

Worksession

MEMORANDUM

April 27, 2011

TO: Government Operations and Fiscal Policy Committee
FROM: Dr. Costis Toregas, Council IT Adviser ^{CT}
SUBJECT: FY12 Operating Budget NDA for Desktop Computer Modernization (DCM), Sections 65-6 and 65-7 in the Executive's Recommended Budget (continued)

The following are expected to attend:

- E. Steven Emanuel, Chief Information Officer, DTS
- Ivan Galic, DTS
- Alex Espinosa, Office of Management and Budget (OMB)

Summary of Staff Recommendations

1. **Accept** the Executive's FY12 recommended DCM budget of \$4,815,470, but reduce the outlay of PC replacements by \$200,000 and re-program this amount for the development and deployment of a support model for non-PC and non-laptop devices on the County network (iPads and similar equipment).
2. **Support** the Executive's stated strategy to migrate PC, laptop, and other devices to the Windows 7 operating system environment, as well as to replace PCs over 5 years old with new devices.

Overview

For FY12, the Executive recommends a budget of \$4,815,470 for the Desktop Computer Modernization (DCM) program, an overall increase of \$1,634,520 or 51.4% from last year. The details of the requested resources are provided in the table below:

	<u>FY11 Approved</u>	<u>FY12 Recommended</u>	<u>Change</u>	<u>% Change</u>
DCM Program	\$3,180,950	\$4,815,470	\$1,634,520	+ 51.4%

This increase of \$1,634,520 is made up of two components:

1. An increase in support of \$2,996,300, primarily dedicated to replacing 2,400 units that are beyond their recommended useful lives, and the initiation of a migration from Windows XP (the current operating system) to the new Windows 7 platform.
2. A decrease of \$1,361,780, primarily reducing contracted support services; this will impact service levels for end users.

The Committee met to review this budget on April 13, 2011, but requested additional information before making a final decision on the DCM budget. Staff suggested a change in the strategy by shifting away from a PC-only replacement policy to one where half the replaced devices were PCs and half were tablets such as iPads, able to operate on the County network and in a mobile environment. Depending on pricing of individual units and of infrastructure, this option had the potential of saving almost \$1m in DCM outlays.

The CIO has explored this option and provided his response on ©1-18. This response has several elements:

1. The 2,400 PCs which will be in the inventory with ages beyond 5 years should be replaced. The department would like to replace them on a one-to-one basis with PCs as well (in the “standard” or D2 category of equipment), but with a major difference: that the replacements would conform to the transition requirements of Windows 7 and away from the outdated Windows XP currently in operation. Staff concurs with this strategy after reviewing the aging schedules and the PC replacement policies.
2. There are many departments that are migrating to tablets because of convenience, better match to work requirements, and portability. However, there is currently no County support offered for these devices. The CIO suggests a “discovery process” that can inform each user of requirements and conditions for adoption of new technologies. Staff agrees with this perspective, but suggests that DTS must go further and deploy actual supporting services for the pioneers who are now using portable devices to “take the County to the residents” in a mobile environment. Therefore, it is suggested that \$200,000 be taken from the replacement fund and re-allocated to the development and deployment of a tablet support mechanism.
3. The \$200,000 reduction in the PC replacement fund in #2 above need not mean a reduction in the number of traditional PCs replaced in FY12. A cursory look suggests that the D2 configuration may be available through high volume channels at price levels significantly less than the forecast in the CE proposed budget. Staff is awaiting confirmation of actual price levels for the DCM program. If indeed the price for D2 units can be found for less than the assumed price of \$1,250, then additional PCs or tablets as secondary PCs or laptop replacements where appropriate can indeed be procured.

DTS provided a description of the process used to procure large quantities (over 800) of PCs directly from one of the dominant manufacturers. Details on the program are on ©19. The information provided asserts that the prices are significantly lower than State of Maryland and Small Business benchmarks. The information provided does not permit an analysis of pricing or a recommendation to alter existing processes.

4. ©12-18 provide an early assessment regarding the utility of iPads by the Gartner Group; while written more than 6 months ago, the basic elements of their review, other than product maturity, are not significantly different than what the market evaluators are saying today regarding the most recent I-Pad edition.



DEPARTMENT OF TECHNOLOGY SERVICES

Isiah Leggett
County Executive

E. Steven Emanuel
Chief Information Officer

MEMORANDUM

April 22, 2011

TO: The Honorable Nancy Navarro, Chair
Government Operations and Fiscal Policy Committee
Montgomery County Council

FROM: E. Steven Emanuel
Chief Information Officer 

SUBJECT: DCM Budget Strategy for FY12

Pursuant to our budget session on Wednesday, April 13, 2011, we have reviewed the Council recommendations and recognize the value of the Council strategy for innovative technologies adoption. We have considered the tiered recommendations proposed by Dr. Torgas and believe that we have a strategy that is very much in line with the progressive adoption Montgomery County has been known for over the past many years.

