



Standardize your desktop
hardware to reduce TCO



Overview

Today's small to medium-sized businesses (SMBs) require a great deal of personal productivity and computing power to maximize employee productivity. But the total price of that computing power is much more than just the cost of acquisition. In fact, a complete total cost of ownership (TCO) model looks at all direct and indirect costs associated with the desktop. This includes not just the outright, upfront costs of the hardware itself, but also user training, maintenance and support costs, and the expenses associated with keeping machines compatible with others on networks and in a computing infrastructure.

Standardizing desktop hardware, software, and configurations can help you manage the costs of ownership for your desktop systems. While this approach may mean spending somewhat more upfront on new systems, it can help save money in numerous ways through the remaining life of the equipment you buy. For one thing, standardization supports standard deployment, updating, and troubleshooting procedures; no "one of a kind" or "one at a time" approaches are necessary. Standardization also means employees can switch from one desktop to another easily and simply. Finally, standardization makes installation, repair, and maintenance easier, faster, and less expensive.

This How-To Guide will cover the basic terminology and concepts behind the TCO concept, explain the cost components that go into computing TCO, and explain why and how desktop hardware standardization confers TCO advantages and control. The sections of the guide include:

- **Understand it:** get a complete picture of the elements that make up an accurate TCO model.
- **Plan it:** find out what steps you need to take to evaluate your company's desktop needs.
- **Do it:** evaluate the needs of different groups in your organization and identify a standard desktop blueprint for each.
- **Use it:** see how hardware standardizing benefits companies in the real world.
- **HP Office Productivity:** learn about upgrades, migrations and browse HP's equipment options to find the right collection of systems to meet your needs.

Understand it

You're aware of the alluring promises of desktop computing technology that business-focused publications describe, and you talk to savvy IT professionals regularly. The message from both sources is that standardized desktops can help to contain and control total costs of ownership (TCO). But exactly what does that mean?

To begin, it's essential to understand the concept of total costs of ownership. After that, the benefits of standardization fall out quite neatly and succinctly. TCO is a lifecycle model -- that is, it considers the total costs of acquiring, owning, operating, and maintaining equipment over its entire useful life. Furthermore, TCO includes not only costs associated with owning and operating the equipment, but also the costs associated with using the equipment to its fullest potential. Thus, items like user training, performing regular maintenance and audits, testing and deploying software updates, and handling systems management tasks are also part and parcel of the TCO model.

When calculating TCO for desktop systems, it's essential to consider the following expenses:

- Costs of analyzing and determining desktop computing needs, then specifying workable solutions
- Initial costs of hardware, as specified and delivered
- Costs of initial deployment into the workplace
- Costs of employee training and familiarization with new equipment and software
- Ongoing maintenance costs for software updates and upgrades
- Costs of employee retraining and refamiliarization when updates or upgrades require it
- Occasional costs for system repair or replacement owing to normal wear and tear, and infrequent system or component failures
- Ongoing costs for system and network maintenance, including configuration and security management, system cleanup and control, and backups or other data protection and preservation techniques

The costs involved after purchase -- as is the case for most life-cycle models -- normally exceed initial acquisition costs several times over during the useful life of computing hardware. Though SMBs are invariably sensitive to upfront costs, the real money is spent after the hardware arrives on the scene. Proper planning for and awareness of recurring or ongoing costs after purchase can actually save you significantly more money in the long run than achieving the lowest possible purchase prices on desktop systems.

Keeping the list above in mind, consider the following related implications of standardizing your desktops, and their benefits throughout the TCO life cycle:

- Implementing a standard desktop specification requires broad analysis and consideration, but since it is a deliberate "one size fits all" approach, it requires little effort to maintain once completed -- at least, for the projected life of the systems involved.
- Initial costs of hardware may be deliberately set to trade longevity and upgradability off against purchase costs (invariably, cheaper machines are the shortest-lived and the hardest to upgrade or migrate).
- With a standard desktop specification, deployment can be scripted and automated in a test lab, then follow a completely "cookie cutter" strategy that's the same for all standard desktops. This also holds true as subsequent updates and upgrades are tested and deployed.
- Most employee training on standard hardware can also be standard; only department- or job-specific application training must vary by job roles or responsibilities. The same is true for retraining and refamiliarization following updates or upgrades. Simplification results in reduced training time and costs.
- Careful purchase of a small number of extra machines augments assigned desktops, creating a loaner pool for easy replacement of out-of-service units.
- Smart use of system management tools and consoles, as well as proper backups or system images, makes it easy to manage and maintain a collection of standard desktops for all users. What users and administrators learn about any one machine applies to all machines, by and large. Users can move from machine to machine, and administrators can build and manage systems that move gracefully with them.

