Cool Elephant
Life Beyond the Desk...

Towards A New Landscape

Positioning the Enterprise for Agile Working

Table of Contents

Introduction

Cool Elephant was recently retained by a large public sector organisation to undertake research into the rapidly changing landscape in which they found themselves, and to recommend approaches to both technology and working practise that could maximise benefits to the organisation and its employees.

Some work had already been undertaken, but capturing and analysing business process over a large scale and across a diverse enterprise had proven futile. Instead the client had fallen back onto an approach that has worked historically but is rapidly becoming redundant, made so by both technology and social change. The workplace has altered radically in the last ten years, and recent advances in technology, society and working practise seem set to force it into continued radicalisation. In the face of this, the approach favoured by the organisation was to deem that employees were either static or mobile, and then to concentrate on attempting to deliver architectures and functional sets designed for traditional offices to a series of poorly defined and understood “mobile” scenarios. Unsurprisingly, there was a feeling in the organisation, that this approach had resulted in a series of “solutions” which offered no real fit to the experiences and requirements of staff members; additionally, feedback from those same staff members had indicated that they were well-versed in new technologies that they clearly believed could have a role in step changes to efficiency and work practises. Tied closely to this was a growing resentment that the organisation’s IT department could neither see nor deliver any of these technological improvements. For their part, the IT department regarded radical change as a high-cost, high-risk strategy, and one that offered no real benefits. A bolster to this opinion (and in some ways one of the main drivers in its formation) was traditional Enterprise IT thinking which can be both wedded to tired but tested approaches and excessively risk-averse. IT had become a hindrance to progress, rather than a catalyst.

This paper contains a palimpsest of the work undertaken by Cool Elephant, along with the conclusions reached as part of the engagement and further conclusions reached on further reflection and research. Although a retained engagement formed some of the thought that has gone into this paper, none of the real problems described should be ascribed to our client: certainly they suffered from some of them, but by no means all. Additionally, some of the proposed approaches simply were not relevant to the consultancy piece we were involved with at the time; still, they could be of use to other organisations with similar (if not identical) problems.

A Typical Current Landscape

Many organisations find themselves in a similar situation. It is a simple one to understand, both in terms of its evolution and intractable nature. After many years of continuous IT investment, a large, inflexible and often incredibly complex IT estate has evolved. The cost and effort of managing this landscape is considerable - as a reaction, organisations put in place management structures that attempt to control the chaos, but often result in stasis. Part of the control is a rigorous insistence on the production of requirements sets - if the business cannot prove that it needs a solution, then it simply is stopped from procuring one. In many cases this response is both justified and justifiable, but it can easily lead to an intractable set of hurdles that stop the organisation from being early adopters of technology and approaches that could potentially reap great benefits. Added to this, the act of generating a statement of requirement that can lead to a close-fit solution is often hamstrung by the offerings on the market (which may only offer a 70 or 80% fit to requirements and might in the process impose unacceptable operational constraints on the business).

Existing profiles

Previous phases of the client's thinking had identified four worker profiles, outlined their high level working practises and provided a breakdown of the costs associated with the profiles.

profile	description	technology provision
office	Can only do their job if they are working at a fixed location, in this case a standard shared desk.	Standard desktop, with full network access, phone and filing space. Desktop support.
home	Can only do their job by working from home either full time or very close to full time. These employees come into the office for pre-planned distinct appointments only.	Home build desktop, printer, broadband, IP phone. Desktop support.
flexible	Are required by their job to work over a number of different locations and maintain high levels of contact with internal and external co-workers.	Secure VPN access to the network. Standard build laptop. Access to virtualised enterprise desktop. Mobile phone/PDA. Desktop & mobile support.
mobile	Required by their job to be fully mobile - these workers are rarely (if ever) required to be in an office environment.	Secure VPN access to the network. Standard build laptop. Access to virtualised enterprise desktop. Mobile phone/PDA. Mobile support.

A number of issues became apparent with these classifications, though they were widely reviewed before use and had received broad agreement from reviewers. The first and most obvious problem came when actual workers were assigned to a category. Workers were allowed to occupy only one category, but it was quickly found that most (if not all) spanned categories in the course of their jobs. At that point two sets of infrastructure solution needed to be provided for each multi-categorical users, and costs spiraled. Secondly, it was found that there were many more workers who were classed as mobile than had previously been estimated (or seemed likely) - especially given the essentially office based nature of the enterprise.

This led to a re-examination of the classifications themselves, and a realisation by the enterprise that the thinking behind the production of the classifications was too restrictive, inflexible and based on redundant dialectic models (mobile vs static, office vs field).

Mobile or Agile?

Traditional ways of thinking about worker profiles leads inexorably to the kind of profiling outlined above, where provision is seen as largely locative – the primary driver is where any tasks are to be undertaken, with a small number of mutually exclusive locations driving profile definition. Thus the Office profile exists in a single kind of office with a fixed layout and unchanging parameters, whilst a Mobile profile exists outside any office environment. Home workers are essentially office workers who exist beyond the narrow perception of the “enterprise office”. Lastly, the Flexible profile exists to cover any scenarios not included in the other three profiles - in practise this means that the vast majority of workers will fall into the flexible profile, at which point the whole thrust of profiling in the first place has been lost.

However, some pioneering work has been done in this area. The enterprises concerned are largely public sector bodies (specifically the OGC [1]), but their work has shown that this approach does not include the levels of granularity required – either in worker profiling or workspace definition. This research stresses that thinking about the traditional mobile vs fixed practises hinders innovation and the ability to drive forward properly flexible working initiatives. This leads inevitably to a new view of working practises, the “Agile” profile.

Instead of the profiles above, coupled with a 'per user' view of IT provision, Agile working concentrates on several key drivers:

- A wider range of worker profiles;
- A wider range of workspaces, and an acknowledgement that work can theoretically happen almost anywhere; and
- A 'per solution' view of how systems are delivered to their users.

These three main drivers are behind the concept of Agile working which can be further defined as the move away from a method of working which is defined by where it takes place, to a method of working that can happen anywhere with no loss of efficiency.