The County Executive Recommended FY12 Operating Budget is consistent with recommendations made to the GO Committee on March 28, 2011 when the ITPCC presented the FY12 IT Program and Budget Overview annual report which expressed significant concern over the aging inventory of PC systems. This is also supported by the Policy Guidelines for Replacement of PC Systems adopted on February 7, 2011 by the ITPCC agencies. The FY12 DCM budget request for FY12 is targeting the urgently needed replacement of "beyond useful life" devices that are over 5 years in age and either failing or at high risk of imminent failure. Council support of the DCM program generally, and funding replacements of these high risk systems in FY12 is crucial to maintaining the productivity of our employees, reducing risks, and minimizing any disruption to our County residents. We continue to recommend full funding for replacement of 2,400 standard (D2) desktop computers in FY12 as an urgent priority.

The objective of the DCM process is to ensure that the systems deployed fully meet current agency business and mission requirements. The program's continued success ensures that the oldest technology communicates and interacts with the newest system across all internal and external networks in a transparent fashion. This best practice methodology, recognized by the Committee, ensures that business process needs, include ongoing capability, over the full system lifecycle. While the County and other agencies address challenges with legacy systems, maintaining a common foundation over this lifecycle requires an assessment of risk through business functionality and is DTS' highest priority when making transformational recommendations.

Upon further detailed analysis of hardware options, cost configurations and support options related to introducing tablet computing and other potential consumer options into our business environment, we have concluded that the costs per device used in the Council's proposed change to the CE Recommended budget for

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DCM significantly understates the costs that the county will likely incur. As a result of our analysis, provision of the 2,400 devices for FY12 in any combination that includes non-standard computing devices would not result in savings. If a tablet device inclusion is mandated by Council, it will reduce the total number of replacement PCs that are more urgently required because of the additional risk and costs they will create for the organization.

In the spirit of demonstrating a progressive posture towards County opportunities, concurring with Councilmember Ervin's direction on customer need and acceptance of a new tool, DTS would like to utilize Council's forward thinking recommendation and develop a discovery process to assist users in making the appropriate choice. This discovery process will ensure that integration of these new computer devices have equitable value to the user's business process and users choosing the new technology. Users must be consummately aware of the device's capabilities, the current business systems that are compatible with the new devices, understand the current support structure and be fully aware of any known limitations during this early adoption period.

As a commitment of our current, proactive and aggressive efforts to support the innovations that Council recommends, DTS staff has compiled information that we believe supports the Executive's recommendation and provides a sound path for the FY12 plan that addresses known, compatible and supportable desktop solutions. The information outlines the fiscal prudence of the initial recommendation for FY12, using the current DCM plans, strategies and refresh process that will enable a consistent, non-disruptive and dependable end user computing solution. The recommendation also creates a pathway for progressive users to make an informed decision before moving to new technology solutions while assisting DTS in formulating a next generation plan for new technology adoption and integration.

Cc: The Honorable Valerie Ervin, County Council President
The Honorable Hans Riemer, County Council Member
Dr. Costis Toregas, Council IT Advisor

DCM Solution Strategy and Consumer Innovation Assessment

Overview - DCM Program Strategy

Implemented in October, 1998, the current DCM program has evolved into a certified ISO 20000 Compliant Service Delivery Model methodology. Through the implementation of DCM, the County achieves several key goals:

- Brings current technology to the desktop in a manner which achieves accessibility across all departments, application compatibility and data security across the Enterprise.
- Reduces the cost of and need for support services through standards, planning and the delivery of devices that guarantee interoperability through the lifecycle of selected program devices.
- PC and laptop refresh policies reflect energy efficiency best practices. Standard PC and laptop refresh policies include the purchasing of Energy Star capable machines. Purchasing Energy Star compliant machines has always been the standard for the DCM Program.
- Provides a single source of system support through a centralized single point of contacting the IT Help Desk.
- Provides quality services to end users in an accurate, consistent, timely and professional manner.
- Controls total cost of ownership through projectable discounts, leveraging economies of scale via enterprise standardization and deployment which provides for centralized management over the device lifecycle.
- Provide for reliable and uninterrupted user productivity.

Furthermore, DCM has consistently negotiated deep discounts in the range of 10-30%, for business class computers as compared to the State of Maryland and other local jurisdictions. The result: savings of hundreds of thousands of dollars and lower total cost of ownership to the County. Results such as these have garnered the County's DCM program recognition from organizations such as the Public Technology Institute and the National Association of Counties.