TCO calculations are based on the projected useful life of desktops and the average frequency of major desktop operating system releases (every two to three years is typical for Windows). By planning around a specific life cycle, savvy SMBs can create standards that not only remain usable and productive for the current life cycle, but help prepare for the next one.

Why and when to think about standardizing desktops

The desirability of a standard desktop design enters the picture when SMBs plan to deploy multiple new desktops, or as part of migrating to next-generation desktop operating systems. If a company currently

has a hodgepodge of systems, it's not always practical to replace all of them at once except under the following special circumstances:

- When upgrades or migrations become necessary, whether because of planned obsolescence of current platforms or due to necessary changes to key systems or applications in the workplace.
- When multiple new desktops are needed to accommodate new hires, organizational changes, moves, mergers, and so forth.

Even so, you don't want to make technology purchases that won't help your bottom line, improve key business processes, or otherwise benefit your organization's situation. There really is no single test you can apply to determine if you need to standardize all desktops immediately, but some general guidelines will help.

If your organization has more than five staff members, or if it operates various elements of an IT infrastructure itself -- such as one or more departmental or workgroup servers, public or private Web services, or e-mail or database services -- there's enough work involved in installing, deploying, and managing desktops to realize benefits from standardizing your desktops. Even if an organization moves gradually toward a standard desktop over the course of a year or longer, benefits of standardization increase as the number of standard platforms grows.

The most important thing you can do to ensure that a desktop standard meets your company's needs and fits your budget is to devote some time and energy to assessing your needs and mapping out a solution. Until you understand what kinds of applications your users must run and what onboard storage and processing capabilities they need, you run the risk of either implementing an underpowered standard or spending more money on desktops than you really need to.

Plan it

Planning a standard desktop means understanding your users' desktop computing needs. This requires some effort to assess the capabilities you will need from a standard desktop. Remember, also, that a standard desktop must meet the needs of its most demanding users so that the same design can be deployed on all desktops once desktop standards are adopted. This is a "highest-common-denominator" approach, but one that is well-suited to accommodate future growth and requirements -- today's power users are usually tomorrow's "average Janes and Joes."

Ultimately, assessing needs and determining solutions require you to answer various important "how much," "what kind," and "how many" questions. These questions must be answered for each individual user job role or responsibility you plan to support on the desktop -- this means that your organization might need to compile separate sets of answers for clerical staff, help desk workers, administrators, managers, accountants, and so forth.

- What operating system will be standard for the desktop? What does this say about processor, memory, and disk requirements? Additional peripheral and interface requirements?
- What kinds of applications does the user run? What does this say about processor, memory, and disk requirements?
- What kinds of graphical display do applications and job roles require? (Use this to establish display size, color handling, and graphics interface requirements.)
- How much hard disk space does data require, now and in the future? (Always buy at least twice as much space as current needs dictate to leave room for growth.)
- What kind of network interface card will you need for each desktop? (Scheduled plans to upgrade from 10BaseT to 100BaseT within the desktop's useful life may help justify purchase of 10/100 interfaces, for example.)
- What kinds of peripheral devices do applications and job roles require? (Potential answers include floppy drives, CD-ROM or DVD-ROM players or burners, and PC Card ports).
- What kind of desktop management tools do your users need? What kinds of remote control or monitoring capabilities will your help desk staff and system or network administrators require? (The

former helps to keep desktops properly configured and up and running; the latter helps you to deliver the best possible services to your end users, and helps you measure how well their systems are working).

- Will you need help in building and deploying desktops?
- What kinds of maintenance or support contracts will your desktops require?
- How many spare units make sense for your user population? (At least one is always a good idea, and enough to provide a loaner for each site or department is even better.) Don't forget to plan for growth, including new hires, consultants, and temps.

Even if you don't know where to start getting answers for these questions, the next section will guide you through an analysis of the capabilities your desktops must support; this process will help lead you to the right answer. Once you have formulated the broad outlines of the kind of solution you want, you can work with a reseller or a consultant, and use the tools on hp.com to help you convert your initial ideas into a more detailed standard desktop specification. (You'll find more on these topics in the Use It section later in this guide.)

