

February 17, 2004

Information Technology Equipment Life-cycle

Public Act 161 of 2003 Sec. 579:

The department of information technology shall provide a report that analyzes and makes recommendations on the life-cycle of information technology hardware and software. The report shall be submitted to the senate and House of Representatives standing committees on appropriations subcommittees on general government and the senate and house fiscal agencies by March 1.

Background Information

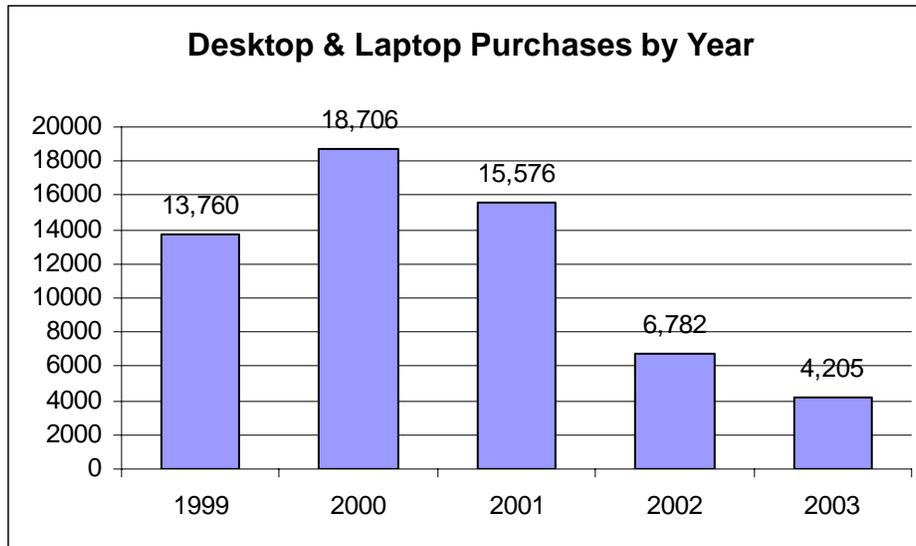
The life-cycle of information technology hardware and software is defined as the period of time during which such hardware and software remain useful to the state. Refresh rate for information technology hardware and software is defined as the rate at which such hardware and software is planned to be replaced.

Current Practice on Desktop Workstations:

The operating systems on state workstations range from Windows 3.11 to Windows XP. The standard purchasing process for desktop workstations has been the purchase of the workstations with three years on-site warranty. Overall, it is not uncommon for desktop workstations and printers to be used for five years or longer. More than half of the desktop equipment in the state is currently out of warranty.

Two common reasons for desktop equipment to be replaced are that the software necessary to operate new applications will not perform on older equipment, or the software on the desktop equipment is no longer supported by the vendors.

Michigan's purchase of desktop and laptop equipment over last 5 years:



Historical desktop counts are attached to the end as Appendix A.

More PCs than People:

Agencies and departments have more workstations, laptops and docking stations in use than staff because workstations are used in training centers, interview booths, conference rooms, and in some cases supervisors and managers that cover different offices have workstations at both locations.

DIT Desktop Salvage process:

DIT has implemented a desktop equipment salvage process that allows all equipment to be evaluated before being sold through the state salvage process. Usable desktop equipment is returned to the DIT Depot Operation to be reissued to other state agencies as needed and other equipment is stripped down for parts to be used by Field Services for equipment still in operation. Only very old or completely unusable equipment is salvaged. Before the statewide DIT salvage process it was not uncommon to find equipment still under warranty being salvaged. Detailed information on the desktop salvage process is available on the DIT web site.

The salvage process evaluates usefulness of the machine. For complete workstations, the salvage process was to keep any desktop workstations or laptops that would support the current Windows XP environment.

For parts, keep any equipment parts (workstation, laptop, and printer) that can be used in the repair of makes and models that are still in use by the state.

Equipment under warranty should not be salvaged. It should be reassigned to other users due to the fact warranty equipment is normally under three years old and has a useful life cycle remaining.

Lease vs. Purchase recommendations:

Although Meta, reports that the industry trend is to moving back to purchase over lease. With the DIT attempting to provide a fix cost model for reimbursement from agencies, leasing would allow for a stable cost over a period of years, for both equipment and warranty.

