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# ICT System Software Support

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# Scope and overview

This is a report detailing the support of ICT system software, focusing on the management, security, backup, and restoration of ICT systems. Additionally, this report covers documentation, accessing necessary software and files, maintaining system performance, and utilizing a range of features and system tools. This report will cover the importance of effective file management systems, the significance of security in ICT systems, the necessity of regular system backups, the importance of having a reliable system restore process, the role of documenting in supporting ICT systems, how to necessary software and files within an ICT system, the importance of monitoring maintaining system performance and various features and tools available in ICT systems.

# Effective file management systems in ICT systems

File management involves naming, storing, and organizing files in a system or program to facilitate easy document retrieval. Most companies use digital file management, but physical methods remain beneficial for certain contexts. File organization is a crucial part in maintaining organization within ICT systems.

## Benefits of effective file management include:

Improved organization:

An ICT system will have countless important files that have to be stored. An organization method ensures that files are stored logically and reduces clutter within digital systems.

A centralized document location:

Having all documents in one place simplifies retrieval and users can find the desired files quickly and easily.

Increased Efficiency:

Time management and efficiency are vital for productivity, which is crucial for ICT systems and well organized files reduce the time spent on searching for files allowing said users to focus more on tasks. (indeed.com)

## Best practices for Digital file organization:

Use a clear and structured method for organizing your files

Use a cloud based Document management system to centralize storage and allow secure access from any device

Establish consistent naming rules for files and folders using descriptive and short names to make searching easier

Control who can access specific files and set permissions to maintain security (“How to organize digital files | Box”)

## Examples of File Management Tools and Software

* + **Microsoft OneDrive**: Cloud storage with collaboration features.
  + **Google Drive**: Similar to OneDrive, integrates well with Google Workspace.
  + **Dropbox**: Popular for file sharing and syncing across devices.
  + **Box**: Enterprise-grade cloud storage with robust security features.
  + **Evernote**: Organizes notes, documents, and web clippings.
  + **Trello**: For project management and organizing tasks.
  + **File Explorer (Windows) / Finder (Mac)**: Built-in file management tools.
  + **Document Management Systems (DMS)**: Solutions like SharePoint, Alfresco, or M-Files for enterprise-level file management.

# Security in ICT systems

The single most important aspect of any ICT system is its security capabilities. ICT systems handle sensitive information, including personal data, financial records and intellectual property Security ensures confidentiality, integrity, and availability. A breach of data security can disrupt operations in ICT systems leading to financial losses and reputational damage. (Ross)

## Strategies for protecting systems:

* Access Control:
  + Limit access to authorized personnel only.
  + Implement strong authentication (e.g., multi-factor authentication) to verify users.
* Regular Software Updates:
  + Patch vulnerabilities promptly to minimize exploitation.
* Endpoint Security:
  + Secure devices (endpoints) like desktops, laptops, and mobiles.
  + Use antivirus software, firewalls, and intrusion detection systems (IDS).
* Encryption:
  + Encrypt data at rest (stored) and in transit (during communication).
  + Protects against unauthorized access even if data is compromised.
* Firewalls:
  + Network security gatekeepers that filter traffic.
  + Block unauthorized access and monitor traffic patterns.
* Intrusion Detection and Prevention Systems (IDPS):
  + Detecting and responding to suspicious activities.
  + Prevent attacks like denial-of-service (DoS) or unauthorized access (Ross)

