clouds — after a long history of saying that clouds were a bad idea; it is interesting to note that Larry Ellison funded (and still owns a substantial part of) successful SaaS provider NetSuite (and Oracle still offers a SaaS version of the latter's financials software)
- planned for much broader hardware/software combination offerings; this is the means by which it means to make a marketing asset of Oracle's vertical integration — by offering a pre-integrated stack, from the hardware all the way up to the application.

In the latter instance, Oracle departs from IBM's relatively open enterprise approach by offering everything from soup to nuts. Oracle seeks to be 'your one and only supplier'.

## What does this mean?

Today Wohl Associates sees customers facing three big systems vendors, each claiming to offer a bottom to top approach for enterprises:

- HP is scrabbling (a little) to gain enterprise weight to match IBM and Oracle

- IBM is trying to build infrastructure to take its offerings into the mid-market (where HP also successfully markets)
- Oracle continues its traditional large enterprise software vendor positioning (though it remains to be seen whether it will be tempted to take its offerings into the mid-market, and how it might choose to do this).

At the same time these three elephant systems vendors are competing in multiple market places where there are many other changes taking place. Consider the following...

Cloud computing may be rendering the whole notion of buying an integrated stack obsolete. If the customer is doing computing in the public cloud, he or she looks for efficiently priced and well managed compute cycles — and perhaps software that he or she would like to use, not own. All systems vendors will try to be 'arms providers' for cloud computing infrastructure vendors — as well as building private clouds for those enterprise customers who want them. In Wohl Associates' analysis, this market may shift with many customers paying less attention as to how infrastructure is provided (or which vendor provides it) and more to whether they are satisfied by the service provided by their cloud vendor.

As public clouds become more secure and offerings more varied, many applications which today are deemed to demand a private cloud implementation may move to a public cloud infrastructure. At this point those systems vendors who were not successful in establishing themselves as 'arms providers' to public cloud vendors may find both their hardware and software business eroding. IBM's recent announcement that it will provide infrastructure especially tailored to the telecommunications industry was designed to ensure that when others provide public clouds, they will also be selling IBM products.

At the same time we are rapidly moving from a world in which users compute at desktops or laptops to a world where an ever greater proportion of 'computing' is accessing messages and information via a browser from a mobile device. This is yet another aspect for cloud computing. More importantly, it changes perceptions:

- who is your vendor?
- what are buying and from whom?



- is your primary vendor now your device vendor?
- is your device vendor your new application vendor
- is your mobile network provider your prime vendor?
- is it your data center or someone else's?
- where are applications and data hosted?

In this brave new world, device vendors and service providers may become much more important brands than they have in the past. This could yet upset the three elephants' carefully laid strategies.

### Management conclusion

*Enterprises will continue to provide custom services to their internal customers. But the face of those services looks to change radically. No longer will they be viewed on 13", 15" or 19" flat panel screens but more likely on a 4" or 7" or 10" or 12" mobile device on your lap (not your laptop).*

*HP, IBM and Oracle see the changes coming. All three are positioning themselves so as not to be left behind.*

*That said, contradictions abound. IBM has sold its only consumer-friendly business (to Lenovo). Oracle has never really espoused anything with a consumer face.*

*As described above the weakest enterprise elephant*

*would seem to be HP. Yet it is also the only one with a serious capability to play in the new 'prosumer' device market. Not only has it an established printers and PC business but it now has WebOS and already offers a 7" Windows tablet today — and with more to come.*

*Such contradictions, and inversions, will affect HP and IBM and Oracle differently and thereby all of us. The dust will take time to settle. Expect interesting times.*

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# Cloud computing predictions for 2011

## Ray Wang, Constellation Research

### Management introduction

*In 2010 Cloud computing was accepted as real. Vendors began to sell in earnest and customers to buy. As expected there was a natural tension between those looking to buy usage of external clouds and those preferring to build private ones within their organizations.*

*2011 will see more developments. In this analysis, Ray Wang examines the factors that he sees changing and what will be the consequences.*

### Adopters embrace clouds for innovation and legacy optimization

Once thought to be the answer to deployment options for just the Small and Medium Business (SMB) market, early cloud adopters have proved otherwise. Stereotypes about industry, size of company, geographies and roles no longer hold back adoption. Cloud implemented — at all four layers of the cloud (Figure 1) — passed the fundamental tipping point in 2010. Clouds are now key elements of all sizes of business and technology strategies.