Cost Benefit Analysis

In response to the Council recommendations, DTS staff performed an analysis of device options that more accurately reflect potential costs for considering the infusion of consumer tablet devices. Similar to comparisons to consumer PC and laptop devices, it is important to recognize that these low cost consumer solutions are initially targeted for home or novelty use. As was the case with PDA's and early smart phones, there was an early mis-match between the consumer devices and business needs. However, as the consumerization grew, the business adoption grew and eventually the technology could be incorporated into business objectives. DTS believes that the consumer tablet market will have a similar maturity process and early adoption, for substantiated business cases should and will be recognized.

DCM Solution Strategy and Consumer Innovation Assessment

The DTS comparison is a small summary of a larger analysis that was performed. It represents a cost benefit analysis that supports the Executive Branch direction to utilize the recommended DCM funds for the cost effective computing systems currently deployed. As stated in the initial committee session, consumer devices are commonly refreshed at a much higher rate than business class devices. While DTS believes that the maturity of these devices will lead to as many as four generations (similar to the early years of the PC), our analysis makes a presumption that during a typical business class, four year lifecycle, consumer based devices will have half of the business system tenure and the costs associated with this methodology surpasses the business class solutions currently provided.

The tables below provide a cost analysis, based on a four-year lifecycle:

iPad 2 Wi-Fi (32GB) – Least Cost Option

Base model	599
AppleCare Protection Plan (2yrs)	79
Cover, keyboard, docking station	137
Open Wireless Access Point Costs (Assume \$10 per month 4 years)	480
Replacement and second Protection Plan (2yr Lifecycle Assumption)	678
Total (4 years)	\$1973

DCM Laptop Light – Dell latitude E4300 – High Cost Option

Base Model	1455
Total (4 years)	\$1455

Device Assumptions

- Standard Four (4) year lifecycle for both County Standard PCs and Consumer devices
- Consumer devices require non-secure network access (outside County Firewall)
 - Assumes a \$10 cost per month for open access point installations, maintenance and support
- County standard PCs will have access to both open wireless, secure wireless and wired internal network
- No inflation or upgrades included
- No cost for monitors or other displays included
- Pricing for other Near Term devices will be similar (e.g. Blackberry Playbook)

In the development of this analysis, the DTS team also provided the inclusion of aggressive mobility options for both the consume tablet devices as well as accessories to augment a high level of mobility for business class solutions. This detailed analysis

DCM Solution Strategy and Consumer Innovation Assessment

has been included to clearly demonstrate that while business benefits can be gained and productivity enhanced, investment and operational costs are clearly evident and such an investment requires the comparable offset by business process and productivity improvements from our users.

Summary - FY12 DCM Strategy Recommended

DCM's best practices based approach to maintaining a modern and cost effective computing environment throughout Montgomery County Government continues to demonstrate high fiscal prudence, interoperability and reliability. The program continues to reduce the Total Cost of Ownership (TCO) of PCs through standardization, acquisitions, asset management, help desk support and maintenance services. The continuation of the DCM model will retain the consistent enhancement to user productivity by County staff, maximizing the availability of their systems; facilitating the introduction of new business driven technology and user tools; and assisting County agencies in meeting their technology support requirements.

The DCM solution for the current laptop and desktop distribution / replacement model demonstrates a cost effective approach to the current needs of the average user in the Executive Branch. The current plan for FY12 will begin the migration of systems to the Window 7 operating system, while maintaining the capabilities of users to access enterprise applications, with no impact to functionality, application compatibility and data security

Enterprise Solution for Non-Standard Client Devices

The DCM program includes flexibility in the development and incorporation of innovative technology. While support of consumer solutions is closely scrutinized, alternative computing has been incorporated. Similar to other agencies, tablet-computing options have been included in a limited fashion. The DCM solution has a tablet device that allows for the flexibility of tablet based computing, but it is built on the high end, business laptop model base that does include a significantly higher cost. The challenge, as presented to the DCM process with the new consumer tablet devices repeats the early innovation challenges, similar to Smartphone and PDA maturity. DTS is in agreement that consumer based technology will need to be integrated into the workplace, and has positioned itself to provide for that transition, based on business needs driving the technology adoption and providing a level of support acceptable to the user community and ensuring a constant cost conscious approach to this transition.