Towards A New Landscape - Architectural Analysis

User Profiles

As noted above, the idea of user profiling as a means of ascertaining requirements is not a new one, and has been used successfully in many instances - however, if the profile sets chosen are neither flexible nor granular enough, changing from traditional methods of delivery can be impeded rather than enabled. Nevertheless, it is clear that ome form of profiling can be the most accurate method of deriving future state models of solution and IT provisioning. In accordance with the work done by OGC [1], Cool Elephant recommends adoption of the following profile set (along with high/medium/low ratings for their requirements):

	resident workers		internally mobile		externally mobile	
work style characteristics	**team anchors**	**process workers**	**knowledge/ net workers**	**executive/ managers**	**nomads/ travellers**	**home/ remote**
use of owned office desk	H	H	M	M	L	L
use of shared office desks	L	L	H	H	H	H
in prime office, not at desk	H	H	M	M	L	L
internal physical interaction	H	L	H	H	L	L
external physical interaction	L	L	M	M	H	L
dependency on paper files	H	M	L	M	L	L
dependency on office systems	H	H	M	M	L	H
need for mobile technology	L	L	H	H	H	H
need for fixed technology	H	M	M	L	L	H

Broadly speaking, workers are now split into three categories, with further subdivisions occurring inside these major divisions.

Workers who are bound to one physical office location are deemed as residents, and fall into one of two categories.

- Team Anchors - workers who are vital in facilitating the work of a wider team, such as administrators or project office staff; and

- Process Workers such as call centre staff. These workers typically require a more traditional workspace with fixed location, single occupancy desks and static IT provision.

The second category (internally mobile) contains workers who may well work in teams, but whose day to day tasks are typically accomplished alone and without the need for a fixed office geography. As can be seen in the table above, the need for mobile technology is high in this group and can be used to supply other medium to high needs that are identified, such as the need for interaction and the dependency on filing and other back office systems. These workers do not, however, typically require remote access to back office Line of Business (LOB) systems.

The third category contains the workers who can be said to have the most pressing requirements for remote access. These workers are either truly mobile - spending the vast majority of their time in the field or in partner organisations' offices - or are home workers. Both categories are likely to require access to back office line of business (LOB) solutions. At this point it should be noted that workers who are permanently stationed at home are not mobile in any sense, and should also be counted as “residents” - their requirements do not change as a result of this change in status.

> **NB:** It should be noted that (with some caveats) these profiles stretch across the entire organisation and can equally be applied to non-clerical staff - true agility applies across many job roles.

Considering these profiles, it is now possible to map the variety of access each profile requires, and to use this mapping as the basis for designing the enterprise’s future state agile architecture.
The IT access required by BCC workers can be split broadly into the following categories:

- Access to the file system and to documents held centrally. This section comprises file and print access and electronic document and records management (EDRM);
- Access to the ‘office suite’. This section comprises those solutions required to generate and edit information (word processing, spreadsheet, presentation creation), as well as those required for office administration (time sheet entry, email, messaging & collaboration); and
- Access to LOB solutions.

Mapping these against the worker profiles gives the following:

	resident workers		internally mobile		externally mobile	
IT provision required	**team anchors**	**process workers**	**knowledge/ net workers**	**executive/ managers**	**nomads/ travellers**	**home/ remote**
access to file system	H	M	M	H	L	L
access to ‘office suite’	H	H	H	H	H	H
access to LOB	L	H	L	L	M	M

Access to the 'office suite' is the highest priority as all BCC workers will require to:

- Create and edit documents; and

- Record their time against project codes; and
- Collaborate with other workers. In an agile environment where office space may be at a premium, collaboration is vital as it takes the place of many of the traditional forms of team interaction. The 'office suite' provides this collaboration.

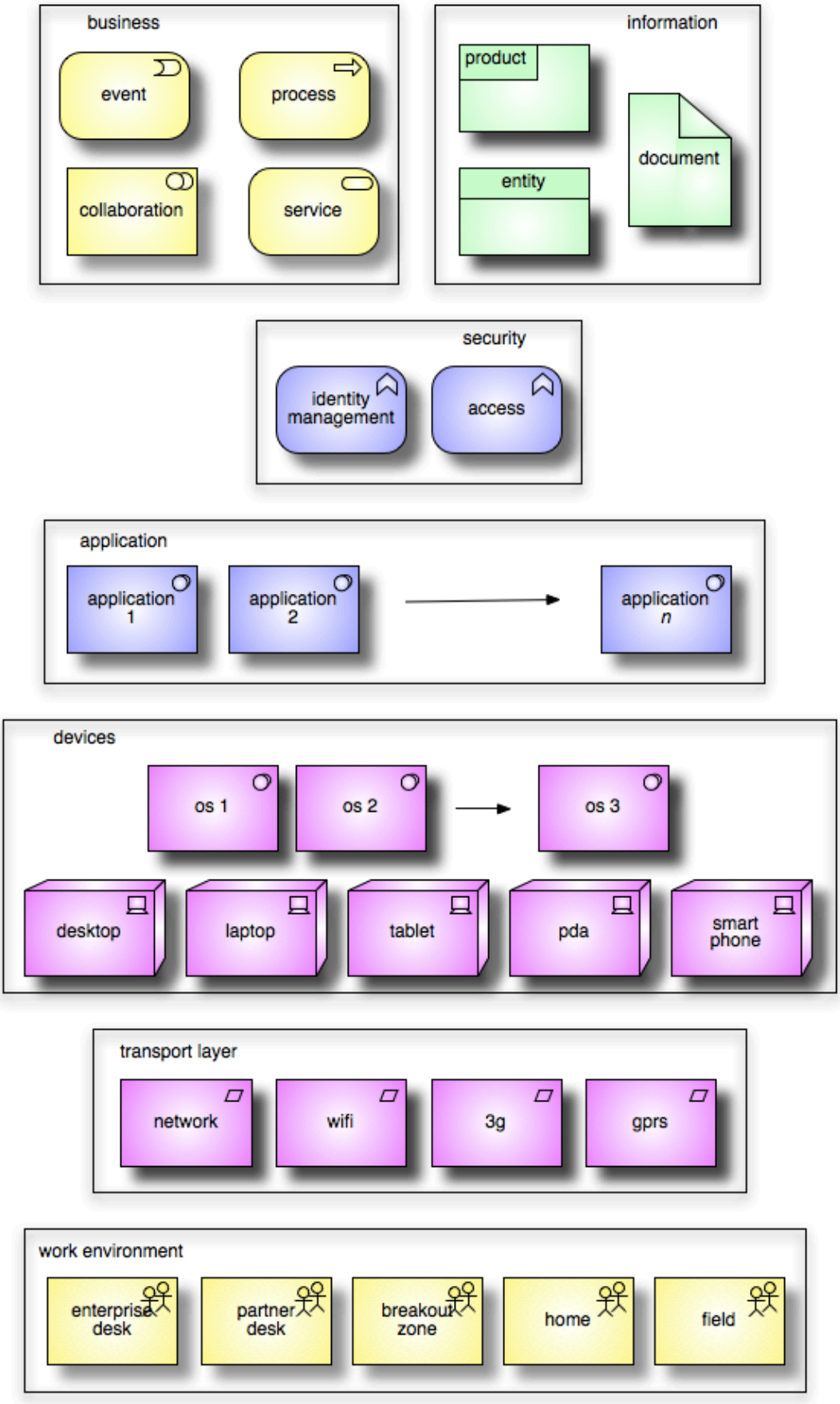
The second priority is access to the documents held on the file system, with the bulk of the functionality here being provided by the provision of an accessible EDRM solution available equally to all agile platforms across the Enterprise. As documents are stored in the EDRM, the focus is switched away from the physical file system – an easily accessible EDRM also reduces the need for printed documents.

