



## FC0-GR1

### INTRODUCTION

The CompTIA Strata Green IT exam is designed to show that the successful candidate has the knowledge and skills to implement environmentally sound techniques such as disposal, preservation of power, and reduction of an organization's carbon footprint. Furthermore, a successful candidate will be able to identify organizations and standards, implement virtualization on IT systems, and calculate the ROI involved in implementing green IT. This test is intended for candidates who have decision making authority over their company's IT infrastructure such as: IT Manager, IT Supervisor, Data Center Manager, and Operations Manager. CompTIA A+ and CompTIA Server + are recommended prerequisites.

Domain	% of Examination
1.0 Green IT Techniques and Technologies	80%
2.0 Green IT Policies and Standards	20%
Total	100%

**\*\*Note:** The bulleted lists below each objective are not exhaustive lists. Even though they are not included in this document, other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam.

(A list of acronyms used in these objectives appears at the end of this document.)

## 1.0 Green IT Techniques and Technologies

### 1.1 Implement environmentally sound techniques to dispose of hazardous materials.

- Environmentally hazardous substance disposal
  - Battery disposal
  - CRT disposal-replace with LCDs
  - General Recycling
    - Recycling of computers for reuse or parts
  - Toner disposal / ink cartridge recycling
  - Cleaning supply disposal
  - Materials that meet RoHS guidelines
  - Retired equipment disposal
  - Use of third party approved vendors for disposal
    - Shredding
    - Incinerating
    - Hard drive wiping

### 1.2 Identify and implement environmentally sound techniques to preserve power.

- Power management ( Power saving features)
  - BIOS settings
    - ACPI
    - Screen brightness
    - Power saving profile
    - Wake on LAN
    - CPU states
      - SpeedStep™(Intel processors)
      - PowerNow!/Cool'n'Quiet™(AMD)
      - LongHaul™ (Via CPU)
      - LongRun™ (Transmeta)
    - Fan speeds
    - Power on and power off timers
  - OS settings
    - Automatic standby after a specified time limit of non-use
    - Hard disk power down time
    - Wireless and Wired NIC power saving settings
    - Sleep, standby, hibernate modes
    - USB Suspend settings
    - PCI Express power management
    - Search and Indexing power saving mode
    - Windows Vista DreamScene™ power setting modes
    - Multimedia Power settings
    - Power utility in control panel
  - IT policy and procedures
    - Shutdown/power off procedures/policies at end of day
    - Shutdown scripts
      - Group policy
- Consolidation of office equipment

- Multifunctional devices
- Power management PCs and lower power servers replace large desktops with energy efficient laptops and thin clients
- Consolidation of vendors and/or orders to reduce shipping
- Reduce graphic card performance to minimum requirements
  - Motherboard video output using low 3D performance or power
  - Select GPU based on average wattage or performance/watt
- No video card – use of shared terminals and thin clients
- LED monitors and LED lights
- Use Power over Ethernet (PoE)
- Wireless AP Auto Transmit Power or Manual Transmit Power
- Light/power timer on routers and/or networking equipment
- Active cooling (water or fan) vs. Passive (heatsink only)

### 1.3 Explain the purpose and application of virtualization technology.

- VDI – Virtual Desktop Infrastructure
- Virtual Lab
- On demand Labs and On Demand Applications
- Server consolidation
- Storage virtualization
- Application virtualization
- Best practices
- Pros and Cons of virtualization

#### Pros:

- Power reduction
- Reduced infrastructure cost
- Centralization of computing resources
- Centralized administration
- Thin client vs. full workstations
- Enhanced disaster recovery
- Licensing costs
- Faster deployment
- Maximize hardware utilization
- Reduced power and cooling consumption

#### Cons:

- Potential single point of failure
- Increased administrative overhead
- More complex administration
- High initial investment
- Training personnel costs
- Increased network traffic within a single node
- Resource contention
- Increase mean time between failure
- Security
  - Concerns from shared hardware, shared resources, DOS
  - Concerns from timing/interrupt attacks (Encryption) and VM escaping

#### 1.4 Explain different techniques and technologies that will enhance Green IT initiatives

- Duplex printing and use lower cost per page network printers
- Use Terminal Servers
- Blade servers
- Use Energy Star rated equipment
- Use low power NAS (network attached storage) instead of file servers
- Use Solid State drives
- Green building infrastructure and renewable energy sources
  - Insulation- Eliminate air leaks in building/rooms
  - Passive Solar and passive cooling, Active solar
  - Heat recovery ventilation
  - Fluorescent lighting and compact florescent lamps
  - HVAC scheduling and monitoring
  - Smart light switches
  - Proper spacing for cooling IT equipment
  - Solar panels
  - Wind power
  - Other energy sources
  - Heat exchangers
  - Batteries
- Decrease print margins (increase print area)
- Paperless documents / electronic records
- Online collaboration technologies
- KVM switches to share a single PC or a single monitor
- Rechargeable batteries
- Measurement of energy for IT hardware and infrastructure
  - Active accountability and management to measure 6-12 months
  - Measure each workstation's power draw