In concert with the transformation to non-standard access capabilities, DTS can demonstrate the incorporation of business solutions that have been instrumental in making early adoption possible. These widely used business solution include:

- Open Internet access applications:
 - County Email
 - Calendaring
 - MCTime for timesheets
 - ERP Employee self-service

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- Financial Disclosure
- County Web Information

(Note - All have browser requirements that the non-standard client must meet for standard functionality)

- VPN Access - VPN access supports the following Operating Systems:
 - Windows (XP SP3, Vista, Windows 7)
 - Linux MAC
 - Handhelds - Android OS, Windows Mobile, IOS, Blackberry

(Note - Operating Systems currently supported by the vendor; Windows Operating Systems require up to date virus checking software)

The overarching challenge with a rapid transformation to new technology lies in the ability to ensure that business applications in use can transition seamlessly or transparently with the technology modernization. While DTS and County solutions are making these migrations to web based, open access capable methods, the County has hundreds of business applications that require review, testing and in some cases wholesale modernization to ensure the functionality built for use by the current PC and laptop platform. As exemplified by the recent implementation of our ERP, new solutions will be available in delivery agnostic venues, but the expanse of the County's application portfolio has yet to be analyzed for this delivery migration.

Enterprise Limitations and Cautions for Consumer Appliances

The challenge of consumer solution into large organizations and other commercial entities is not unique to Montgomery County. Most larger, business process centric organizations have not adopted iPads and tablets as full replacements for desktops and laptops for the same reasons that the County is illustrating. Reasons for this lag include, but are not limited to:

- Business application incompatibility (legacy systems)
- Data portability vulnerabilities
- Absent or no standards for Anti-Virus and malware management
- Lack enterprise printing functionality
- Incompatibility of freeware for business process needs
 - Native Windows Applications
 - Flash Video (iPad)
- Playbook (RIM) requires Blackberry Phone tether for internet capability (WiFi device only, at present launch)
- Ruggedized version are not options
- Lacking Enterprise management support (remote / wireless support)

In a late 2010 review by Gartner, senior analyst identify clearly, as described by the title of their research, "iPads: Not Notebook Replacements, but Still Useful for Business", the overall functionality of iPads (and presently paralleled by other devices appearing in the marketplace) that the functional maturity of these devices has not attained the ability to

DCM Solution Strategy and Consumer Innovation Assessment

perform as a primary device. They do denote a number of potential early adoption fields including senior executives, sale and marketing staff and some elements of field task workers (with applications designed for the devices) may make the early transition. It goes on to state that organizations that have developed substantial positions in virtual desktop solution will have a more rapid possibility of application and business alignment.

Enterprise Activities In Support of “Open Access” Opportunities

DTS and the County business applications direction have been forward thinking about making information systems and services device agnostic. Since the redevelopment of the County’s web content and web portal in the 2003 timeframe, information systems that adopted web access and delivery have made it easier and readily available outside of the internal network. This effort was primarily to provide alternate work access possible for a workforce culture that began to utilize home computing and Internet speeds to continue their business contribution.

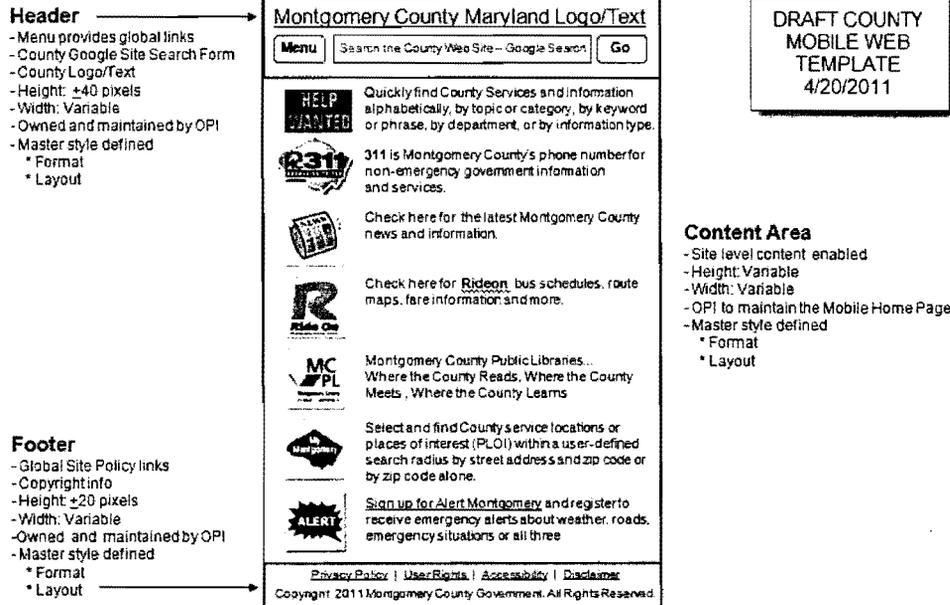
The County’s standard architecture calls for Web based applications as the standard delivery medium. It is documented in the enterprise architecture plan and has been the standard. With this Web model, our preferred hosting environment is the Enterprise Hosting Infrastructure (EHI) for applications with any type of security or high availability requirements. With this architectural standard, the County can expose business applications to both the Internet and Intranet. The decision as to which exposure method(s) is determined solely on the business need, by the Application owners. As a result, the business priorities currently dictate the level of open access and transitions of legacy solutions to the architecture also depend on business priority and mission.