In 2011, general trends will reflect the natural maturing of the cloud market place. In this context, expect users to:

- replace most new procurement with cloud strategies
- use private clouds as stepping stones into public clouds
- adopt much more realistic attitudes about security
- introduce private clouds as backups to public clouds.

Users will replace most of their new IT procurement with cloud strategies. Preference in deployment options and lack of availability of innovative solutions in on-premises options will result in a huge shift towards clouds in 2011. Add the attraction of CAPEX swap-out for OPEX and most CFO's will be singing the praises of clouds alongside business and IT leaders.

Many will start with private clouds — as a stepping stone to public clouds. Conservative CIOs who are looking to dip their toes into cloud computing will invest in private clouds while simultaneously evaluating public cloud options.

User organizations will finally 'get real' about security. Customers will move from an attitude where 'clouds are not secure' to asking 'how can security be achieved in a cloud?'. They will start to ask real questions about security. One result will be that cloud vendors will have further to showcase various industry-specific compliant approaches.

Private clouds will come to act as backups to public clouds. Forecasts about cloud security breaches will call for 'partly cloudy' cloud adoption. Despite the woes in on-premises security and the march to the cloud, cyber attacks will force companies to move from public clouds to private clouds in 2011. Concern about cyber gangs hacking into commercial as well as military systems will lead to a worldwide trend that will temporarily slow public cloud adoption. Hybrid models for applications in the public cloud and data in the private cloud will then emerge as users migrate from on-premises models. Data integration and security will rise to become key competencies in 2011.

The bottom line: improved data security reliability will drive increased overall cloud adoption in the latter half of 2011. Yet many organizations will maintain private clouds, for both security and back up.

### The Consumption Layer (SaaS) emerges as a route to innovation

A transition will start in 2011, from best of breed purpose-built solutions to cloud mega stacks. Customers will still, nevertheless, need stacks to be augmented by best-of-breed, purpose-built solutions.

As in the early days of ERP and CRM, expect suite consolidation to occur for SaaS applications vendors. Those vendors with both the best PaaS platform and ecosystem will win as mature cloud customers bet on several emerging platforms and applications as well



as on content-driven cloud platforms that are complemented by strong integration solutions.

Access to deep industry vertical solutions will play a key role in this migration. The need quickly to innovate will hasten SaaS adoption by:

- leveraging application market places
- acknowledging that the importance of superior user experiences will not be sufficient.

Customers will leverage application market places and ecosystems for the last mile. The growing consumerization of enterprise applications will include a shift in how software is acquired and consumed. Market places will be the predominant channel for not only the acquisition of last mile applications but also for dominating requests for proposals for custom application development. There will be two byproducts from this:

- system integrators will have to deliver solutions in the cloud
- software vendors will emerge as information brokers.

There will also be widespread acknowledgement that superior user experience and scale are not mutually exclusive. Customers, especially in the line of businesses, will demand that superior user experience plus scale in SaaS applications and the tools that they want to use.

Thus ease of use will remain near the top of most selection lists when evaluating SaaS applications. Good end user experiences will help SaaS vendors win deals against on-premise incumbents (whose products may have more features but whose inferior user experiences will prove a problem).