## 2.0 Green IT Policies and Standards

#### 2.1 Develop and implement an internal IT strategy analyzing ROI for the Green IT initiative.

- State objectives and goals for implementing Green IT initiatives.
- Calculate the savings and ROI for Green IT investments
- Project management for the implementation of green initiatives
- Identify needs and cost effectiveness of power redundancy on a system that does not require 24/7 use or access
- Understand full life cycle assessment of environmental impacts of any product and/or solution
- Calculate and understand the carbon footprint of an organization

#### 2.2 Identify Green IT framework assessment tools, organizations, and standards.

- United Nations Intergovernmental Panel on Climate Change (IPCC)

- United Nations Environment Program (UNEP)
- Agenda 21
- International Federation of Consulting Engineers Project Sustainability Management (FIDIC's PSM)
- IPD Environmental Code
- ISO 21931
- U.S. Environmental Protection Agency
- Energy Star
- TCO Certification
- Restriction of Hazardous Substances (RoHS)
- 2002/96/EC Waste Electrical and Electronic Equipment (WEEE) requirements
- Climate Savers Computing Initiative (CSCI)
- Green Computing Impact Organization, INC. (GCIO)
- Green Electronics Council
- The Green Grid
- International Professional Practice Partnership (IP3)

### 2.3 Identify methods to reduce workforce environmental impacts.

- Car pooling
- Use public transportation or alternate transportation
- Telecommuting / working from home
- Working remotely but securely
  - VPN
  - Remote Desktop
  - Remote third party software
- Replace travel with video conferencing
- Remote interviews
- Remote/Mediated classroom
- Compressed work week (e.g. Mon-Thurs 7a.m. - 6p.m.)
- Reduced office space heating, lighting, etc

# CompTIA Strata Green IT Acronyms

## Introduction

The following is a list of acronyms which could appear on the CompTIA Strata Green IT exam. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as a part of a comprehensive test preparation program.

<b>ACRONYM</b>	<b>SPELLED OUT</b>
AC	alternating current
ACPI	Advanced Configuration and Power Interface
BIOS	basic input/output system
CD	compact disc
CD-ROM	compact disc-read-only memory
CD-RW	compact disc-rewritable
CPU	central processing unit
CRT	cathode-ray tube
CSCI	Climate Savers Computing Initiative
DC	direct current
DDR	double data-rate
DDR RAM	double data-rate random access memory
DDR SDRAM	double data-rate synchronous dynamic random access memory
DHCP	dynamic host configuration protocol
DIMM	dual inline memory module
DNS	domain name service or domain name server
DOS	denial of Service
DSL	digital subscriber line
DVD	digital video disc or digital versatile disc
DVD-R	digital video disc-recordable
DVD-RAM	digital video disc-random access memory
DVD-ROM	digital video disc-read only memory
DVD-RW	digital video disc-rewritable
DVI	digital visual interface
EMI	electromagnetic interference
EMP	electromagnetic pulse
ESD	electrostatic discharge
FAT	file allocation table
FAT32	32-bit file allocation table
FDD	floppy disk drive
FIDIC	International Federation of Consulting Engineers
Gb	gigabit
GB	gigabyte
GCIO	Green Computing Impact Organization

GHz	gigahertz
HDD	hard disk drive
HDMI	high definition media interface
HTML	hypertext markup language
HTTP	hypertext transfer protocol
HTTPS	hypertext transfer protocol over secure sockets layer
HVAC	heating, ventilation, & air conditioning
IDE	integrated drive electronics
IP	internet protocol
IP3	International Professional Practice Partnership
IPCC	Intergovernmental Panel on Climate Change
IR	infrared
ISDN	integrated services digital network
ISO	International Organization for Standardization
Kb	kilobit
KB	Kilobyte or knowledge base
KVM	keyboard, video, mouse
LAN	local area network
LAN	local area network
LCD	liquid crystal display
LED	light emitting diode
MB	megabyte
Mb	megabit
MHz	megahertz
MP3	Moving Picture Experts Group Layer 3 Audio
MP4	Moving Picture Experts Group Layer 4
MPEG	Moving Picture Experts Group
NAS	network attached storage
NIC	network interface card
OS	operating system
PC	personal computer
PCI	peripheral component interconnect
PCIe	peripheral component interconnect express
PCIX	peripheral component interconnect extended
PCMCIA	Personal Computer Memory Card International Association
PDA	personal digital assistant
PoE	power over Ethernet
PSM	Project Sustainability Management
RAM	random access memory
RJ	registered jack
RJ-11	registered jack function 11
RJ-45	registered jack function 45

RoHS	Restriction of Hazardous Substances
ROI	return on investment
SATA	serial advanced technology attachment
SCSI	small computer system interface
SD card	secure digital card
SOHO	small office/home office
SSID	service set identifier
SSL	secure sockets layer
TB	terabyte
TCO	Total Cost of Ownership
TCP	transmission control protocol
TCP/IP	transmission control protocol/internet protocol
UNEP	United Nations Environment Program
UPS	uninterruptible power supply
URL	uniform resource locator
USB	universal serial bus
VDI	virtual desktop infrastructure
VGA	video graphics array
VM	virtual machine
VoIP	voice over internet protocol
VPN	virtual private network
WAP	wireless application protocol
WEEE	Waste Electrical and Electronics Equipment
WEP	wired equivalent privacy
WIFI	wireless fidelity
WPA	wireless protected access