DTS, as with other service based IT organizations, leverages business need as the driver for open accessibility. As best practice states, the application owners are the decision makers.

Within the context of what DTS can support innovative direction, opportunities to provide for new technology innovations are taken as appropriate. Where enterprise systems are managed by DTS, solution changes that are adapted to increase mobility include:

- Web Services delivery as the standard business model for new applications and services
- Focus on inclusion of mobility delivery (see example of Smartphone and tablet proposed mobile view of County’s web below)

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DTS applications staff is looking at best practices and award winning solutions that present web solutions in standard desktop and mobile configurations. This effort is being developed as part of the template for the next generation of content management configurations as part of the County’s web governance program.

FY12 Advanced Adopter Options and Opportunities

In concert with Council’s recommendation to identify early adoption user for newer technologies, including devices like the Apple iPad and Blackberry Playbook, DTS will develop a user survey mechanism to identify users that can utilize these new solutions in lieu of standard desktop solutions provided by DCM. DTS leadership will propose a client device analysis that will identify users with those systems that are due for the most urgent replacement and include a needs assessment that will help the user and DCM identify a potential match as an early adopter of the tablet technology.

DTS, as a part of the user qualification and functionality assessment, will assist the users in determining the impacts of making the transition to the newer technology. In preparation for this functionality and support assessment, DCM will develop an early adopter program plan to ensure users understand and completely agree with the transition to the new technology. DTS and the role of the CIO are to ensure that the user has defined a “firm business case” for taking the innovation step. As a part of ensuring the value of the business case, this plan will include:

- DTS will provide a complete description of the support model for software and hardware

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- DTS will confirm with users the ability to function completely outside of the County network (from the Internet) and the required wireless access is available at the primary work location.
- DTS will develop a Service Level Agreement that will identify the program expectations, including the refresh plan and initial support limitations
- User agreement to replace DCM standard device to make the procured tablet or other device the primary workstation solution.
- DTS will provide information to the Department head regarding the solution choice and request concurrence for departmental requests for consumer appliances.
- DTS will request the using Department take responsibility for added costs beyond the DTS/DCM early model, including the purchase of a DCM standard desktop if the consumer unit is found to be inadequate for business use.

(Note: Early adopters that prefer to use tablets as a secondary device can purchase devices with non-DCM funds and be included in the support and feedback loop of those that are selected for the early adopters)

- DTS will create a procurement method for table solutions.
- DCM will fund tablet computers for a limited number of qualified users in FY12 and provide an assessment on the early adopter program for FY13 budget planning.
- Early adopters will be asked to participate in feedback loop process to improve the use of consumer devices, lessons learned and barriers for future users.
- DTS will provide a reporting of costs, support or satisfaction issues as requested.

The approval of the DCM budget at the Executive's request is crucial to the development of a program that can be implemented during FY12. Once the program is launched, a survey, list of initial DCM replacements and impacted users can be created and the analysis of user requirements will be completed to launch early adopter acceptance solutions.

iPad vs DCM Seat Machine Costs Comparison

Year 1 Year 2 Year 3 Year 4 4yr Total

iPad 2 Wi-Fi (32 Gig)					
32 Gb	599				
cover	39				
docking station	29				
keyboard	69				
iPad AppleCare Protection Plan (2yrs)	79				
Outside Wireless Access Point	120	120	120	120	
Replacement (2 Yr life Cycle)			599		
Second Protection Plan (Yr 3-4)			79		
Total	935	120	798	120	1973

iPad 2 Wi-Fi (64 Gig)					
64 Gb	699				
cover	39				
docking station	29				
keyboard	69				
iPad AppleCare Protection Plan (2yrs)	79				
Outside Wireless Access Point	120	120	120	120	
Replacement (2 Yr life Cycle)			699		
Second Protection Plan (Yr 3-4)			79		
Total	1035	120	898	120	2173

iPad 2 Wi-Fi + 3G (32 Gig)					
32 Gb	729				
cover	39				
docking station	29				
keyboard	69				
iPad AppleCare Protection Plan (2yrs)	79				
Verizon data plan 5GB per Month at \$50	600	600	600	600	
Replacement (2 Yr life Cycle)			729		
Second Protection Plan (Yr 3-4)			79		
Total	1545	600	1408	600	4153

iPad 2 Wi-Fi + 3G (64 Gig)					
64 Gb	829				
cover	39				
docking station	29				
keyboard	69				
iPad AppleCare Protection Plan (2yrs)	79				
Verizon data plan 5GB per Month at \$50	600	600	600	600	
Replacement (2 Yr life Cycle)			829		
Second Protection Plan (Yr 3-4)			79		
Total	1645	600	1508	600	4353