Automated Desktop Inventory Process:

There is currently a project to roll out an in-house developed system to all state desktop equipment. The program will gather desktop information at the time of sign-on each morning to update the inventory database. This will include detailed information that is needed to support the user from the Client Service Center when requests come in for assistance, up to date billing information to the agencies and software counts when renewing software with vendors, and overall information when planning future equipment and software migrations.

Security Issues:

Six major security issues supporting shorter life cycle replacement times for desktop personal computers were considered.

1. Older hardware systems chipsets presents risk of hardware level PROM/BIOS attacks.
2. Older machines lack physical locks and BOIS passwords.
3. Older software both for operating systems and COTS applications security fix support is often no longer provided elevating risk profiles and raising difficulty levels to protect systems adequately.
4. Older operating systems do not provide any self indication of hacking or an audit trail of how, when, and where a hack or compromise may have occurred.
5. Older operating systems present an Internet Relay Chat risk.
6. Increased security risk overall from older hardware, operating systems, and applications is that new attacks that take advantage of old software and application weaknesses will have little to no counter measures available to prevent digital injury or few options to apply a fix or first aid after an adverse event.

Desktop Recommendation

The recommended time period for mandatory removal of desktop equipment from service is 5 years, due to parts/patches not longer available. DIT will review the

refresh rate recommendation every year based on budget conditions and other impacting issues.

Gartner reports indicate that PCs currently being deployed would be sufficient for mainstream users for four years. However, as workstations age they can be transferred to workers needing less horsepower.

Recommended on-site warranty period is four (4) years.

Recommended repair method after warranty will be in-house repairs by DIT.

Recommended method of capturing the inventory is by using an Automated Inventory System.

Exception Process to the guidelines will be established by DIT.

Server Hardware Recommendation

Most hardware vendors commit to five years of parts availability for servers. Therefore, we believe that five years is the reasonable upper limit for the life of a deployed server. To avoid these problems the State of Michigan should coordinate hardware refresh with operating system life cycles.

Servers depreciate very quickly. Most servers have no “book” value after three years from the date of purchase. Pursuing a server replacement based on a depreciation schedule can cause tremendous churn based on the number of servers being used in the enterprise. It also may cause the staff to be so consumed with server replacement projects that administrative productivity suffers. Another problem with following a replacement schedule based on a depreciation schedule is hardware platforms can become out of sync with the operating system upgrade. When the next operating system comes out, the hardware of these servers may not meet the operating system requirements. This then causes the State of Michigan to have to replace the server again.

Server Operating System Upgrades:

The State of Michigan should expect to support a rolling heterogeneous Operating System environment. It is not pragmatic to upgrade the operating systems of all servers to a new release and test the applications at the same time. It is best to minimize the percentage of end users affected by an infrastructure change by planning upgrades in small groups rather than to attempt to change the enterprise at one time. At a minimum, operating system upgrades should be time to coincide with normal hardware refreshes or when applications/middleware are undergoing a major upgrade. The State of Michigan should plan on supporting at least two releases of operating systems server at the same time; the current release and the release that is being upgraded at the next hardware refresh

Many vendors publish a life cycle road map for their operating system. For example, Microsoft has published a set of guidelines that indicate its operating systems will be supported five years with two years of paid support. It is an industry best practice to

design a long-term plan to be completely migrated off the product by the end of life. It is recommended that to avoid unexpected delays in migration that migration should be completed one year in advance of the end of support. In designing the migration strategy, the SoM has to take into consideration software vendors who may drop support for their software at a different schedule than the operating system vendor. It is best practice to spread the cost of upgrade over a series of years.

There is little benefit in upgrading to an incremental upgrade release if the releases are being delivered less than four years. Therefore, we believe that five years is the reasonable upper limit for the life of a deployed server.

Industry Lifecycle Guidelines and Recommendations

Questions to META appear below. Responses are shown as **bold text**.