Thirdly, there is the requirement to access LOB back office solutions. Some workers will have little or no requirement for this; of the others, many are "resident" workers and so do not require any agile provision of functionality – provision to the static desktop is sufficient. This picture strongly implies that a small number of LOB solutions need to be made available to a relatively small portion of the workforce, which in turns implies that a system by system approach could be the correct solution. In any event it shows that agile working does not necessarily require mobilisation of the entire enterprise back office landscape.

The Agile Model & The Virtual Device

'Work is what you do, not a place you go. The next generation of workforce will know that and be ready and able to work anywhere. Work has migrated beyond the conventional boundaries of time and space into a wider environment and those who manage the government estate need to be prepared.'[1]

Traditional dichotomies (office work vs field work, mobile vs stationary workers) are no longer flexible enough to allow IT to maximise its delivery to business. Instead of a set number of, architecture needs to become more agile. Traditional ways of IT provision can be summarised as:


business
event
process
collaboration
service
information
product
entity
document
security
identity management
access
application
application 1
application 2
application n
devices
os 1
os 2
os 3
desktop
laptop
tablet
pda
smart phone
transport layer
network
wifi
3g
gprs
work environment
enterprise desk
partner desk
breakout zone
home
field

At the top of the diagram, business process and information requirements drive the IT provision, but are not dictated by it. The Enterprise provides a single layer of security which entails one set of identity management and authorisation. This allows access as and when required to a range of business applications. These levels have controlled or business led levels of variance and must not affected by the need to provide for agile working environments.

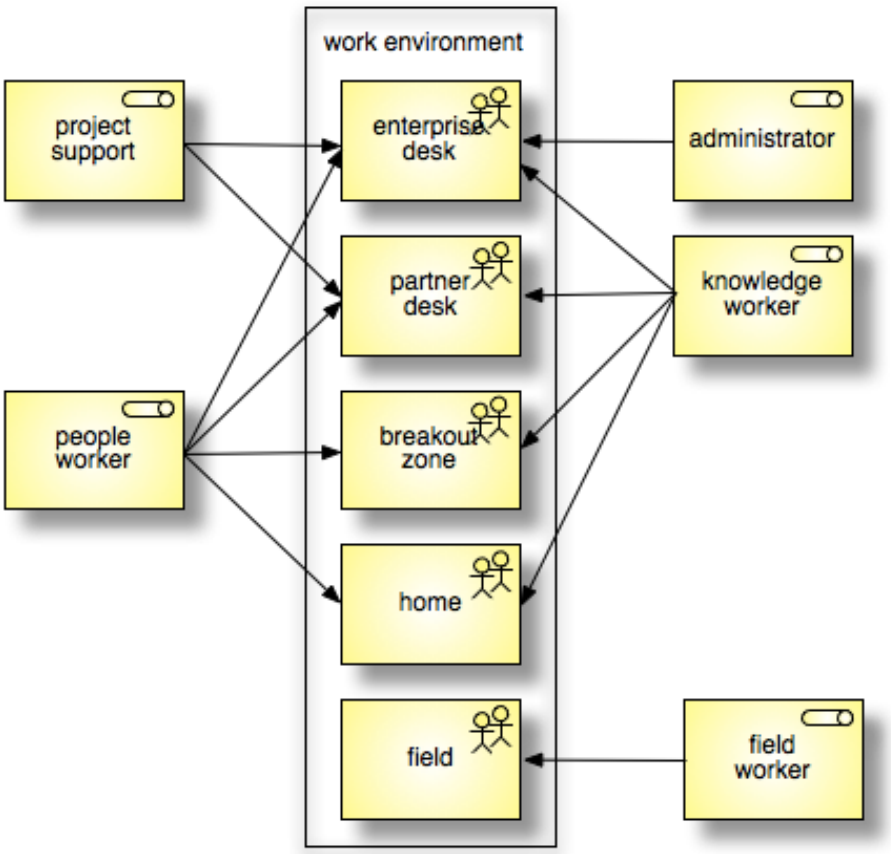
However, the layers beneath the application layer are greatly impacted by the levels of diversity inherent in the modern computing environment. In the devices and transport mechanism layers there are:

- Multiple device types whose differentiating features are increasingly blurred;
- Multiple operating systems (OSs), both shared and in silos;
- Increased transport layer diversity, including traditional wired networks, WiFi, GPRS and 3G; and
- Some environments providing more than one transport mechanism to a single device simultaneously (potentially switching seamlessly within a singe application session).