## Commonly used security measures:

* Antivirus Software:
  + Purpose: Detects, prevents, and removes malware (viruses, worms, Trojans).
  + How It Works: Scans files, emails, and web traffic for known malicious patterns.
  + Examples: Norton, McAfee, Bitdefender1.
* Firewalls:
  + Purpose: Controls incoming and outgoing network traffic.
  + Types: Network Firewalls: Protect entire networks.
  + Host-Based Firewalls: Installed on individual devices.
  + How They Work: Filter traffic based on rules (allow/block).
  + Examples: Windows Firewall, Cisco ASA2.
* Encryption:
  + Purpose: Secures data by converting it into an unreadable format.
  + Types:Symmetric Encryption: Uses a single key for both encryption and decryption. Asymmetric Encryption: Involves public and private keys.
  + Use Cases: Secure communication (e.g., HTTPS), data storage.
  + Examples: AES, RSA3.
* Intrusion Detection Systems (IDS):
  + Purpose: Monitors network traffic for suspicious activity.
  + Types:Network IDS (NIDS): Analyzes network packets.
  + Host IDS (HIDS): Monitors individual devices.
  + How They Work: Detects anomalies or known attack patterns.
  + Examples: Snort, Suricata1.

# System backups

Data loss can strike unexpectedly due to hardware failures, human errors, malware attacks, or natural disasters. Backups ensure all the data has been safely copied and stored in a safe drive or cloud so in case of a data loss said data can be restored.

## Necessity of regular system backups

Regular backups endure quick restoration of important data after a loss and it will reduce the downtime which will allow the systems to resume operations promptly. By having regular backups it will minimize the downtime by providing accessible copies of data. Proactive backups will significantly lower the risk of irreparable data loss. Safeguarding Critical information always becomes a priority. (“The Importance of Regular Data Backups”)

## Types of backups

* Full backup: makes a full backup of the whole system
* Incremental backup: Backs up the changes along with the old data since the last backup
* Differential backups: backs up only the changes since the last backup

## Procedures and Tools for System Backups

* Offsite Servers:
* Store massive amounts of data securely.
* Effective for disaster recovery.
* Provide additional redundancy by backing up data onto their own drives
* Independent Drives (Terabyte Drives):
* Affordable and easy to use.
* Plug-and-play simplicity.
* Suitable for local data storage and recovery. (“Backup and Recovery of Data: The Essential Guide”)

# Reliable System restore process

Having a Robust system for system restoration after a backup is essential for multiple reasons such as ensuring uninterrupted operations even after system failures or disasters, minimizing downtime, safeguarding critical data and mitigating the risk of losing data,

## Steps in restoring systems from backups:

1. Identify data to restore (Determine which data or system components need restoration and Prioritize critical files, databases, applications, and configurations)
2. Locate the appropriate backup ( from the backed up Drives or cloud)
3. Initialize the restoration process (Transfer data from the backup source to the destination
4. Validate the restored data (Ensure the integrity of restored files and Verify that data matches the original state)

## Examples of critical restoration scenarios:

* Automated Failover and Failback:
  + Cloud Outages: When the primary cloud platform fails, automated failover switches to a backup cloud environment.
  + Local Server Failures: Swift transfer to a redundant server prevents data loss and maintains services.
  + Mainframe Crashes: Instantly switch to a standby system to keep critical data accessible. (“How to organize digital files | Box”)
* Backup Verification Testing:
  + Regularly test full restorations to catch issues (corruption, incomplete backups) before data loss occurs and Identify key backups and validate their reliability. (Flinders)

# The Role of Documentation in Supporting ICT Systems

Documentation is very important in supporting ICT systems because without communication among peers/users it will be very difficult. It ensures efficiency,productivity and an easier transfer of knowledge.

## Types of IT documentation:

* System documentation; describes the system itself
* Infrastructure documentation; Helps technicians understand how components interact and solve critical issues.
* Process documentation; Breaks down IT processes step-by-step.
* Incident response documentation; Outlines steps during cyberattacks (“What is IT Documentation: Types, Examples & Templates”)

## Best Practices for Creating and Maintaining IT Documentation

* Thorough Planning:
  + Create a documentation plan.
  + Design a consistent structure for easy navigation.
* Clear Language:
  + Avoid jargon and complex terms.
  + Keep it simple and user-friendly.
* Regular Updates:
  + Set an update schedule.
  + Ensure accuracy and relevance.
* Internationalization:
  + Translate documentation for global readers (Vranovic)

# Accessing Necessary Software and Files

You can access the necessary software and files in an ICT system using the file navigation system (eg; file explorer) in the system, from network drives or from cloud storage.