Do it

Assuming that you may not have answers for all the questions listed in the preceding section, how can you go about assessing your desktop needs? You need to evaluate several different aspects of the solution to create a set of driving requirements you can use to find the right desktop for your users' needs, now and for the projected useful life of your systems:

- The solution itself
- Software
- Data
- Users
- Special requirements

Your solution

While you may have some idea about what kind of solution you plan to create, the more details you can supply, the easier it will be for you to choose the right desktop hardware. For example, if you must support accounting professionals in the finance department, do they plan to run Excel spreadsheets and Great Plains general ledger software, or to make use of Web-enabled services to perform the same tasks? Because the former activities actually run large, powerful programs on the desktop itself, they require more processing power, memory, and disk space than accessing Web-enabled services (where background servers offload much of the processing and number-crunching work involved).

Above and beyond determining how your desktops will be used when they're first deployed, you must consider carefully any changes or enhancements you plan to make for your users in the near term. Set your time horizon between a few months and next year. If you're planning to introduce new end-user applications or software, or to upgrade existing programs or capabilities, it's vital to "buy ahead" to support those plans. Then, you can implement those planned upgrades or changes without having to revise your desktop standards to accommodate increased desktop processing or data handling needs.

User roles and responsibilities

Let's talk about the requirements of a hypothetical company called MidSized Corp, and analyze a typical set of end-user roles and responsibilities:

- All staff require access to base-level applications: standard Outlook e-mail, Internet access using Internet Explorer, and Web-based access to standard reporting and request forms using Internet Explorer on the company intranet. The standard desktop OS is Windows XP Professional, which

requires a minimum 233 MHz processor (300-plus MHz recommended), 128 MB of RAM (higher recommended), 1.5 GB available disk space, super VGA (800x600) resolution or better, a CD-ROM or DVD drive, and a keyboard and Microsoft Mouse-compatible pointing device. Combined with base MS Office and basic local storage requirements for documents and e-mail, overall disk space requirements are at least 8 GB.

- Clerical and administrative staff must work with Microsoft Word and Excel for data entry, using macro- and template-based data entry forms. Beyond this, only base-level capabilities are necessary.
- Help Desk staff must be able to operate remote control and monitoring software; Windows Terminal Services are adequate for such needs. They must also operate a help desk database client and basic report generator. Other than adding 2 GB to base storage requirements, this adds nothing to desktop requirements.
- Finance and purchasing professionals require access to Great Plains accounting software, including general ledger, accounts payable, and accounts receivable. They must also be able to run large, macro-driven Excel spreadsheets and access several SQL databases for financial data, trend reports, and information on parts, order tracking, and inventory. Additional processing capability will improve productivity (most base-level systems start at 1.5 GHz or better nowadays); industry reports show that for large spreadsheets and data sets, 256 MB of RAM works better than the 128 MB Windows XP Professional requires. A minimum of 12 GB of local storage (total) is needed for these users.
- Software developers require access to all MS Office components, to Microsoft Visual Studio and various developer framework components, and to automated test and source code management environments as well. Because the developers must compile and process code on their local machines, vendor recommendations suggest a 1 GHz processor, 512 MB of RAM, and 40 GB of disk space for these users.
- Managers and executives require access to all MS Office components, and to basic Great Plains and Web-based reporting tools, trend analyses, financial databases, and various newsfeeds. Requirements are similar enough to those for finance and purchasing professionals to impose no additional requirements.

Services and software

If you plan to run a particular set of software packages or to access various network or Web-based services on a desktop, such as Web server or database software, you must assemble all pertinent details about your software before you set desktop requirements. In the preceding section, we've tried to specify the basic kinds of information you'll have to determine in advance based on user job functions. Here, you must translate this into specific implementations. Most packages or services state specific requirements for the kinds of systems they can run on, and will typically mention minimum and recommended processor speeds, RAM size, and hard disk space needs.

When the documentation for packages or services includes requirements information, you might also consider asking the software vendor for advice on what kind of system to purchase. Vendors want to sell you their software, so they'll be happy to share the benefits of their usually considerable experience in implementing their software on your desktops.

Data handling and storage needs

How much data your users must currently handle locally, and how that data grows over the useful life of your desktop deployment, will determine how much storage space your users will need. Sometimes, a bit of inspired guessing is required to quantify how much space you need right now, and how much more

you'll need in the future. But there are ways to use past history to approximate storage requirements going forward.

For example, if your purchasing and finance staff members need desktop storage for lots of numerical and record-oriented data, you can add up the amount of space these needs require and look at how user requirements have grown over the past year or so. If local data requirements were 1.0 GB last March, and 1.6 GB this March, data storage has increased by about 50MB per month over the last 12 months. This helps you to calculate how much additional storage they'll need over the 24- to 36-month period that's typical for a desktop life cycle (for 24 months, this is 1.2 GB; for 36 months, 1.8 GB).