This diversity is in turn delivered to a physical environment set including:

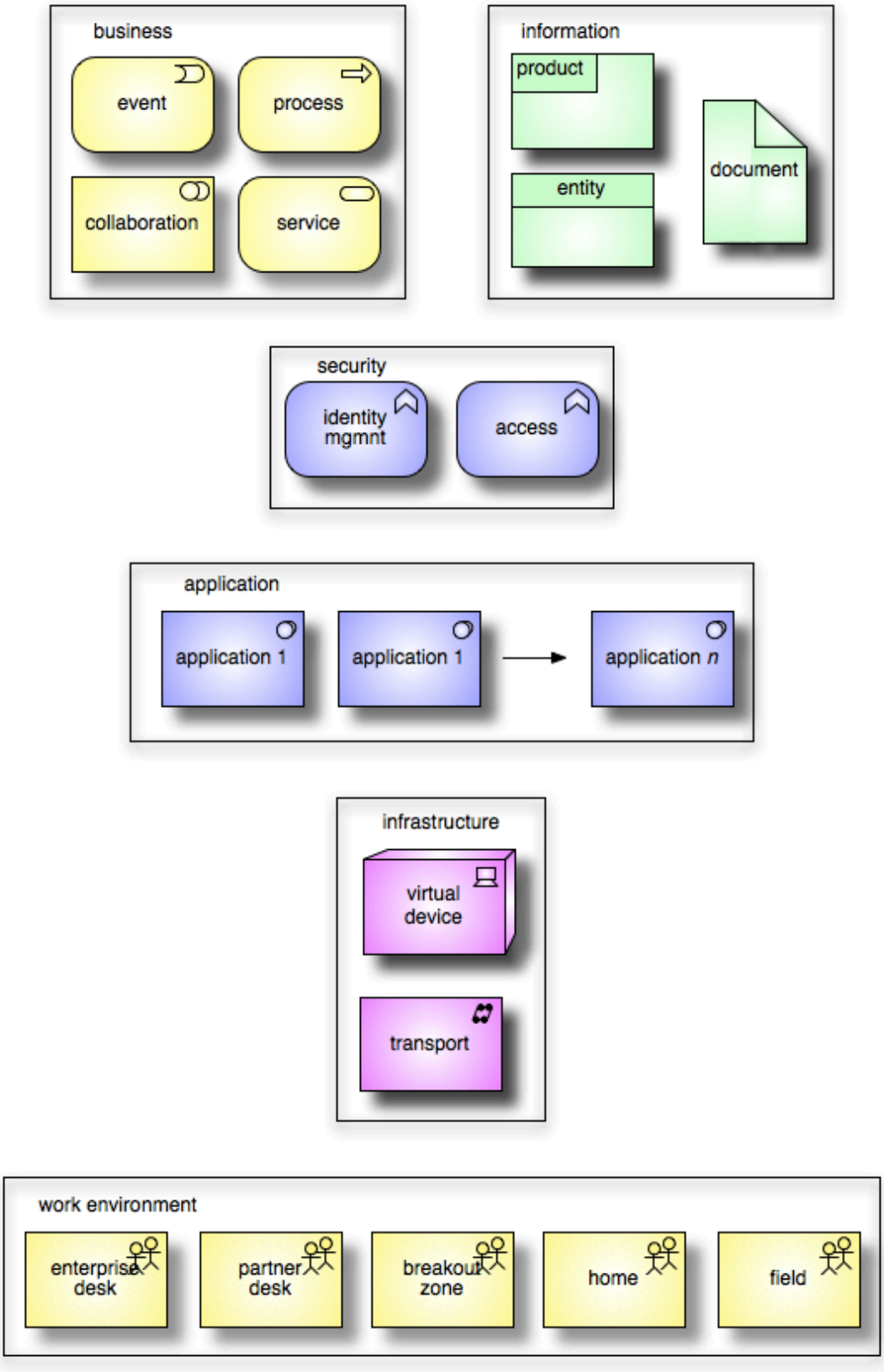
- The single fixed desk office;
- Hot-desk team environments;
- Single hot-desk 'hotels' ;
- Breakout zones;
- Office environments that do not support the enterprise architecture;
- Home offices (both employee and customer); and
- The field.

Workers may make use of some or all of these environments within a single working week as shown below:



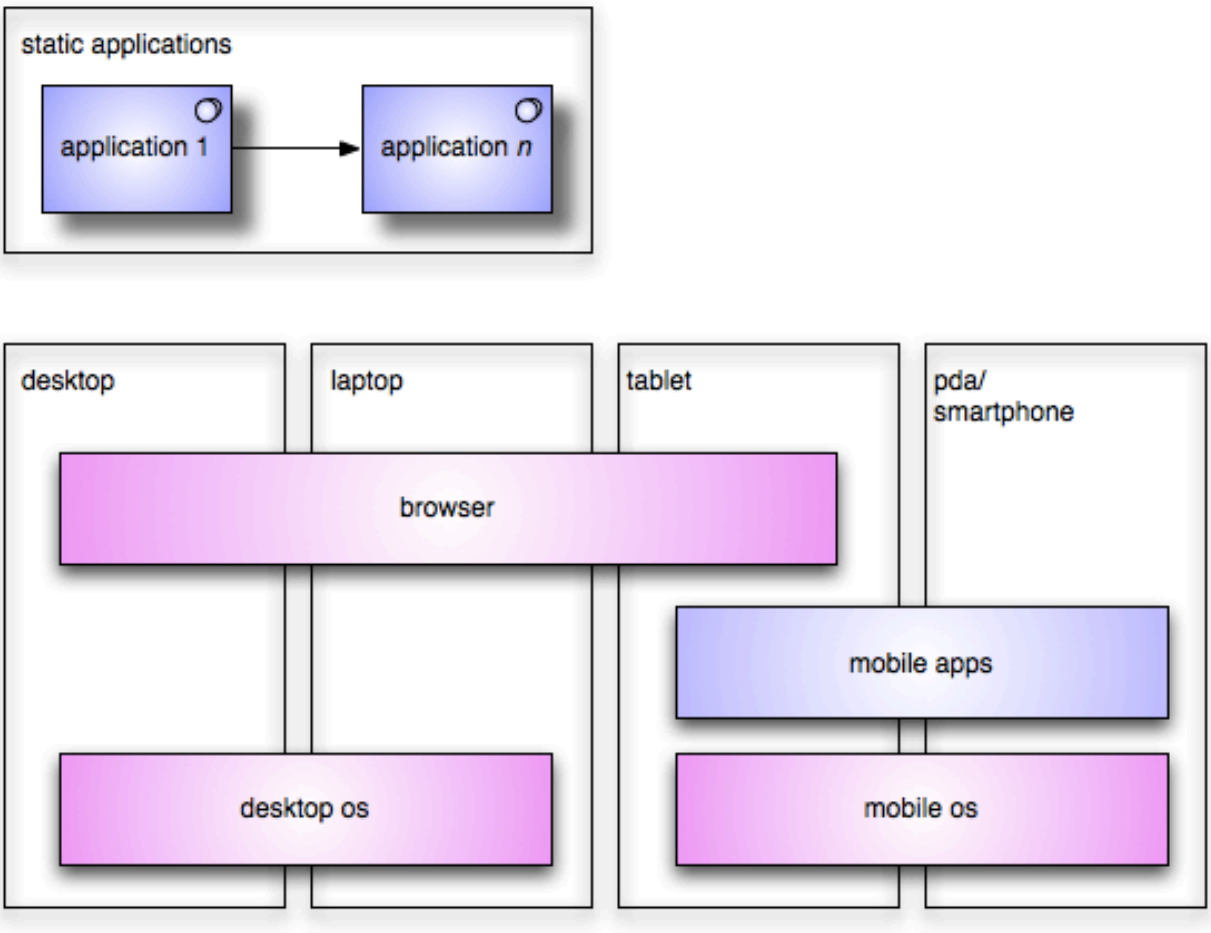
This makes the architectural goal of constraining diversity significantly more problematic, which in turn weakens the ability to impose strategic architectural decisions and means that any provision of agile working leads irrevocably to an uncontrollably diverse IT landscape.