1. Lifecycle for Personal Computers (hardware):
 - a. What is the current industry practice for refreshing personal computers? **40% of companies are on a 4-year cycle, 30% are on a 3-year cycle, and 30% are on other cycles (5 year, 6-7 year, or until the computer wears out).**
 - b. Do you see the refresh cycle accelerating or decelerating in the future? **META sees the current cycle lengths as having extended from the year 2000, at which time 60% of companies were on a 3-year cycle.**
 - c. What would you recommend for a statewide Strategic (2-5 years) Policy? **META does not recommend a cycle as long as 5 years, because this projects a 20% refresh per year, causing budget problems in years that become event driven, such as our plan to move the state to XP this year. They observe that companies on 3-year cycles have to be more flexible, and often do not perform the replacement of devices until about 42 months of use. They observe that companies on 4-year cycles more reliably replace devices every 48 to 50 months. They also recommend that the state remain aware that the history of corporate PCs is that they have been replaced due to outside constraints and events, not due to calendars, and that this is likely to remain true.**
2. Lifecycle for Personal Computers (software – operating systems and utilities):
 - a. What is the current industry practice for refreshing/upgrading? **Industry practice has not been to keep up with each release of a Windows OS. The move to XP for us is understood to be timely, and XP is expected to be supported to the end of the 2000 decade.**
 - b. Do you see the refresh cycle accelerating or decelerating in the future? **Microsoft has planned to be on a two-year cycle for release of new operating systems. They have not kept to this schedule. Their next version of Windows, code named Longhorn, is due out in 2006 or 2007. The one after that, code named Blackcomb, is due about two**

years later. With regard to MS Office, the next version is due out with Longhorn, and may or may not have hooks that can only be used with Longhorn. Longhorn is anticipated to be a release that will require many hardware changes, but META could not predict their nature at this time, not having examined Longhorn yet.

- c. What would you recommend for a statewide Strategic (2-5 years) Policy? **META recommends that we proceed to XP, but evaluate Longhorn when it comes out, with the possibility of waiting for the Blackcomb release, anticipating it to be a fix for anything that might be wrong with Longhorn. We should be aware that they are predicting that the change to Longhorn or Blackcomb will require as yet unspecified hardware upgrades, supporting their observation about event-driven refreshes of computer equipment.**
 - d. Do you see a movement away from Windows? If so, to what? **META sees a trend to wait for a Windows upgrade that is necessary, not a move away from Windows. They recommend moving to XP, if you are not already on it.**
3. What is the industry practice (and trend) on the number of vendors (Dell, HP, Apple, etc.) that organizations have supporting them? (For example, do most organizations have multiple vendors supporting them or is there a single vendor?) **META sees an industry practice of having one vendor for any given segment of a computer fleet. It is common to see a company using Dell as a desktop vendor, and IBM as a notebook/laptop vendor. The potential of a customer buying from a different vendor seems to be enough, in many cases, to provide an incentive to the vendor to provide good pricing.**
 4. What is the industry practice (and trend) for buying versus leasing of hardware and software in both the personal computer and server environments? **META sees a tendency to move away from leasing and back to buying. Accounting principles say that you can't have a capital lease for more than 75% of the value of an item, and most computer leases exceed this. Leases provided a disposal service for equipment, but this service is commonly available as a standalone service. Leases were also found to include non-productive time, such as time between delivery to customer and actual use (due to set up, staging, etc.) and time at the end of the lease taken up by disposal activities (such as shipping to, and time at a site to wipe company data from the machines).**

State Standard Workstations:

The State needs to accomplish a study to produce the State Standard Workstation(s) to best leverage existing equipment. As State workers are getting into several levels of computer needs, we propose the following standards to reflect this:

The CCA-H (Consistent Client Architecture-Hardware) standards are still adequate for usage. Specialized Worker workstations will be quoted.

Standard CCA-H:

Single-task User: A user whose job typically requires access to one application, with few other computing needs.

Task-oriented User: A user whose job typically has a well-defined and limited set of tasks, but is likely to use email and office productivity tools regularly.

Knowledge Worker: A user whose job typically requires the use of multiple applications at the same time, but does not use processor intensive applications.

Specialized Worker: A user who needs a high end workstation that will perform functions specific to their duties, such as computer-aided design (CAD), or software development tools.

Workstation recommendation for Windows XP:

The lowest level of desktop equipment planned to be used for Windows XP rollout will be a Dell GX1 (or equivalent) 300 MHz processor, 256 MB Memory and 6.4 GB of Hard Drive space.

