



INFORMATION &
eGOVERNMENT AUTHORITY

Governance & Enterprise
Architecture Directorate

Standards & Guidelines for Government Personal Computing Purchases

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Glossary

Acronyms	Definition
CPU	Central Processing Unit
DDR	Double Data Rate
GB	Gigabyte
GIS	Geographic Information System
GPU	Graphics Processing Unit
HDD	Hard Disk Drive
iGA	Information and eGovernment Authority
IR	Infrared Radiation
PassMark	A software development group specialized in developing of high-quality benchmarking solutions for computer hardware performance
PC	Personal Computer
RAM	Random Access Memory
SSD	Solid-State Drive
TB	Terabyte
TPM	Trusted Platform Module



1. Preface

This document is intended to set standards and guidelines for Computer Desktops and Laptops purchases for government employees in the Kingdom of Bahrain. The objectives include:

- Optimizing cost of computer-related purchases by selecting appropriate specifications based on business needs and ensuring optimum utilization of the procured devices.
- Reducing technical issues by investing in reliable and efficient technologies to prolong the life span of the procured devices.
- Enhancing IT security by utilizing multi-factor authentication for system login.
- Protecting environment with Green-IT practices by investing in energy efficient technologies.

In order to ensure that the procured machines meet the standard performance requirements, without limiting the purchases to specific brands or slowing down the adoption of technology updates, the performance requirements are defined by performance benchmarks. CPU and GPU performance benchmarks are a method to compare their performance in real life scenarios. These benchmarks act as references independent of brand or model.

The standards and guidelines are not meant to limit the options of government entities, but rather ensure entities get the best value for their money while not compromising their staff's productivity.

This document will undergo periodic updates to keep up with emerging and future demands and advances in technology.

2. General Standards & Guidelines

- 1 Computer-related purchase requests should include detailed requirements about the requested **machines**, such as, quantity, unit costs, specifications, along with a list of applications that will be installed and used on each machine specifications.
- 2 The purchase requests should include details about the **users**, such as user roles, their numbers, their usage and their associated machines specifications.
- 3 The requested machines **specifications should be aligned with job requirements** of the intended users.
- 4 The purchase requests should specify whether the requested items are new purchases to cover new recruitments, or to replace existing machines. If it is a replacement request, entity should specify the age of the existing devices along with their specifications.



- 5 For “3D and Animation Modeling” roles, desktop computers are preferred over laptops due to their high performance, durability, scalability & cost effectiveness. Laptops can be provided at exceptional cases where portability is a core requirement.
 - a. For all other user categories Laptops are temporarily preferable over desktops while the government is moving toward work-from-home since the outbreak of the COVID19 pandemic in Q1 2020.
- 6 Procurement requests should not specify brands unless there is a compelling technical justification.
- 7 The machine processor generation for CPUs should not be older than 3 generations. For example, if the current Intel CPU generation is the 12th, then government entities can get 10th, 11th & 12th generation CPUs, whereas 9th or older generations should be avoided. The same concept applies to AMD CPUs.
 - a. The different CPU series (e.g. Intel’s i3, i5, i7, AMD’s Ryzen 3, 5, 7, etc.) refer to a range of features included in each series related to the number of cores, size / levels of cache available, hyperthreading and so on; however, they are not indicative of the overall performance in general. The proposed benchmarks in this standard ensure whichever model is acquired delivers the required performance, in addition to other constrains – such as the number of physical cores – based on the nature of the targeted applications that the user needs.
- 8 The storage configuration for both desktops and laptops should be SSD rather than HDD. HDD can be chosen only for exceptional cases where massive storage is needed. Typically, the average employee should get no more than 256GB of SSD storage considering the availability of Microsoft Office365 and the OneDrive On-Demand feature, which optimizes usage of local storage by giving users direct access to their files through the cloud without consuming local storage space.
- 9 Windows 10 is memory intensive, therefore, all machines must have a minimum of 8GB of memory to ensure their performance and longevity.
- 10 In many cases, older machines can work efficiently for upwards of 3 more years – on top of their 5-year replacement policy – if they receive SSD storage along with RAM upgrade, provided that hardware-support is available in the market at a reasonable price. This option allows entities to save more than 60% of the cost of procuring new machines without compromising the continuity of their work.