The only alternatives are to forego the advantages concomitant with agility (through the provision of either desk bound functionality, or some limited mobility) or to change the model. What is required, as will be seen, is not provided at the application, business or information layers, but at the technology and physical levels, thus:



Business processes and access to Enterprise information remain unchanged, again with a single security layer providing identity and access management (IAM). At the application layer, individual solutions remain tightly linked to business, information and security requirements.

The virtual device is the key to this model – by replacing the multiple devices of the previous model with one target, platform diversity at the application layer is constrained allowing the Enterprise to concentrate on delivering the business and information requirements. It is vital that the virtual device is able to range across transport layer mechanisms – this allows multiple working spaces to become one logical workplace and opens the way for truly agile working. The most obvious candidate for this device is the browser, which provides a container for most of the diverse platforms in the problem area – with the exception of PDA/smartphones (though these do run browsers, physical screen space imposes strict limitations on browser based apps. Nevertheless, the advent of HTML5 is making even this caveat less concrete). Thus in some cases mobile applications running directly on the native OS may be necessary. However, choice of mobile OS would mean that these applications could be provided across both PDA and tablet platforms. Careful choice of mobile OS could reap further synergy – as an example, Google's Android is used on both platforms and is a Java-based option, allowing differences in offering across the device range to be limited to the presentation layer. Gartner notes that Android's competitors (Apple, Research In Motion, Microsoft and most recently HP) “have developed broad mobile application development (AD) toolkits that are focused on single-platform development rather than multichannel development. In the cases where a simple approach (such as a single, complex application for a single target) is required, these represent viable long-term choices” [8].
The problem domain for the most Enterprises is far more likely to be multiple applications for multiple targets and without great degrees of complexity.



Future trends (as noted in [9]) are for the capabilities of rich client Java based technologies to rise making the device deployed apps more subtle, and in the longer term, for thin client technologies to further enrich their capabilities, potentially rendering rich-client apps unnecessary. The basis for these technologies appears to be Java in all cases – this should influence the choice of any mobile OS adopted by the Enterprise. A key stage in this process will be the wide dissemination of HTML5, the latest version of HTML, and one which adds increased richness in terms of document, video and graphics content. The HTML5 standard has not yet been finally agreed.

In the interim it is true that there are few business LOBs available on any of the leading smartphone/tablet platforms. Where these exist they have been largely deployed to the soon-to-be-defunct Windows 6.x platform which is (as noted elsewhere) now a niche player. LOBs that are ported to Windows 7 look likely to share the same fate. The thrust of this paper is not to replace applications native to one platform with applications native to another, but to provide a platform agnostic (and inclusive) architecture.

Applications are effectively web pages delivered in a browser agnostic way to which ever device requests them, or mobile apps delivered in an OS agnostic way, and encapsulate the business logic of the solution. All data, business rules etc are held in the back office and accessed by a set of reusable (and re-used) services. These services are shared between agile and static solutions such that the maximum amount of re-use and therefore efficiency is gained. Likewise, the applications themselves are not limited to agile working, but are equally available to all user profiles.

Agile Devices

Agile devices are devices that allow working in a large number of diverse environments (including the office at one end of the spectrum and field working at the other). They may be better suited to one or more of the environments in the range (laptops, for instance are more suited to internal, desk-based working). Largely speaking there are three categories:

- Laptops (of which netbooks may be considered a specialist subset);
- Tablets; and
- Smartphones

as well as a plethora of add-ons to enhance capabilities (such as digipens and mobile scanners).

Of the three main categories, traditional solutions can be run on most laptops, a severely restricted tablet set and no smartphones (effectively). This is due to the solution's reliance on Windows. Microsoft have had several attempts to engage with the mobile device arena (Windows tablets have been around for some considerable time without any significant marketplace take up), but have had limited success. Increasingly, they are now losing ground to specialist suppliers who already have strong market share, with both Google and Apple being strong in the smartphone and tablet arenas. Microsoft are making attempts to regain some of this ground, but they are hampered by an OS that is resource intensive in a world where resources are scarce. Microsoft themselves don;t seem to grasp this - Windows (even a cut down version like Microsofts previous attempts in this arena) is simply not an agile OS.

Additionally, several significant players are about to either announce or launch new offerings:

- HP have acquired Palm and, although they have a Windows tablet available in the US, have announced a WebOS based tablet for 2011. This should tie in with Palm's

WebOS powered smartphones in the same way that both Google and Apple have based their offerings on a single, mobile OS.