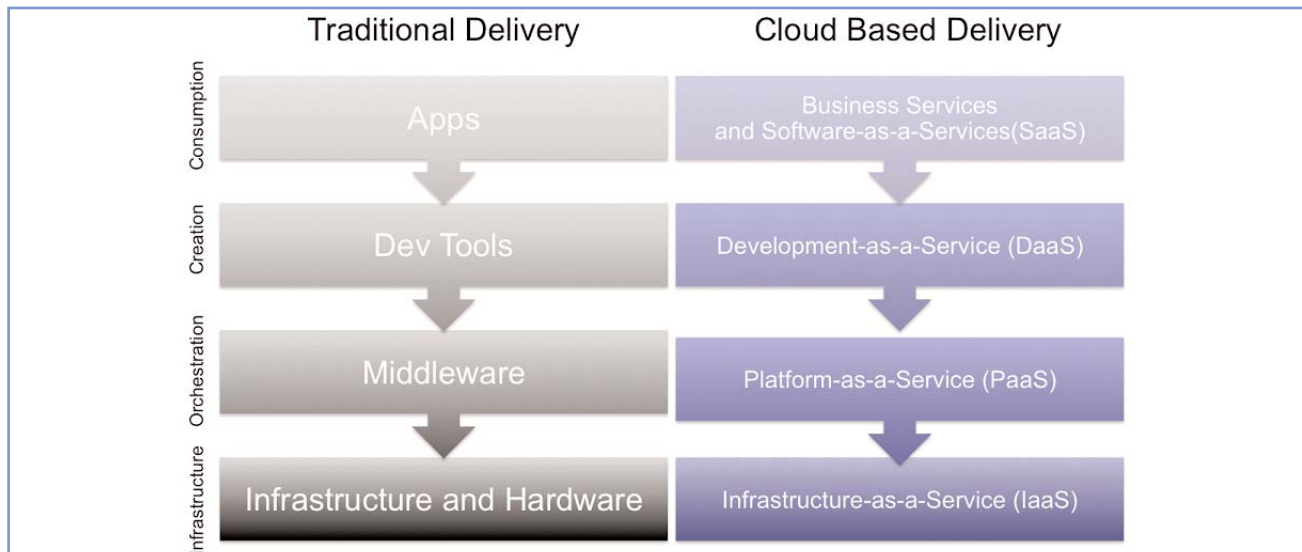
**The creation layer (DaaS) will address development needs**

Another 2011 shift will see new custom application development taking place in the cloud. Early adopters already see the benefits of elasticity as they design, build and test custom applications without having to wait for procurement of hardware, installation of software and preparation of particular environments. In addition, emerging tool kits will continue to take advantage of more business oriented development languages — such as Ruby and Python.

Expect DaaS and PaaS (see below) to merge in 2011. Customers will expect their platforms not only to provide orchestration, but also to support a plethora of development languages. Smart customers will seek open standards in order to avoid platform lock-in. Expect truly open PaaS platforms to provide more choices during 2011.

**The orchestration layer (PaaS) will focus on simplifying connectivity**

Orchestration (PaaS) will focus on simplifying connec-



**Figure 1: Cloud layers**

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tivity and on delivering new technologies. In this context users will bet more on integration vendors with extensive libraries that move beyond just data integration. Increasing hybrid deployment models will raise customer expectations for easier integration management. Most customers will expect integration to work beyond point-to-point data.

Better integration will also address process and meta data. Customers will seek improved analytics and the resemblance of a common data model.

This means that PaaS will deliver consumer tech-type features into the enterprise. As social business platforms, mobile enterprise capabilities, predictive analytical models, unified communications and other disruptive technologies enter the ecosystem, customers will expect their cloud platforms to keep up. Analytical platforms will emerge first, followed by mobile and then social features.

### **The infrastructure layer (IaaS) will aim to reduce complexity**

The infrastructure layer (IaaS) will target the reduction of complexity and simplification of management. This will result in demands for better virtualization. Private, as well as public, cloud vendors will focus on reducing the virtualization overhead. As customers invest in virtualization as a stepping stone to fully fledged cloud adoption, they will expect easier to use and more comprehensive virtualization management tools.

There will also be a move to simplify the overall technology landscape. Customers with a hybrid landscape of legacy and modern cloud systems will exploit cloud technologies as a means to simplify their existing IT landscape. Clouds will also be used to reduce the amount of software shelfware and unused hardware capacity. Users will benefit from smaller energy and management footprints.

Furthermore, archived data will return to being accessed online. For many customers, especially in

certain industries where it was economically and technologically impossible to keep all content online, cloud adoption will mean bringing back archival content access — text, audio and video — into online systems. Information management skills in archiving and data management will re-emerge as a core competency among cloud users.