- 11 The requested machines must meet the following **minimum requirements** in order to enable Windows Hello security feature:
 - a. Windows 10 (Build 1803 or later).
 - b. TPM 2.0 (for PIN number).
 - c. At least one of the following features:
 - i. Fingerprint Reader (for Fingerprint Recognition feature).
 - ii. Compatible IR Camera (for Face Recognition feature).
- 12 It is recommended to consider the weight of the procured devices based on user's nature of business – for example, top management or public relations teams (who are traveling frequently) should be provided with relatively lightweight devices for smoother mobility.
- 13 Once proposals / quotations are received from vendors, government entities are advised to capture and document the benchmark score for audit purposes. This applies to both CPU and GPU benchmarks.
- 14 Exceptions to the standard are to be provided to the ICT Taskforce in the following events:
 - a. If there is a business need that is not satisfied by the specifications listed in this standard, an exception may be granted upon valid justification.
 - b. If the target specifications are not available in the market, an exception is granted once the ICT Taskforce confirms the unavailability of said specifications.

3. Benchmark Mechanism for CPU & GPU:

[PassMark](#) Benchmarks will be the reference for government entities for evaluating and choosing their machines. PassMark is one of the most widely adopted computer benchmarking platform. In the extreme event that PassMark goes offline for an extended period of time, the ICT Task Force will provide an alternative benchmarking reference.

4. Recommended Specifications based on Usage:

The following table defines recommended specification based on different user categories.



User Category	Common Applications Used	Recommended Specifications																	
Standard Government User / Project Management / System Analysts / System Administrators / Helpdesk Agent	<ul style="list-style-type: none"> • Microsoft Office 365 • Microsoft Project • Microsoft Visio • Microsoft Teams • Adobe Reader / Acrobat Pro • WinZip / WinRAR • Image editing for basic users • Remote access to services that are not executed on the user's own machine 	<p>Processor (CPU): CPU Benchmark 10,000 ~ 15,000</p> <p>Memory (RAM): 8 GB (DDR4)</p> <p>Storage (Hard Disk): 256GB SSD</p>																	
System Development	<p>In addition to the Standard Government User applications:</p> <ul style="list-style-type: none"> • Microsoft Visual Studio • Eclipse • Adobe Dreamweaver • Oracle SQL Developer • Aqua data Studio • Jaspersoft Studio 	<table border="1"> <thead> <tr> <th>PC</th> <th>Laptop</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">Processor</td> </tr> <tr> <td colspan="2" style="text-align: center;">CPU Benchmark 10,000 ~ 15,000</td> </tr> <tr> <td colspan="2" style="text-align: center;">Memory (RAM):</td> </tr> <tr> <td colspan="2" style="text-align: center;">16GB</td> </tr> <tr> <td colspan="2" style="text-align: center;">Storage (Hard Disk):</td> </tr> <tr> <td colspan="2" style="text-align: center;">256GB SSD</td> </tr> <tr> <td colspan="2" style="text-align: center;">Optional: Additional 1TB HDD for virtual machines storage (i.e. VMware, Hyper-V, VirtualBox, etc...)</td> </tr> </tbody> </table>		PC	Laptop	Processor		CPU Benchmark 10,000 ~ 15,000		Memory (RAM):		16GB		Storage (Hard Disk):		256GB SSD		Optional: Additional 1TB HDD for virtual machines storage (i.e. VMware, Hyper-V, VirtualBox, etc...)	
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User Category	Common Applications Used	Recommended Specifications					
Media and Marketing	In addition to the Standard Government User applications: <ul style="list-style-type: none"> • Adobe Illustrator • Adobe InDesign • Adobe Photoshop • Adobe Premiere Pro • Adobe After Effects • DaVinci Resolve • Blender • 3ds Max • Maya 	Usage			PC	Laptop	
		Processor					
		Still Graphics	CPU Benchmark 10,000 ~ 15,000				
		Video Editing & 3D Rendering: (Min. 4 physical cores)	CPU Benchmark 13,000 ~ 18,000				
		3D & Animation Modeling: (Min. 4 physical cores)	CPU Benchmark 17,000 ~ 22,000	CPU Benchmark 15,000 ~ 20,000			
		Memory (RAM):					
		Still Graphics	16GB				
		Video Editing & 3D Rendering	24GB / 32GB (2x8GB+2x4GB), (2x16GB), (4x8GB)				
		3D and Animation Modeling	32GB				
		Graphic:					
		Still Graphics (Optional)	GPU Benchmark ≤ 4,000	GPU Benchmark ≤ 3,000			
		Video Editing & 3D Rendering	GPU Benchmark 9,000 ~ 13,000 (≤ 8GB)	GPU Benchmark 6,000 ~ 9,000 (≤ 6GB)			
		3D and Animation Modeling	GPU Benchmark 13,000 ~ 18,000 (≤ 12GB)	GPU Benchmark 8,000 ~ 11,000 (≤ 8GB)			
		Storage (Hard Disk):					
		256GB ~ 512GB SSD					
Optional: Additional HDD for media storage							



