



# Five-Year PC Replacement Cycle Considerations

INFORMATION TECHNOLOGY SERVICES DIVISION

## Summary:

Extending the PC replacement cycle from the current four-year cycle to five years has both financial and technical considerations.

Changing to a five-year cycle has the potential to save \$945,000 in PC purchase costs per fiscal year, but additional costs to keep those PCs in service the fifth year would certainly reduce that savings, and could even eliminate the savings or cost more than a four-year replacement cycle. Extending the replacement cycle shifts cost from highly visible hardware expenditures to less visible support costs, especially personnel services. From a TCO perspective, we believe the net benefits of the proposed change are likely to be minimal, at best. Note also that the cost of lost user productivity and diminished service associated with work disruptions is not quantified.

The workload placed on PC's by applications is just now beginning to change significantly, making this an appropriate time to thoroughly research and position "thin client" devices as an alternative to traditional PC's. Where there is an appropriate workload, replacing traditional PC's with "thin client" devices has the potential for significant savings (greater than 50%) compared to replacement with a traditional PC.

We suggest that all new development be required to employ a "three-tier" architecture to assure the ability to use "thin client" devices in the future.

## Financial Considerations:

The following table provides cost comparisons between a 4-year and 5-year PC replacement cycle:

		4-year replacement cycle	5-year replacement cycle	Savings
Number of PCs to replace	10,500	2625	2100	
Cost of PC replacement <sup>1</sup>	\$1,800	\$4,725,000	\$3,780,000	\$945,000
Potential additional costs:				
Add'l warranty <sup>2</sup>	\$100		\$210,000	-\$210,000
Add'l operating system upgrade <sup>3</sup>	\$291		\$611,100	-\$611,100
Add'l parts & labor cost <sup>4</sup>	\$150		\$315,000	-\$315,000
Total		\$4,725,000	\$4,916,100	-\$191,100

<sup>1</sup> PC replacement costs are based solely on the currently installed base, not on previous or proposed budget amounts.

<sup>2</sup> Standard warranty is 3 years. An additional year of warranty may be necessary in the 5-year cycle to mitigate hardware failure risk. An alternative might be to adopt a hardware sparing policy.

<sup>3</sup> Microsoft discontinues support for an operating system 4 years after initial release. Our experience has shown that operating systems work well through 3 years, begin to have problems in the 4<sup>th</sup> year (stability, driver availability, etc), and are in serious need of replacement by the 5<sup>th</sup> year. Cost of upgrade includes \$141 software license and \$150 (3 hours) labor.

<sup>4</sup> Estimate \$150 per PC for equipment upgrades and/or labor to keep PC in service for 5<sup>th</sup> year. Common options include upgrading memory (\$50-\$100), swapping PC's from high-end to low-end users (3-4 hours, \$150-\$200), and misc. parts replacement (cost varies).

It is important to note that these additional costs are “worst case” and would not necessarily be incurred for every PC. Additional warranty costs could probably be reduced by assuming more risk and adopting alternative fix/replace and sparing strategies. Operating system upgrades could be done only on PCs exhibiting problems or when applications require it. The additional parts and labor line item is the only one which has little potential for reduction because PCs kept in service for an extra year are going to need more attention to keep them running adequately.

It is also important to note that costs associated with user disruption and reduced productivity have not been factored into the above cost table. As PCs age and have problems, users will have more service outages. Older PCs will run applications more slowly. These will have an impact on productivity, but we are not aware of any specific studies to measure this cost.

### **Technical Considerations:**

***Industry Best Practice Guidelines.*** Gartner recommends the following PC replacement cycles:

- 4 years for low-end/mainstream users
- 3 years for high-end users
- 3 years for laptop users

Gartner also recommends refreshing the client operating system as hardware is refreshed.

***Operating System Viability.*** Microsoft operating system (OS) lifecycles typically follow a four-year cycle from introduction to discontinuance of Microsoft support. While the OS will continue to function after this time, risk is introduced in a number of areas: inability to get vendor support to resolve problems, availability of hardware drivers (e.g. printers), and inability to support new releases of application software (with the likely result being application enhancements and implementations being slowed by the PC inventory).

A five-year replacement cycle implies that 20% of the state's PC would be without OS support from the manufacturer unless the OS is upgraded. The five-year cycle will also place greater burden on ITSD and agency staff to be expert in and support additional OS versions.

***Hardware reliability.*** Hardware reliability has improved steadily over the years. Manufacturer service has become a distinguishing feature of successful vendors as PCs have become a commodity. Our current term contract vendors offer a standard 3-year warranty and an optional 4-year warranty, but do not offer a 5-year warranty. Many agencies purchase the standard 3-year warranty and fix or replace the PC if it breaks after that. Changing to a 5-year replacement cycle would cause re-evaluation of warranty, break/fix and sparing strategies.

***Changing software demands on PC hardware.*** PC-centric software, such as the office suite and client-based applications, place heavy demands on desktop processing capacity and require substantial desktop PCs. The State currently has a heavy reliance

on these types of applications since the majority of many agencies' applications use this desktop-intensive approach.

However, most new application development places the processing burden on an application server and uses a web browser interface or a "thin-client" architecture (i.e. Citrix MetaFrame), which requires far less desktop processing power. Some applications such as SABHRS and POINTS have already moved to a "thin-client" architecture, and a review of agency strategic plans indicates that many agencies are planning to replace old client-based applications with new browser and "thin-client" applications. Unfortunately, there are many applications that need to be replaced and therefore it will take considerable time to do this on a statewide basis (several biennium). Therefore, while some near-term PC cost savings can be achieved on selected desktops, the majority of desktops will continue to require a substantial PC during the next biennium.

In the future, high-end PCs will be needed on far fewer desktops (e.g. application developers, engineers, financial analysts, etc) and mainstream users will be able to get by with substantially less local processing power.

Application designs that employ "thin clients" are known as "three-tier" architectures (database server, application server, and client tiers). Without specific intent to design applications with this model, the use of traditional, "fat client" PC's will continue and costs unnecessarily increased. "Three-tier" application architecture should be the stated standard for multi-user applications.