iPad vs DCM Seat Machine Costs Comparison

Year 1 Year 2 Year 3 Year 4 4yr Total

DCM (Wi-Fi Access)					
Desktop PC					
Dell Optiplex 780 + Monitor	1070				
upgrade memory to 4G	84				
Total	1154				1154
Laptop Mainstream					
Dell Latitude E6410	1140				
Total	1140				1140
Laptop High End					
Dell Latitude E6510	1340				
Total	1340				1340
Laptop Light					
Dell Latitude E4300	1455				
Total	1455				1455

DCM (3G)					
Laptop Mainstream					
Dell Latitude E6410	1140				
Sprint wireless - \$40 per month	480	480	480	480	
Total	1620	480	480	480	3060
Laptop High End					
Dell Latitude E6510	1340				
Sprint wireless - \$40 per month	480	480	480	480	
Total	1820	480	480	480	3260
Laptop Light					
Dell Latitude E4300	1455				
Sprint wireless - \$40 per month	480	480	480	480	
Total	1935	480	480	480	3375



iPads: Not Notebook Replacements, but Still Useful for Business

Leslie Fiering, Ken Dulaney

Apple's iPad has become the focus of attention of businesses due to its high consumerization potential, to deliver entirely new applications and customer delivery mechanisms. At the same time, it also creates new support burdens as end users bring iPads into the enterprise and onto corporate networks.

Key Findings

- In the short term, the main use for iPads will be as companions to notebooks, not notebook replacements.
- In some circumstances, senior executives, marketing, sales and task workers may be able to use iPads as their primary device.
- Secure access clients such as Citrix Receiver for the iPad, Wyse Technology's Pocket Cloud or HLW's iTap can bring corporate Windows applications and desktops to the iPad for organizations that have the server infrastructure in place.
- New applications and uses are emerging for iPads in a number of vertical fields, as well as in business-to-consumer (B2C) areas.

Recommendations

- Prepare for the fact that many employees have already purchased iPads and are likely to use them on enterprise networks.
- Provide iPads to IT staff and key users to understand which applications and uses the iPad can — and cannot — support.
- Leverage the use of secure access client utilities like Citrix Receiver to provide "zero footprint" access to centralized enterprise applications and data.
- Focus long-term application strategies on Web-centric, cross-platform, cross-vendor tools such as HTML5 (Web-centric models are replacing client/server models), and design user experiences for mobile devices first to force simplicity and improved user experience on all platforms.

ANALYSIS

A recent minisurvey of Gartner CIO clients showed that 85% have been getting requests for Apple iPhones, iPods or iPads, and that almost 75% have found that end users are connecting those devices to the enterprise network with or without permission. Yet, only 15% are supporting iPads today, but are being motivated to support them in 25% of the cases by executives and in 42% of the cases by other staff (the remaining respondents said there were no motivators for the iPad).

This level of interest has been confirmed by a high rate of client inquiries to Gartner client-computing and mobile and wireless analysts.

Notebook Companion

For the immediate future, the main use of the iPad is as a notebook companion or as a secondary device to take on the road or use for fast access to e-mail, calendaring, interrogating Web applications and information sources, and showing PowerPoint presentations (with an external Video Graphics Array [VGA] out cable, the iPad can connect to video projectors). The iPad falls short of full notebook functionality on the content creation side where:

- Serious computing power is required (for example, manipulating large spreadsheets and databases or developing graphics).
- A large amount of text keyboard input is required. (External Bluetooth keyboards are available, but are not mainstream.)
- High document fidelity is required (see Note 1 and "Office in Your Pocket: Not Quite There Yet").
- A mouse is required for finer manipulation than touch provides.
- Easy access to printing is required.
- Users need to run multiple applications (locally) at the same time.

As a result, the majority of knowledge workers cannot use the iPad to replace their notebooks. Since these workers usually also have smartphones, the iPad becomes their third device. Most organizations will not buy that third device. Of course, there are exceptions, such as for high-ranking executives.

Nonetheless, because of the convenience factor for travel and an "instant on" for quick look-up functions, many users are paying for the iPad with their own money to use both for work and pleasure. This creates an imperative for ensuring that iPads can be secure to keep work and personal functions/data separate.

Apple has stated that it will add support for multitasking, printing and more-sophisticated mobile device management when the iOS 4.2 update becomes available for iPad in November 2010.

Cases for Notebook Replacement

For workers requiring only mail, calendaring and a very limited or fixed set of tasks, an iPad may serve as a notebook replacement (as could a smartphone). Some companies are giving iPads to their sales force. In cases where extensive written deliverables are required or where large spreadsheets are needed to report on pipelines, the iPad may not be sufficient.