- BlackBerry traditionally have the largest fraction of the commercial smartphone market and have announced the Playbook – again the model is a single OS (in this case BlackBerry OS v6) shared across tablet and smartphone platforms.

From this it can be seen that adoption of Windows as an agile platform will constrain the selection of devices to a very reduced section of the tablet market; for example, out of a large and diverse field, 8 smartphones currently run Windows 6.5 (see www.microsoft.com).

For these reasons Windows will in all probability not form part of the agile landscape, but will be confined to desktops and laptops - where it retains considerable advantages over any of its competitors. Thus, Enterprises should look to parallel methods of constraining diversity while delivering to a range of platforms:

- Adoption of the virtual device, as detailed above; and
- Look for levels of synergy between market offerings and existing provision, standards and principles.

Applying these two methods removes both Apple and HP as contenders. Apple is well known for the proprietary nature of its offerings – although Safari is a widely supported browser (and in any case there are versions of Chrome, Opera nd Firefox for MacOSX), the underlying OS is a very singular version of Unix. Code for the Apple platform again tends to be proprietary using the Objective C language on the Cocoa platform – only Apple utilises either of these technologies. On the smartphone front, the Enterprises tend not to have invested in iPhone, but have purchased Blackberry handsets instead. Exactly the same logic applies to HP, WebOS and Palm handsets. This being so, none of these offerings is obviously the right one for BCC.

BlackBerry could represent a good option for a mobile platform, but like Apple it is based on proprietary principles – BlackBerry OS only runs on BlackBerry devices and the development environment for BlackBerry is essentially Adobe AIR.

Of the options, Google offer an OS based on the Linux kernel, a Java development model and a cross- platform standards-based browser. Thus they offer an attractive virtual device and levels of synergy with existing Council provision.

It should be noted that Google and Oracle are currently debating the legality of certain patents related to Oracles ownership of Java – this might materially affect the suitability of Android as a cross platform target. This caveat will cease to be important once native applications have migrated into the browser.

Agility and Cloud Solutions

Cloud computing is a model whereby enterprises effectively outsource layers of their IT and subsequently consume them through the internet on a service level basis. The number of layers is specific to the Enterprise - in theory an entire IT operation could be placed in the Cloud, although in reality most Enterprises have thus far only placed some elements. The important point to note about Cloud computing is that the fundamental difference from more traditional outsourcing models is the service level agreement (SLA) based consumption of services at all layers of the architecture, and the fact that the physical location of those purchased services is unimportant and often unknown.

It is this last fact that is the salient one for many Enterprises, particularly those with sensitive data. Public sector organisations in this category may well have a Code of Connection (COCO) agreement with the Government Connect Secure Extranet (GCSX), a secure wide area network (WAN) for councils and other government bodies. Many of these bodies are Council partners and the GCSX is what enables this partnership in an IT sense. Having data stored in an unknown, non-UK location would potentially violate this COCO, for these organisations to engage with the private sector cloud additional steps would need to be taken to ensure that this risk is not realised. For other Enterprises it may be a question of 'containing' sensitive data and providing two data solutions. This is technically feasible and would involve securing sensitive data, functionality and access in a "dark network" separated from the main Enterprise network - typically by a device combination such as an Intelligent Application Gateway (IAG) and Private Internet Exchange (PIX). Although there is a high degree of expectation in the industry around the Cloud's role in agile computing, these security considerations probably mean that private Cloud adoption may not (for the moment at least) a priority for some Enterprises. This need not impact on the move to Agile working.

> **NB**: It should be noted that Cloud computing is not the same as purchasing solutions which are externally hosted on behalf of the Enterprise; many organisations use this model as a central plank of provision.

Delivering Access to the Network

Access to the file system is required almost universally by all worker profiles, and is commonly provided by a SSL (Secure Socket Layer) VPN (Virtual Private Network) solution. This allows users access to all network drives, protected by 128 bit encryption. This should not be allowed to present forced dependencies on any other technologies (for instance OS choice), there are many VPN providers in the marketplace and costs are low.

However, SSO is vital for agile working (particularly for devices with no traditional keyboard, where typing is not the preferred mode of Human Computer Interface (HCI)).

Delivering Access to the Office Suite

For the purposes of this paper, the office suite is defined as that suite of applications that allow users to create and maintain documentation, and communicate & collaborate with their fellows and with external parties. Typically this suite would comprise (but not necessarily be limited to):

- Word processor;
- Spreadsheet;
- Email & address book;
- Diary and appointments;
- Electronic Document and Record Management (EDRM);
- Collaboration;
- Web conferencing; and
- Instant messaging.

Almost all providers in this sector offer products with a web-based delivery option, and so fit into the agile model proposed by this paper.

> **NB:** The argument for implementing an EDRM is based on the accessibility of information to staff working in an agile environment. Some organisations have attempted to make the case for this component on a cost-savings basis, however it has proven

impossible to make a cogent financial case based on spend vs costs recouped through storage space savings.

Delivering Access to Back Office Systems

As noted in the section “User Profiles” (above), provision of access to the network and the “office suite” of applications will satisfy the majority of agile working requirements for most Enterprises. There are, however, a relatively small number of employees who typically require access to a selection of back office systems away from the traditional office environment with each grouping requires access to one or two line of business (LOB) systems at most.

Ideally the suppliers providing these LOB solutions would all offer browser based, potentially SOA solutions which could be deployed easily and with extended benefit to the architecture detailed in section “The Agile Model” above. This is an ongoing trend in IT and has paved the way for mobile and agile working paradigms as noted in [9]. However, it must be recognised that there are many LOBs (particularly those sold in niche markets) which do not conform to the Cool Elephant standards regarding thin-client applications (see below). Of these, typically

- None have parallel applications that could be deployed to a non-windows device; and
- Few could be considered to be modern in technological terms, with fewer still having product roadmaps that include browser-based delivery.

Notwithstanding this situation, it should be the case that, as existing LOBs reach end of life and are replaced, agile deployment becomes a major requirement for the replacement solutions. In the interim, the Enterprise retains a requirement to deliver some of its legacy thick client LOB applications to a browser. The most obvious solution is to deploy some brand of desktop virtualiser, such as Citrix.