For other job roles that may not be part of our desktop model for MidSize Corp -- such as a documentation specialist or graphics artist (both of whom tend to work with lots of enormous files on the job) -- storage requirements may be even more demanding. Be sure you plan to store anything important on a server, so it can be backed up and managed by your IT staff more easily. For desktops, you need only concern yourself with the size of data and application files that are stored locally while users are doing their day-to-day jobs.

Special roles and requirements

There's a deliberate red herring in the specifications for MidSize Corp. It's a well-known truism that software developers tend to need far more local storage and computing power than other users. Thus, it's not unusual to find that standard desktops come in two forms in many organizations: a standard "regular user" desktop and a standard "developer" desktop.

Even in software development companies, developers seldom constitute more than 25% of the total employee population (and that ratio is far smaller in most companies not in the software business). Therefore, it doesn't make sense to let developer needs set the standard for everyone in an entire organization. In most cases, this would indeed lead to overbuying for a significant portion of the user population.

Use it

In the following case studies, two real-world scenarios illustrate how different organizations might evaluate their particular user roles and related computing needs to set the right standards for their desktop computers.

MidSize Corp

Our earlier example laid out the requirements for MidSize Corp. Let's take those requirements to design two desktop standards: one for software developers and one for everybody else.

The "everybody else" machine starts from the following baseline, using the most demanding set of requirements (for purchasing and finance staff, as well as managers and executives):

- CPU requirements are easily exceeded by available technology, which starts at 1.5 GHz and upwards. For maximum longevity and power, choose 1.8 GHz as the base level.
- Because the more demanding job roles benefit from increased RAM, choose 512 MB as the standard RAM configuration.
- Because 40 GB drives are base level for most available PCs nowadays, and maximum current requirements do not exceed 12 GB, 40 GB will be quite adequate for current needs and future growth.
- Since larger displays provide general productivity benefits and high-end users typically work with large data or spreadsheet displays, pick 19-inch monitors and mid-range graphics controllers for the

best compromise between price and capability, with room for higher-end graphics requirements in the future.

The developer machine sets the bar much higher; the "more is better" approach gives developers extra memory, processing power, and storage space to boost productivity:

- CPU requirements go for the best available technology that's still affordable. For maximum productivity and power, choose 2.5 GHz as the base level.
- Because developers will use all the RAM they can get, choose 1024 MB (1 GB) as the standard RAM configuration.
- Because lots of drive space is desirable for developers, choose a 120 GB Ultra ATA drive as the standard developer configuration.
- Since larger displays provide general productivity benefits and developers typically work with multiple windows open, pick two 19-inch monitors and a "two-head" graphics controller for the maximum amount of screen real estate and functionality for developers.

MidSize Corp puts all this information together and consults with a local reseller to choose the right desktops. Working with a reseller representative, MidSize picks the HP Compaq D310v Microtower for ordinary users, and the HP Compaq D510 Convertible Minitower for developers. Both models come with Windows XP Professional preinstalled and are available with good options for monitors, graphics cards, and hard disks.

HealthCom

Although HealthCom has only 22 employees, it has unbelievably large amounts of data to manage. The company handles MRIs, CAT, and PET scans for four large hospitals in its metropolitan area, and also provides medical records storage, management, retrieval, and delivery for the same four large hospitals, as well as for half a dozen additional smaller hospitals and professional medical practices.

The HealthCom staff uses an impressive laundry list of applications and services, with a common baseline and specialized applications for several job roles.

HealthCom expects 10% growth over the next two years, and requires desktop access for up to six each consultants and temporary workers. This makes a total of 39 desktops at the start of year two. Because in-house users can access corporate servers, local storage needs are fairly modest except for the company's three in-house software developers.

A job role analysis for HealthCom leads to the following staff roles that must be accommodated in one or more standard desktop configurations. (Note: because developer needs are nearly identical to those at MidSize Corp, we do not repeat that analysis or the resulting recommendation here.)