### **Management conclusion**

The bottom line for 2011: cloud adoption will provide paths to the next generation enterprise. Cloud adoption is inevitable. Business technology leaders will move beyond 'try and buy' across the 'cloud stack' (Figure 1) for seven specific reasons:

- *cloud computing has moved from 'when' to 'how'*
- *as the economic climate improves, cloud adoption discussions are moving from being cost-oriented to value-oriented — and from being tactical to becoming strategic*
- *reducing hardware costs plus increasing competition amongst vendors and economies of scale was already put customers (rather than vendors) in the driver's seat*
- *customers have realized that the total cost of ownership of software should be the vendor's problem, and not theirs*
- *cloud computing will deliver optimization savings — which will pay for future innovation*
- *future innovations will arrive 'cloud first' — and maybe never as an 'on-premises' option*
- *the time to value, ease of use and good-enough functionality will lead as the primary drivers for SaaS adoption.*

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## Why enterprises are adopting private clouds and not making 'The Big Switch'

Robert B. Cohen, Cohen Communications Group

### Management introduction

*Nicholas Carr's book, The Big Switch (Reference 1), posits an almost inexorable migration of corporate IT to outsourced cloud computing. His book expects that external cloud service providers — such as Amazon and Salesforce.com — will provide applications far more economically than when a firm builds its own internal cloud.*

*Certainly, Microsoft, Google and others, have won their share of enterprise email and CRM contracts, providing such services on a cloud platform. Amazon has also been quite successful in winning the business of spinning up servers for Wall Street banks and other enterprises, all with the swipe of a credit card.*

*Yet the evidence is that enterprises moving into clouds are spending far more time deploying their own internal, private clouds rather than using public ones. Robert Cohen examines why.*

### The Big Switch is not happening

In a direct contradiction of Carr's thesis, firms are finding that it is much cheaper to install their own cloud computing facilities than to purchase cloud services externally. In most cases, firms taking this position have compute needs that mean their cloud facilities routinely are taxed with significant computational tasks.

For example, in the financial industry, IT groups must perform relatively complex investment, risk and portfolio analyses many times daily. This type of vast increase in computational requirements contributes to the desire to create internal clouds. In addition, in other firms, the focus is on complex product development and/or applications or software development functions — which face a great number of similar pressures.

What turns the Carr thesis on its head? Several factors do.

First, the totaled up costs of hardware and software plus the cost of internal support staff vs. the calculus

of compute time for external clouds still favors an internal solution, even with its own staff and hardware plus software costs. Why is this true? Where firms need to have a frequently used 'surge capacity', internally owned clouds which can be 'surged' quite a number of times every day often turn out to be cheaper than what is available from external public clouds like Amazon and others when priced out on a compute capacity per dollar basis. Thus, the more frequent use of far greater computing power drives the desire to keep clouds internal.

Second, businesses want to control their own computing operations. Many have significant security concerns or regulatory requirements that limit their ability or desire to use public clouds.

Third, enterprises see building sophisticated clouds as a significant way to obtain different forms of competitive advantage over rivals. They believe that if they operate their clouds efficiently and in an innovative environment, they can create applications that will help evaluate risk and investment strategies far more efficiently than competitors. In the financial world, this may result in more trading, more funds to manage, higher profits and lower risk. In addition, it may permit some firms to incorporate new information, such as news feeds, into their traditional analytic capabilities.

Fourth, enterprise clouds seem able to provide for greater collaboration with other financial and enterprise partners. Used in this way, they may also offer speedier access to intellectual property assets which a firm has created. This can include design tools, applications and even services aspects like advertising, songs or multimedia.

### Digging deeper

This deserves further exploration. Why do enterprises find clouds are cheaper when deployed internally? Certainly, they are saving when they virtualize computing centers and data centers. But they still need to maintain the capacity to surge unusual demand for

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computing power to several times normal daily requirements.