This solution should not be viewed as a “silver bullet” in that it does not address delivery of functionality to any device not able to run a browser and involves greater adoption of a technology previously deemed outside its core set of enterprise components. Set against this, the solution offers the following advantages:

- Delivery to the virtual device;
- Move to a 'per solution' model;
- Cost: provision of virtualisation has become readily affordable;
- Scaleability: applications can be located in a Citrix “farm” on an on-demand basis;
- Security: the Citrix SecureGateway is used as a main component in many classified architectures;
- Availability: the Citrix browser plug-in supports all major browsers;
- Re-use of existing components;
- The adoption of a wider range of mobile devices; and
- Provision of functionality on an “as-required” basis.

The architecture of this proposed solution is:

Connection between back office and agile device is via SSL VPN, which is a single mechanism for all elements. As noted above, the “office suite” is already browser enabled. LOB applications are relocated to a Citrix farm on an on-demand basis, and made available by the secure gateway and delivered via a plug in on the agile device.

It should be noted that this solution (or any other aimed at delivering thick client functionality to the browser) must be viewed as a tactical solution. The recommended long term strategy is to deploy thin-client solutions, at which point the requirement for this technology should wither on the vine.

Security

IT security can typically be split into a number of areas – access, authorisation and data transfer. The first deals with who can access the Enterprise estate, the second with what they can do once they get there and the third with the flow of data from the estate beyond the firewall. It can be summed up in four questions:

- Who Am I?
- What can I do?
- Where can I go? and
- What am I (in terms of device type)?

The first question covers authentication, the second authorisation to both individual files and applications, the third access to subnets and file shares, and the fourth a list of known and acceptable devices.

For an agile environment, a number of requirements come from these areas; these can be summarised at a high level as:

- The ability to log in, from a number of different locations and on a number of different device types;
- Access to broadly the same set of services and permissions, irrespective of device or geographical location;
- Service and permission sets to be governed by individual user roles (and possibly individual identifications);
- Security at transport level – in this case acceptably provided by either an IPSEC or SSL VPN, but with a number of other options depending on the sensitivity of the connection;
- The ability to grant controlled access to external users for as long as this might be required;
- Single sign on – the need for the user to be authenticated once and to have that authentication 'travel' with them for the duration of their session, along with their rights and privileges; and
- Access to enterprise data without having that data automatically transferred beyond the enterprise firewall.

In order for agile working to be accommodated, security needs to be comprehensive, but unobtrusive. As examples, single sign on is a real benefit when working on a keyboardless device, and users should be able to log on using a tablet or a desktop – depending on their work mode at the time. Physical security devices (such as RSA devices) are acceptable, however, the latest trend is for software based authentication, which in effect turns the mobile device into a token. This provides a similar benefit to SSO - ease of use by minimising the need for typing.

In order for this kind of security to be implemented, it is important that the whole identity and access management landscape is considered. This includes more than a technological solu-

tion, and it is this area that the many Enterprises have their largest challenges. In particular, the following areas need to be addressed:

- Data classification – data exists at different levels of sensitivity and risk and each level shouldhave policies and guidelines ensuring security. A formal data policy should provide classification and policy guidance;
- Data separation – once data is classified it should be separated according to its sensitivity.
- This allows access rights to ensure that data is only available to user with the correct access permissions. This allows areas of the network (for instance) to have access restricted.

Enterprise Architecture Principles Compliance

The following architectural principles represent Cool Elephant's generalised view - at the time this paper was written. One of the core features of Cool Elephant's approach is that architecture, while it cannot be driven by change, cannot remain static in the face of a continuously developing world. Cool Elephant publishes its architectural standards at