- All staff require access to base-level applications: Outlook Express e-mail, Internet access using Opera 6.0, and e-mail access to standard reporting and request forms using Internet Explorer on the company intranet. The standard desktop OS is Windows 2000 Professional, but HealthCorp plans to upgrade all desktops to Windows XP Professional before August. Thus, Windows XP Professional requirements set the baseline: a minimum 233 MHz processor (300-plus MHz recommended), 128 MB of RAM (higher recommended), 1.5 GB available disk space, super VGA (800x600) resolution or better, a CD-ROM or DVD drive, and a keyboard and Microsoft Mouse-compatible pointing device. Combined with base MS Office and basic local storage requirements for documents and e-mail, overall disk space requirements are 6 GB.
- Clerical and administrative staff must work with Microsoft Word and Excel for data entry via standardized data entry forms. Total clerical/admin staff: 8.
- Help desk staff must be able to operate remote control and monitoring software; Windows Terminal Services are adequate for such needs. They must also operate a help desk database client and use Crystal Reports for incident reports, tracking, and trend analysis (the help desk works with customers, as well as in-house users). Because help desk staff must occasionally check medical records,

including various scan files, they require 20 GB of local disk space for storage. Total help desk staff: 4.

- Finance and purchasing professionals require access to PeopleSoft ERP and accounting. They must also run large Excel spreadsheets and access Oracle for financial and customer record data. Oracle recommends 1 GHz or better systems for best results, and at least 256 MB RAM. A minimum of 28 GB of local storage (total) is needed. Total finance/purchasing staff: 4.
- Managers and executives require access to all MS Office components, and to Oracle Financials and Web-based reporting and analysis tools. Requirements are similar enough to those for finance and purchasing professionals to overlap with them completely. Total managers/executives: 2.
- The medical records staff works with customers to perform various image analyses and create special image formats for various medical scans. Beyond baseline requirements, they need large displays with high-end graphics adapters, local storage of 60 GB of data, and large amounts of RAM and processing power for image analysis software. Total medical records staff: 4
- The software developers fall under the same scenario as the MidSize Corp developers, and will be hired later this year. Total headcount to be allocated: 3.

Given HealthCom's specialized needs for medical records staff and developers, the solution is to create three standard platforms.

The standard employee desktop below applies to all staff except for medical records specialists and developers. Baseline and job role requirements dictate slightly more local storage than MidSize Corp employees required, but other specifications stay the same based on the most demanding needs:

- CPU requirements are easily exceeded by available technology, which starts at 1.5 GHz and upwards. For maximum longevity and power, choose 1.8 GHz as the base level.
- Because the more demanding job roles benefit from increased RAM, choose 512 MB as the standard RAM configuration.
- Because 40 GB drives are base level for most available PCs today, but maximum current requirements currently approach 40 GB, 80 GB is a good choice for current needs and future growth.
- Since larger displays provide general productivity benefits and high-end users typically view large data or spreadsheet displays, pick 19-inch monitors and mid-range graphics controllers for the best compromise between price and capability, with room for higher-end graphics requirements in the future.

The medical records specialist machine sets the bar much higher based on high-end image processing needs, which put high demands on processing power, memory, and disk space requirements:

- CPU requirements call for the best available technology that's still affordable. For maximum productivity and power, choose 2.5 GHz as the base level.
- Because image analysis will go faster with more RAM, choose 2048 MB (2 GB) as the standard RAM configuration.
- Because current requirements approach 80 GB for medical records specialists, choose two 120 GB Ultra ATA drives as the standard configuration.
- Since larger displays are essential for image analysis, pick two 21-inch monitors and one 17-inch monitor and a top-of-the-line "quad head" graphics controller for maximum screen handling capabilities.

HealthCom puts all this information together and consults with a local reseller to choose the right desktops. Working with a reseller representative, HealthCom picks the HP Compaq D310v Microtower for ordinary users, the HP Compaq D510 Convertible Minitower for developers, and the same base model with different graphics card, monitors, and hard disks for medical record specialists. All models come with Windows XP Professional preinstalled.

Because all desktop machines chosen come in tower cases, expansion options are more available should standards change unexpectedly before the 24- to 36-month lifecycle of these machines expires. The idea

is to leave sufficient room for further growth should it be needed, even for demanding job roles like the HealthCorp medical records specialist position.

Working with vendors and resellers

As you've read in other sections of this guide, creating a desktop standard to meet everyday and special needs takes some effort for analysis, planning, and design. But it's not an impossible task, nor do you need a big professional IT staff to make it work. HP offers the tools and resources you need to match your requirements to the right collection of servers, even if you don't know the difference between Ultra ATA and RAID, or between single and multi-head graphics adapters. If you can define your needs in terms of features, software, data, user roles, and special requirements, HP can do the rest.

If you aren't comfortable choosing your own standard desktop(s), or you would feel more comfortable working with an experienced professional, certified HP resellers and sales associates are available to help you make choices that meet your needs and won't break your budget. To get in touch with either a reseller or the HP sales associate in your area, call 800-282-6672, or visit one of HP's online reseller partners or your local reseller. Follow the links to the right for quick access to both.

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