For most enterprises this 'surge' capability is used increasingly often. As a consequence, possessing surge capacity has become a critical function. Cost estimates at financial firms indicate that it is much cheaper to maintain cloud capacity internally than it is to buy externally. When public clouds are used intensively and frequently, it costs organizations and they have to pay for an Amazon or Salesforce.com to spin up servers so often.

Enterprises also stand to gain from building internal clouds. This is driving firms to prefer internal to external clouds. If firms outsource computing to an external cloud service provider, they may not develop or retain the skills needed to run complex applications in the cloud. They might also not keep a skilled staff that knows how to 'surge' the capacity of their private cloud many times a day.

Third, building internal cloud skills helps firms support collaborations in R&D — for example in clinical trials or in design and testing. These are frequently activities which firms prefer to manage on their own. In addition, cloud-related innovation is a difficult-to-measure factor that can drive enterprises to build internal clouds. By establishing skills, they collect economic rents on innovations they have created via clouds. This improves competitiveness.

### **What has been happening?**

How has this played out over the past year? In financial firms, there has clearly been an early move to build internal private clouds as well as to use Amazon and other cloud service providers when needed. There are several factors that seem to be pushing the current trends.

First, there is tremendous pressure on the IT groups of financial firms to deliver cost savings. Virtualizing resources and deploying cloud computing facilities are ways to achieve these savings.

Second, by controlling their move to private clouds, enterprises are reviewing the entire range of applications they are using. Many are planning to reduce the number of applications they are using by 20% to 30%. This is a type of saving that Carr did not consider as a major consequence of the first wave of the move to clouds. Yet it is proving to be a key way that

banks and other corporations are rationalizing application use and shifting to applications that are easier to virtualize. It also provides significant cost savings that would not have been achieved without the decision to build a private cloud.

Financial firms also appear to choose private clouds over external ones because of the size of the trades that they manage. It is not unusual for a large investment firm, investment management fund or hedge fund to make billion dollar trades. With smaller trades, if there is a problem, the exposure to legal suits to recover damages is not very large. If a major firm fails to execute a billion dollar or multi-billion dollar trade, it might damage its reputation as well as result in legal action.

A related factor is the fact that some financial firms have very mixed portfolios. They invest in stocks, derivatives, oil and gas and real estate. Since these markets function in very different ways, a firm cannot manage them by taking a single, unified approach. A number of firms with this type of a business model favor many private clouds over public solutions from Amazon and others.

Many enterprises also have a culture that rules out disseminating much information about how they use new technologies. Why? Contrary to Carr, many of these firms continue to believe that if they can understand, use and innovate based upon a new technology, they will reap the rewards — economic rents — that others will not. This competitive spirit also drives decisions to build and deploy private clouds.

### **Not only the finance sector is cloud-interested**

In addition, there are a number of other industries where a small number of firms see clouds not only as a technology to improve computing but also to support providing greater access to 'intellectual property'. Cadence Design (a firm that sells electronic design tools — Reference 2) offers trials of its tools by supporting them within a cloud infrastructure.

In other cases, firms are considering making services they provide available to internal groups of users and clients by using a private cloud that users access via a VPN. Thales, a French engineering firm, provides for its internal engineering groups to use its 'Engineering Factory', an internal cloud, to link collaborators working on the same research project (Reference 3).

Pharmaceutical firms also are considering how they might use VPNs to connect via a private cloud so they can collaborate. Numbers of different firms can collaborate in such clouds.

In sum, internal IT groups are transforming the way they use computing and storage resources and reducing capital spending. They are doing this in ways that were not expected to be part of the process of moving to private clouds.