User Category	Common Applications Used	Recommended Specifications																																												
Architecture & Engineering	In addition to the Standard Government User applications: <ul style="list-style-type: none"> • Bentley MicroStation • ArcGIS • AutoDesk AutoCAD • Inventor • Revit 	<table border="1"> <thead> <tr> <th>Usage</th> <th>PC</th> <th>Laptop</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Processor</td> </tr> <tr> <td>Standard (Including 3D rendering)</td> <td colspan="2" style="text-align: center;">CPU Benchmark 10,000 ~ 15,000</td> </tr> <tr> <td>3D modeling only</td> <td style="text-align: center;">CPU Benchmark 17,000 ~ 22,000</td> <td style="text-align: center;">CPU Benchmark 15,000 ~ 20,000</td> </tr> <tr> <td colspan="3" style="text-align: center;">Minimum 4 Physical cores</td> </tr> <tr> <td colspan="3" style="text-align: center;">Memory (RAM):</td> </tr> <tr> <td>Standard (Including 3D rendering)</td> <td colspan="2" style="text-align: center;">16GB</td> </tr> <tr> <td>3D modeling only</td> <td colspan="2" style="text-align: center;">32GB</td> </tr> <tr> <td colspan="3" style="text-align: center;">Graphic:</td> </tr> <tr> <td>Standard (Optional)</td> <td style="text-align: center;">GPU Benchmark ≤ 4,000</td> <td style="text-align: center;">GPU Benchmark ≤ 3,000</td> </tr> <tr> <td>3D Rendering/ Viewing</td> <td style="text-align: center;">GPU Benchmark 9,000 ~ 13,000 (≤ 8GB)</td> <td style="text-align: center;">GPU Benchmark 6,000 ~ 9,000 (≤ 6GB)</td> </tr> <tr> <td>3D and Animation Modeling</td> <td style="text-align: center;">GPU Benchmark 13,000 ~ 18,000 (≤ 12GB)</td> <td style="text-align: center;">GPU Benchmark 8,000 ~ 11,000 (≤ 8GB)</td> </tr> <tr> <td colspan="3" style="text-align: center;">Storage (Hard Disk):</td> </tr> <tr> <td colspan="3" style="text-align: center;">256GB ~ 512GB SSD Optional: Additional HDD for GIS media storage</td> </tr> </tbody> </table>	Usage	PC	Laptop	Processor			Standard (Including 3D rendering)	CPU Benchmark 10,000 ~ 15,000		3D modeling only	CPU Benchmark 17,000 ~ 22,000	CPU Benchmark 15,000 ~ 20,000	Minimum 4 Physical cores			Memory (RAM):			Standard (Including 3D rendering)	16GB		3D modeling only	32GB		Graphic:			Standard (Optional)	GPU Benchmark ≤ 4,000	GPU Benchmark ≤ 3,000	3D Rendering/ Viewing	GPU Benchmark 9,000 ~ 13,000 (≤ 8GB)	GPU Benchmark 6,000 ~ 9,000 (≤ 6GB)	3D and Animation Modeling	GPU Benchmark 13,000 ~ 18,000 (≤ 12GB)	GPU Benchmark 8,000 ~ 11,000 (≤ 8GB)	Storage (Hard Disk):			256GB ~ 512GB SSD Optional: Additional HDD for GIS media storage			Others / Special Requirements	Please send your requirements to iGA's Governance and Enterprise Architecture Directorate (ictp@iga.gov.bh) to get the recommended specifications.
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