Using Secure Access Clients to Extend Capability

Secure access clients like Citrix Receiver for iPad, HLW's iTap or Wyse's Pocket Cloud allow iPads to access corporate Windows applications or desktops via servers running centralized applications. The iPad acts as a thin client. Users can run applications not available natively on the iPad and have full computational ability for databases and spreadsheets. They can run Office applications with full formatting fidelity. Drawbacks to this approach include:

- The enterprise must already have or invest in a centralized application infrastructure.
- The iPad's lack of mouse support can make running Windows applications frustrating, since the "click and drag" interface often requires finer manipulation than is possible with touch.
- Applications don't work offline.
- Application responsiveness and load times depend on communications bandwidth and latency.

Beyond notebook replacement, many new and creative uses are being piloted. Some of these applications are already running on tablet PCs (full-featured notebooks with touch or pen capabilities), but are enhanced on iPads. Others are totally new applications.

Field Service

Here are some instances where iPads can be used for field service:

- Mapping: Multitouch has made the iPad an ideal map-reading platform. A user can go from a global view down to a street-level view, and zoom out again.
- Schematics: As with mapping, schematics on an iPad can be zoomed to a full device view down to the individual component level and back again.
- Technical library: Manuals can be stored on an iPad for just-in-time review.

Any one of these capabilities is useful in field service applications. Future applications that combine them will provide even more functionality. For example, tapping a spot on a map might reveal the equipment at that location (along with the schematics). Tapping a particular component on the schematic might bring up the relevant sections in a technical manual.

Current limitations of the current iPad version include:

- Limited readability in direct sunlight
- Capacitive screen doesn't recognize stylus or gloved finger input
- Not rugged — some companies have determined that the low cost and high convenience factors outweigh the lack of ruggedization
- No camera (although not all field service applications require a camera)

Healthcare

These are some instances where iPads can be used for healthcare:

- Doctors' waiting rooms: Information about patient's illness can be displayed. Drug companies are considering subsidizing with "infomercials," provided that theft and ethical issues can be adequately addressed.

- Doctors' personal organizers with patient care information.
- Reference material: The iPad can house the "Physicians' Desk Reference," medical texts and medical journal articles. (There are currently thousands of iPhone medical applications, most of which are also available on, if not also optimized for, iPads.)
- Viewing diagnostic images.
- Electronic prescribing: Doctors can use a browser to forward prescriptions to a pharmacy in ad hoc moments after speaking to a patient on the phone.

Several major healthcare providers have declined to use iPads for direct patient care applications because the device cannot be sanitized. It will not withstand swabbing with bleach, and the capacitive screen will not work inside a plastic screen. However, strong interest from doctors means that healthcare organizations will have no choice but to support iPads.

Pharmaceutical

Here are some iPad uses in the pharmaceutical industry:

- Face-to-face e-detailing
- Tracking medical samples and doctors' delivery preferences
- Trade shows
- Subsidizing iPad use in doctors' patient waiting rooms
- Providing information for doctors' medical reference applications
- Medical scientific liaison (MSL) visits — Ph.D.s and doctors doing and dialogue with doctors

Many e-detailing applications require Flash and will have to be rewritten for the iPad. While a user mark is usually an acceptable "electronic signature," certain applications involving pharmaceutical research require a full digital signature, with x.500 digital certificates issued to the user. The trend is toward more of this in the future.

Administrative

Here are some instances where iPads can be useful for administrative purposes:

- Digital signage
- Conference room sign-up

E-Learning

The iPads has several uses in e-learning:

- Exploratory learning, e.g., "tell me about that"
- Media material, e.g., podcasts and videos
- Simple surveys, tests and questionnaires
- Time-sensitive learning, e.g., new regulations

- "Just in time"/"just enough" learning
- Document repositories
- Learning administration, e.g., sign up for courses
- Reference material, e.g., disaster plans, manuals, schematics

B2C

The iPad can be useful in these B2C instances:

- Interactive brochures (travel agent examples where customers create their own itineraries)
- Rented or complimentary loaner video players/book library for airlines, cruise ships and resorts

The level of engagement provided by iPads makes them ideal information delivery and selling tools. The combination of direct manipulation, high resolution and interaction allows the customer or user to gather more information faster than through traditional means.