### Management conclusion

*Contrary to what Carr postulated, different economic factors are driving many firms to deploy private clouds instead of subscribing to public clouds. This direction is likely to increase over the coming years as firms benefit from the basic economics of virtualization.*

*This lack of 'The Big Switch' effect is enhanced by the desire to retain a critical 'surge capacity' in house for some and by the possibility to drive new collaborations for others. Internal clouds are likely to enable important cost benefits — by rationalizing the hundreds or thousands of applications in use today, and by as much as 20% to 30%. Finally there is the fact is that many firms with private clouds believe they gain key competitive advantages by keeping their clouds private.*

*The result is that internal clouds have many advantages. Public clouds will find these difficult to dislodge.*

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# An IT Architect's dilemma: managing software rust and decay (Part I)

Larry Fulton, IT Architect

## Management introduction

*IT Architecture shares a key characteristic with most engineering disciplines — the need to balance choices across a continuum that stretches between unacceptable extremes. These 'architect dilemmas' are common challenges faced by virtually all IT architects and enterprise architecture practices.*

*In this analysis, Larry Fulton — a practising IT Architect at a leading bio-sciences company — explores issues surrounding 'software rust and decay'. He then examines at what might be done to address such a fundamental challenge.*

## Does software really rust?

It is something of an inside joke among software developers to point out that software does not degrade over time:

- lines of source code do not change simply because files age
- a machine instruction calling for the addition of two numbers will always add two numbers in precisely the same way.

In most other engineering disciplines, there are physical-world issues associated with the changing nature of materials after project delivery: metal becomes more brittle over time as it flexes; electronic circuits are subject to failure after repeated heating and cooling; bearing surfaces literally wear away over time. Software, on the other hand, is a collection of inviolable machine instructions: a 1 is a 1 and a 0 is a 0, and this is pretty much forever.

In practice, however, software systems do in fact degrade over time. It is important for stakeholders to understand why this happens and what can be done about it.

Of course, software does not physically rust or crumble with age. But it can feel that way. Common experiences include user response times degrading over time, new or more frequent error messages and reduced throughput. Just as important is the percep-

tion that a piece of software no longer 'fits' as well as it used to do, typically when:

- business needs have evolved more quickly than the software itself
- new integration requires users to do more in the way of manual activities.

## Common sources of software decay

Software decay, or simply the degrading of a software solution over time, occurs for one or more of the following reasons.

The system (or some of its components) faces growing demands without a matching increase in capacity. Some obvious instances include an increase in competing network usage, or the addition of more users or features. Less obvious are problems like the growth of data sets impacting performance, which happens in databases and also in areas like indexed search engines: these bog down under the weight of an ever-increasing number of indexed files.

A new version or patch of some component can introduce a defect that directly impacts performance. This can be either by consuming additional resources and starving other operations or just by operating more slowly. Even underlying mechanisms, like file systems or other operating system facilities, will slow down as a result of fragmentation and other cumulative effects.

A complete set of interacting components also may not work as well — perhaps after some long chain of updates — as it did when first deployed. This is akin to adding new features to a sailboat, which may make it safer but also go slower.

## Understanding why software 'rusts'

To establish sound strategies for managing software decay — regardless of the root cause — it is desirable to look at the end-to-end system as a whole. An application — whether it is a widely used office application like a word processor, or a highly specialized



custom application automating a specific business activity — is only one piece of the overall processing environment. The latter will include all of the supporting software and hardware as well as peer systems that interact with the application and the business environment as a whole. Thus any software system includes many components:

- the application itself
- the operating system and all of its associated drivers
- framework components, like those in Java or .NET
- infrastructure components, like application servers, Web servers or databases
- interconnecting interfaces that tie all of these things together, like ODBC or JDBC drivers.

In an enterprise environment, the software system also includes application infrastructure like:

- security directories
- messaging systems
- monitoring systems
- communications middleware.

The bottom line is that all of these components tend to have their own release schedules and compatibility issues. Establishing a complete set of components which work together properly is not a simple undertaking.

When a solution is initially developed, all of these variables are generally controlled through a reasonably well-defined project management process that focuses on, and corrects, any incompatibility problems as part of the system's initial testing and deployment. Major revisions to the solution, which will be common in its youth, will generally include a similar effort to ensure that all of the right components are operating as expected as part of any upgrade.

Over time, however, this management of the entire software system as a whole will fade, with the result that new changes will not be as carefully scrutinized for their potential impacts. At the same time, the impact of new systems on the performance of well-established systems is likely to receive less and less attention.