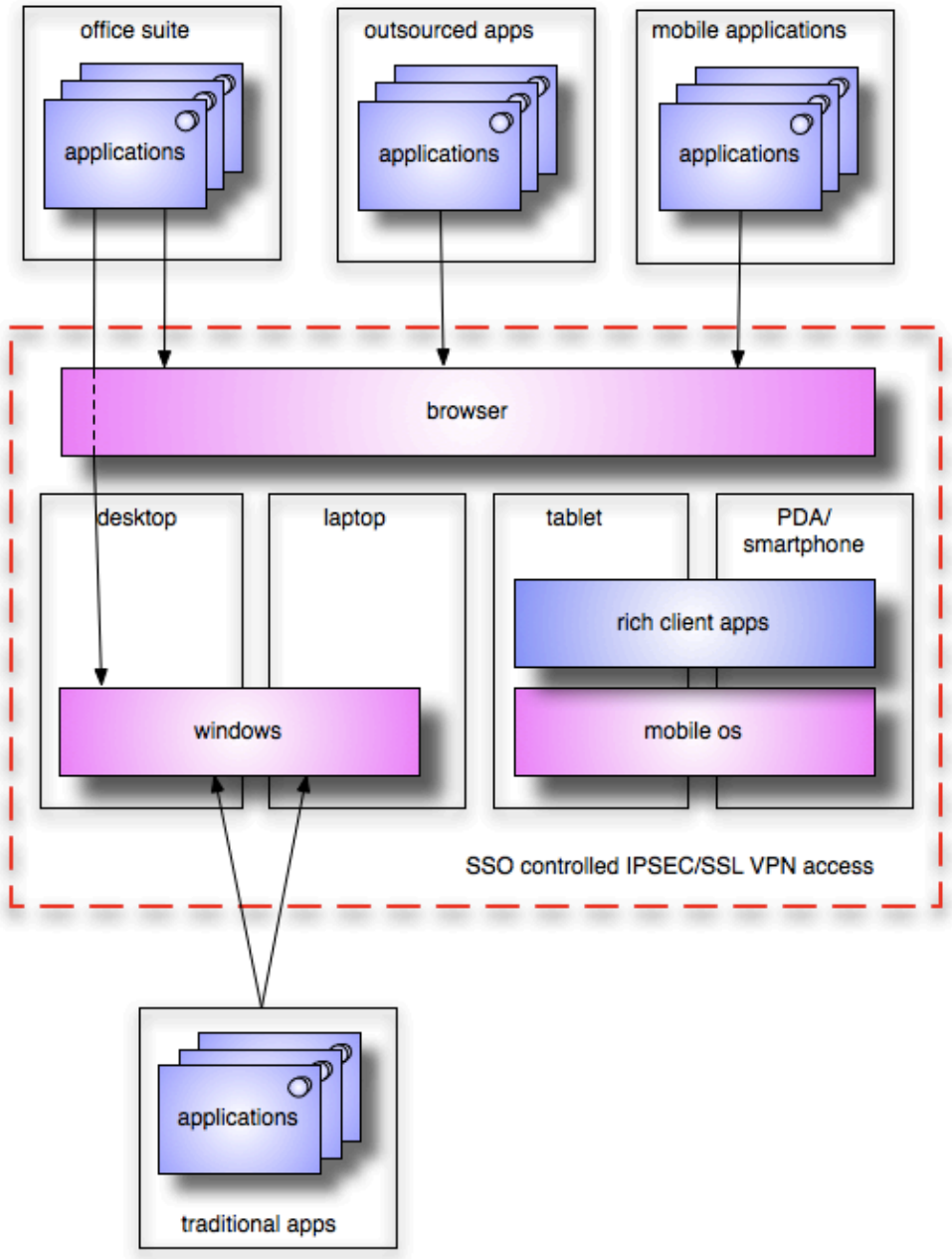
http://www.coolelephant.co.uk/standards

principle	compliance
the enterprise should be shaped by the services it provides to its customers	compliant this paper proposes a position aimed directly at meeting the needs of ICT customers.
benefits from investment should not be limited to narrow business areas	compliant This position paper is not closely aligned with any one project or program.
architectures should be designed for lifetime benefit to the Enterprise	compliant The architectural position outlined in this paper is designed to provide long term benefit to the organisation, and be easily kept in sync with new developments to both technology and culture.
information is a corporate asset	compliant The outline proposal places information at its core and proposes a security approach to further safeguard enterprise information.
business process is a corporate asset	compliant The position outlined by the paper will neither constrain nor limit future business process and is designed around current business processes
employees ideas are a corporate asset	not applicable Except in so far as the proposed approach meets employees knowledge of what is possible.

principle	compliance
architectures should impose an appropriate level of security	compliant The paper makes no recommendations regarding any additional security measures, but neither does it propose anything that would contravene the Enterprise security standards already in place.
architecture must be driven by business strategy	compliant
architecture must be flexible and fit for purpose	compliant
tactical solutions must be temporary	not applicable - no tactical solutions are proposed by this paper.

Conclusions

The high level architectural model for agile working proposed by this paper is:



The “office suite” is available on both desktop/laptop OS and via a standards-based browser. This suite of solutions allows document creation and editing, document and record management, office administration, communication and collaboration. This allows access to the office suite in a truly agile manner.

Outsourced applications are available via the browser as they are currently. It is likely that the number of solutions provided externally via the browser will grow, and so in this respect the architecture is future-proofed. This may also ease a move into the Cloud proper, should that be deemed beneficial in the future.

Applications required away from the traditional desktop are provided on a virtualised, application by application basis via the browser. This is a tactical approach – as these applications reach end of life they will be replaced by browser-based solutions. This allows a shift from a per-user 'blanket' approach to a per application, lower-cost approach.

As noted above the browser is a standards-based, non-proprietary browser.

The Enterprise makes solutions available on a broad range of devices. These range from the traditional Windows desktops to tablets and PDAs running a market leading platform (ideally shared across tablet and PDA and providing some synchronicity with the existing estate).

Inevitably, given the state of the technology, some rich client applications will be deployed to PDA and possibly to tablet. The platform synchronicity mentioned above ensures that these apparent silos have some shared affinity with the remainder of the estate, and that underlying functionality can be re-used. Gartner foresee a gradual fading of the necessity to provide these as thin-client technologies become more flexible, powerful and user-friendly[9].

Windows remains the OS of choice for desktop and laptop devices. For mobile devices the market leaders are Google, Apple or (in the near future) BlackBerry. Due to the ability to secure some degree of synergy across divergent platforms and development technologies, the Android OS and Chrome browser should be considered.

Traditional applications remain delivered in a static Windows based manner. As these solutions reach end of life, they will be replaced by browser-based technology. Where this is not possible natively, the virtualisation solution will render them “thin-client”. Where there is a need to “mobilise” these applications they are virtualised on an on-demand, per application basis.

Secure access to the estate is provided, along with a SSO solution and rigorous security and data guidelines and policies in place.

For many Enterprises, given the small changes required in infrastructure this architecture could be delivered both relatively quickly and easily.

References & Glossary

	Explanation
1	Working Beyond Walls, OGC, 2008
2	Gartner Identity and Access Management Program Maturity Model, October 2009
3	Hype Cycle for Identity and Access Management Technologies, Gartner, 2009
4	Magic Quadrant for x86 Server Virtualisation Infrastructure, Gartner, 2010
5	Server Virtualisation: One Path That Leads to Cloud Computing, Gartner, 2009
6	Magic Quadrant for Mobile Enterprise Application Platforms, Gartner, 2008
7	Mobile Architectures, 2009 Through 2012: A Trend Toward Thin, Gartner, 2009
8	Quantifying the Business Value of VMWare View, IDC, 2009
9	Selecting the Best Network Authentication Solution, Gartner, 2009
10	Gartner Identity and Access Management Capability Models, 2009.
11	HTML5 Differences From HTML4, W3C, 2011

Term	Explanation
AD	Application Development

COCO	COde of COnnection
COTS	Commercial Off-The-Shelf
DDI	Direct Dial Inward
EDRM	Electronic Document and Records Management
GCSX	Government Connect Secure eXtranet
GPRS	General Packet Radio Service
HCI	Human Computer Interaction
IAG	Intelligent Application Gateway
IaaS	Infrastructure as a Service
IAM	Identity and Access Management.
LOB	Line of Business
OS	Operating System
PaaS	Platform as a Service
PDA	Personal Digital Assistant
PIX	Private Internet Exchange
SaaS	Software as a Service
SSL	Secure Socket Layer
SSO	Single Sign On
VDI	Virtual Desktop Integrator
VPN	Virtual Private Network