What the iPad Can't Do Today

Currently, the iPad has the following drawbacks:

- No camera
- No Flash support
- Capacitive screen doesn't recognize stylus or gloved finger input
- No stylus capability for extensive handwritten input (annotation or forms)
- No character recognition
- No mouse support
- Inability to leverage many Windows-based applications natively
- Poor daylight readability
- Can't be sanitized or work in a sleeve for healthcare
- Rudimentary security and manageability
- Not rugged

Application Development Considerations

Every new application developed or deployed in the enterprise should be built to support the iPad (and other tablets), unless specific requirements justify a waiver (such as the requirement for a local terabyte store). Long-term application strategies should focus on Web-centric, cross-platform, cross-vendor tools such as HTML5, and should design user experiences for mobile devices first to force simplicity and improved user experience on all platforms.

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RECOMMENDED READING

"Office in Your Pocket: Not Quite There Yet"

"Managing Client Computing Through 2015"

"iPad's Influence on Media to Build Over Time, Not Overnight"

Note 1 **Fidelity**

Fidelity refers to the ability to maintain all templates, formatting and/or formulae when moving documents from one system to another. Documents created in a desktop version of Office can lose critical details when sent to a mobile device, even if the device is using a mobile version of Windows. Even worse, the user generally gets no notice of what detail was actually lost. The fidelity lost when moving across platforms can come from application compatibility issues and/or from moving to different screen sizes. Much of the business content we regularly work with is formatted for traditional paper, and for 12-inch or larger notebook and PC screen sizes.

A minor but annoying example of fidelity loss is when a beautifully laid out deck of slides is sent to a mobile device and the fonts are changed or the graphics are slightly rearranged.

The problem can get more serious with templated documents intended for production use. Once transported to a mobile device, templating or critical formatting can be lost. For review purposes, just seeing the remaining text or data may be sufficient. However, if seeing the text or data in context, or if doing updates to the document are important, then fidelity loss could be a show-stopper. PDF files retain fidelity across platforms, but do not allow updates.

On the other hand, taking unstructured meeting notes on a mobile device for upload to a PC for later use is unlikely to cause fidelity problems.

This research is part of a set of related research pieces. See "ATV: Guide for Mobile Application Development, Sourcing and Support" for an overview.

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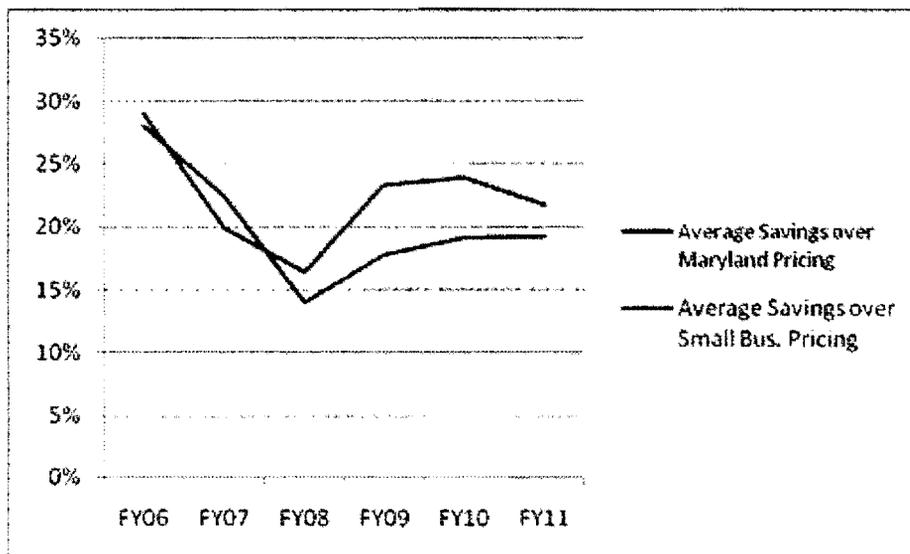
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Pricing Methodology:

The County negotiates pricing discounts with DELL. This negotiation is done typically when there is a new model of desktop and laptop that the County sets as a standard. The County has historically selected DELL because they were able to meet the requirements of discount pricing, availability (being able to provide 2000+ systems with the same configuration & components) and reliability and support (DELL's rigorous testing of new equipment and support for replacement or recalled parts).

DCM reports regularly on discounts the County receives for desktops and laptops. These prices and configurations are available on the County's Premier DELL web site and are also published in the manner of Order Forms on the DCM web site, which is available internally to County purchasers. Through negotiations, the County has recognized pricing discounts approximately 15%-30% deeper than the (1) State of Maryland and (2) Small Business benchmarks. These discounts are passed onto Departments when they purchase new desktops or laptops. The amount of the discount is tied to the County's projected spending (based on historical data) for new equipment.



Furthermore, the County receives volume discounts for replacements when purchased in bulk (800+ systems at a time). Typically, only desktops have been purchased in this manner because Department configuration requirements for laptops can vary greatly. The degree of volume discount depends on the County's projected spending for DCM replacement equipment (also based on historical data).