It is beneficial, therefore, to categorize the components of this complete system to illustrate better the

realities and underlying mechanisms of software decay:

- solution-specific business components: these embody the unique business value of a given solution, providing whatever is specific and unique to addressing a specific business problem
- solution-specific technology components: these involve the underlying structure for the solution-specific business components
- shared business components: these will include any business functionality that is available to multiple solutions
- external components: these are simply all components unique to external business solutions
- shared application infrastructure components: these are the application infrastructure components used by multiple applications, typically providing integration or other shared technical services
- standardized platform components: these will include all of the software directly supporting the solution itself and including the operating system, any application or Web servers, database engines and so forth.

In practice, the solution-specific components tend towards greater stability simply because the business has less and less interest in changing them — either because they are mature and functionally complete or because attention is focused elsewhere. In contrast, the underlying components tend to continue to change over time, creating cumulative performance and compatibility impacts. The result is that, while the business understandably diverts attention from the solution-specific components in favor of investments in new capabilities to drive new business, the resulting lack of attention to the rest of the system slowly drags the solution itself into the rust heap.

### **As in the physical world, maintenance is key**

Keeping a software system working 'like new' is easy (as with a car) in the early days. This is because the resources required to keep all the pieces lean, mean and up to date and which resolve incompatibility issues are readily available when the business focus continues to be on expanding a system's capabilities.

Maintaining the same focus on the system as a whole

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becomes much more difficult once the level of interest and investment falls off and resources are directed elsewhere. It is abundantly clear that ongoing attention to how the system is operating is necessary to avoid degraded performance over time. But it is also difficult to maintain the necessary level of investment.

A different way to look at the problem is to recognize that:

- in the early life of a system, when the solution-specific components are the source of most problems, there are adequate resources available to address those problems
- whereas, in the later life of a system, the more generic components and integration with other systems are those that pose the greater risk.

This changes the question to: ‘how do we establish and maintain a stable, high-performing collection of non-solution-specific components as a hedge against foreseeable late-stage degradation of our business solutions?’

While this is not a new way to look at the problem, it does bear deeper consideration. The first generation solution based on this observation is to adopt a standard set of technologies across multiple solutions, and share the cost of maintaining them. The ‘application mileage’ will obviously vary: the more systems that can take advantage of the same technology stack, the more likely it will be that you can drive the per-system cost down to the point where the combined ‘life support’ budgets of more mature systems will be sufficient to keep everything running smoothly.

In practice, though, while this looks good on paper, it is very difficult to sustain. The reason is that the need to satisfy new requirements creeps into the non-solution-specific layers, causing those layers to expand as new capabilities are tacked on and old capabilities have to be maintained. (This is one way that IT support costs escalate over time — adding new ‘things’ to support without taking anything away.)

## Targeting maintenance resources strategically

Yet a different approach is to think of business solutions as being divided into two layers:

- an ‘upper’ layer that includes only those components unique to a given solution
- a (hopefully much larger) ‘lower’ layer that includes everything that can be shared by two or more solutions.

The second of these represents the essence of a service-oriented architecture (SOA). It establishes a large stable of business and technical capability that can be used to support a wide range of individual solutions, and structuring it in a way that makes that re-use straightforward.

For infrastructure capabilities, though, the challenge remains as to how to provide a stable platform that also evolves. Adding new capabilities and shedding old infrastructure on a continuing basis remains the issue.

## Management conclusion

*The boundaries are clear. The per-solution resource investment needs to be relatively small, and the overall resource investment may be capped as well. Any plan must address significant challenges — like migrating existing solutions with limited or non-existent maintenance budgets away from old infrastructure components slated for retirement.*

*In the end, the goal is to establish a cost profile where the strategic ‘platform’ layer covers everything that is non-solution-specific, and its costs are predictable and in line with available resources throughout the life of individual solutions. (In a second part of this analysis, scheduled for the next **INSIGHT-SPECTRA**, Mr. Fulton will outline some strategies for doing this, as well as look at the effects of various build vs. buy options on these strategies.)*

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## **INSIGHT-SPECTRA**

**is published and distributed  
worldwide by:**

**C3B Consulting Ltd.**  
19 St. Michael's Road  
Winchester SO23 9JE  
UK

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