The following information and/or questions pertain to XP Migration and computer life-cycles.

Memory requirements for Windows XP

XP OS and GW6.5	128MB
Office Modules require 8MB each to run times 4 apps	32MB
Agency Applications estimated	10MB
Internet Explorer	25MB
	TOTAL 195MB

To efficiently run, it is suggested that all systems have 256MB of memory. With additional memory there will be increased productivity, and that should create added life-cycle time to the system.

Disk Drives

Disk space needed for running XP:

Office XP	245MB
Windows XP operation system	854MB
Disk space base size	TOTAL 1-1.2GB

Disk space required for software:

- Anti-virus
- Remote control
- Oracle
- DCDS
- SnagIt
- Agency Applications
- Terminal emulators

Hard drive sizes in use by the State:

4.2GB, 6.4GB, 9.1GB, 10GB, 20GB, 40GB.

To efficiently run, it is suggested that all systems have a minimum 6.4GB hard drive. With additional hard drive space there will be increased productivity, and that should create added life-cycle time to the system.

System BIOS

To migrate to XP, all Dell GX1 model desktops will require a BIOS upgrade. The Dell GX110 desktops may require a BIOS upgrade to run XP.

DOMS Guidelines:

IKON analyst performs onsite assessment of current work area output, recommendation of output solution options for copy, fax, scan and print functions.

Agency Program Coordinator (APC) can use the Exception Process at this point if they do not want to accept any or all of the recommendations made by IKON Analyst.

Network Printers ratio 1:15
 Inkjet printers ration 1:26
 36 months tech refresh and equipment life cycle mgmt
 Purchase of pages used, not equipment

DOMS Desktop Printer Exceptions:

Agency APC completes the Waiver Form providing detailed requirements as to the device requested. APC emails the Waiver Form to IKON for review, with a copy of the email and attached form to the State DOMS Program Manager.

IKON reviews the requirement request and discusses inclusion of scope issues and factors with the State DOMS Program Manager, resulting in agreement on inclusion or exclusion of the device as part of DOMS program.

If IKON and the State DOMS Program Manager agree the device falls within the DOMS program, IKON will inform the APC and execute follow-up procedures to assess, provide recommendation, and implement DOMS devices to fill the requirement.

If the decision is that the request falls outside of the DOMS program scope, the DOMS Waiver Form document will be signed by the IKON Program Manager, documenting justification for the waiver. The Form will be sent through email to the State DOMS Program Manager.

The State DOMS Program Manager will review the Form, sign the Form, and send the signed form through email to the requesting agency APC for them to use as approval reference in procuring the device(s) from a vendor outside the DOMS program. A signed copy will be electronically sent to the IKON Program Manager for their file, and a copy will be filed in the DOMS Program directory for Reporting and future tracking.

If the Waiver is issued, the APC will provide IKON with final device procurement and placement information to allow IKON to maintain current knowledge/device environment records for refresh, cost efficiency and workflow/assessment planning statewide and for the agencies.

APPENDIX A

Number of Machines Statewide	CIS	FIA	DMB	HAL	MDOT	MSP	DOC	Comm Health plus WIC	DNR	Career Dev.	SOS	MV A	TREAS	AG	Civil Rights	DEQ	Education	Civil Serv	Agriculture	Totals by County
Alcona		25				1		2	6		2									36
Alger		25				6	123	2	11		12									179
Allegan		106			3	24	9	4	33	14	6									199
Alpena	3	69			31	17	5	4	13	10	6	2								160
Antrim		37				1	3	4	3		2									50
Arenac		44				1	143	2	4		2									196
Baraga		25			12	8	163	4	31		2					1				246
Barry		63			3	13	7	4	10	110	3									213
Bay	2	152			33	16	16	6	28	15	8					80				356
Benzie		29				1	2	2	11		2									47
Berrien		293			33	13	16	9	11	19	21				1				24	440
Branch		72				13	381	4	2	2	3									447
Calhoun		279			19	29	35	6	2	30	11	22			1					434
Cass		90			1		5	4	6	2	3									111
Charlevoix		37				2	4	4	25		2			4						78
Cheboygan		62				15	3	2	18		2									102
Chippewa	2	65				14	566	2	19	1	6									675
Clare		60					5	4	8		2									79
Clinton		56			78		6	2	2		5									149
Crawford	2	55		1	24	35	2	10	25		2	1								157
Delta	13	103	1	1	54	9	5	2	35	2	6		6						8	245
Dickinson		36				14	3	2	13	1	7									76
Eaton		111	300		526		10	2	2		629			10						1590
Emmet		45				13	4	2	13	3	4									84
Genesee	23	945	5		24	45	154	19	5	33	37		17				200		6	1513
Gladwin		44				8	5	2	12		3									74
Gogebic		39				9	161	2	4		4									219
Grand Traverse	21	105	1		25	23	116	6	25	30	9		9		1				20	391
Gratiot		58				10	572	2	2	1	4									649
Hillsdale		71				11	6	2	2		3									95
Houghton		57	2		1	8	3	17	7	1	7									103
Huron		51				7	3	2	6		2									71