## Permissions and Access Control Measures

* Authentication:
  + Username/Password: Basic login credentials.
  + Biometrics (Fingerprint, Face ID): Enhanced security.
  + Security Tokens: Physical devices for authentication.
* Authorization:
  + Role-Based Access Control (RBAC): Assign permissions based on roles (e.g., admin, user).
  + Discretionary Access Control (DAC): Owners control access to their files.
  + Mandatory Access Control (MAC): Strict access rules (common in government systems).
* Tools and Methods for Access Management:
  + Active Directory (AD): Centralized user management (Windows).
  + LDAP (Lightweight Directory Access Protocol): Directory service for authentication.
  + Access Control Lists (ACLs): Specify permissions for files and folders.
  + Firewalls: Control network traffic and block unauthorized access.

(Hoffman) (Lanchec)

# Importance of Monitoring and Maintaining System Performance

Effective system monitoring ensures smooth operations, prevents downtime, and optimizes resource utilization. Monitoring ensures that most abnormalities are caught before any serious problems occur.

## Key Performance Indicators (KPIs) for ICT Systems

* Total vs. Open Tickets:
  + Measure ticket churn over time.
  + Monitor unresolved tasks to prevent system issues.
* Projects Delivered on Budget:
  + Keep projects within budget limits.
  + Optimize resource allocation.
* Server Downtime:
  + Track downtime occurrences.
  + Investigate reasons and minimize impact.
* Cyber Security Rating:
  + Assess overall security strategy.
  + Address vulnerabilities proactively.

(“Top 20 IT KPIs - Explore The Best IT KPI Examples & IT Metrics”)

## Tools and Techniques for Performance Management

* KPIs and Metrics:
  + Use well-designed KPIs to drive decision-making.
  + Focus on goals and problem resolution.
* Performance Appraisals:
  + Align individual goals with organizational aims.
  + Ensure regular, honest, and constructive conversations.
* 360-Degree Feedback:
  + Assess performance from various stakeholders’ perspectives.
  + Use insights for employee development.

(Marr)

# Features and Tools in ICT Systems

There are numerous features and tools used in ICT systems. Below are some examples.

* Operating Systems (OS):
  + Definition: Software that manages hardware resources and provides a user-friendly interface.
  + Examples: Windows, macOS, Linux.
  + Application: OS controls processes, memory, file systems, and device drivers.
* Device Drivers:
  + Definition: Software that enables communication between hardware devices and the OS.
  + Application: Ensures proper functioning of peripherals (printers, scanners, etc.).
* Utility Programs:
  + Definition: Tools for system maintenance, optimization, and troubleshooting.
  + Examples: Disk cleanup, defragmentation, antivirus software.
  + Application: Enhances system performance and security.
* Programming Languages:
  + Definition: Tools for creating software applications.
  + Examples: Python, Java, C++.
  + Application: Developers write code to build applications and automate tasks.

(“What is System Software? – Definition, Types, Examples and More”)

All of these features and tools can be used in unison to ensure an enhanced experience for supporting your systems. They will work with one another to identify problems and help you solve them. For example the OS will give an output to the user when abnormalities are there in the system.

## Commonly Used System Tools and Their Applications

Task Manager: it is the easiest way of checking your computer's vitals. Shows all the important features such as CPU usage, Memory usage, which programs are crashing etc..

Excel: it is a spreadsheet software for data storage and manipulation, it be used to analyze data, create charts and perform calculations

# Summary

Effective file management, robust security measures, regular system backups, comprehensive documentation, and efficient performance monitoring are essential for maintaining reliable ICT systems. Access control tools, system utilities, and collaboration platforms enhance productivity. All of the main parts play a key role in supporting all kinds of ICT software.

By keeping in mind all the aforementioned points you can single handedly support small system software jobs. My recommendation is to stick to the industry standard and to use this report as a small guide to help you through your journey.

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