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Ingham	1943	3332	1440	250	1425	1157	650	3011	666	445	514	100	1550	450	68	1120	500	434	386	19441
Ionia		78				14	926	8	11	2	4									1043
Iosco		55				19	3	2	10		2									91
Iron		32			40	6	1	2	26	1	3					5				116
Isabella	13	79	1		33	12	10	174	2	14	4								2	344
Jackson	14	239	5		111	36	1301	4	14	17	11					70			5	1827
Kalamazoo	32	288			91		57	212	6	32	16		8		9	65				816
Kalkaska		30			5	24	3	2	9		2									75
Kent	65	686	3		115	125	166	40	7	34	48	20	25	8	17	110			38	1507
Keweenaw		4		1				2	5		2									14
Lake		40				1	11	2	11		2									67
Lapeer		82				11	165	4	6	3	13									284
Leelanau		31					2	4	3	8	2									50
Lenawee		187			24	13	297	2	5	4	7									539
Livingston		268			38	26	15	5	18		16									386
Luce		33			53	6	203	4	48		2					4				353
Mackinac		30		43	9	17		2	14		2									117
Macomb	41	564			67	59	177	8	12	51	48	1								1028
Manistee		44				17	108	4	3	1	3									180
Marquette	10	76	1	7	34	98	230	11	80	22	9	20	3			62				663
Mason		55					5	2	9		5									76
Mecosta		62					5	2	3	11	4									87
Menominee		42				10		2	11		2			4						71
Midland		94				9	11	4	3	6	3									130
Missaukee		73				5	2	2	2		2									86
Monroe		136				38	23	4	7	12	13									233
Montcalm		79			16	16	311	6	2	1	4									435
Montmorency		26			7	2	2	2	19		2								21	81
Muskegon	1	307			20	12	405	6	13	22	13		4						4	807
Newaygo		82				11	5	2	6	1	2									109
Oakland	76	722			178	11	172	12	29	65	90		44	10					75	1484
Oceana		78				1	3	4	9	1	3									99

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Ogemaw		67				15	3	2	7	2	4									100
Ontonagon		24				1		2	8		2									37
Osceola		48			10		4	2	5	1	2									72
Oscoda		26			3	9	3	2	16		2									61
Otsego	21	71			37	49	21	2	67	8	8									284
Ottawa		157				16	31	8	9	2	19									242
Presque Isle		27				2	2	2	9		2									44
Roscommon		70				12	5	20	97		5									209
Saginaw	27	418	3		82	84	222	15	5	19	17		13		8				31	944
Sanilac		62				8	6	2	4		6									88
Schoolcraft		31			3	6	2	2	15		2									61
Shiawassee		90				17	9	6	7		6					100				235
St. Clair		187			24		25	7	11	22	15									291
St. Joseph		95				12	8	6	2	1	5									129
Tuscola		98			15	10		132	6	6	4									271
Van Buren		164			22	79	12	5	16	4	7				1					310
Washtenaw	12	269	3			38	232	590	29	27	23		7							1230
Wayne	217	4291	35		125	363	1463	705	21	320	96		80	140	108	180		30	127	8301
Wexford	2	87			43	24	4	3	47	4	5					70				289
Totals by Dept.	2540	17525	1800	303	3497	2867	9857	5205	1844	1443	1900	166	1766	626	214	1867	700	464	747	55331

