Assistant Engineer IT/ Assistant Maintenance Engineer IT

Information Technology has significantly increased the operational effectiveness of banks. Automation has greatly decreased manual labour, minimised errors, and increased overall productivity for regular jobs including account administration, transaction processing, and document verification

What is the information systems audit policy?

Information systems audit and control policies are designed to ensure the reliability, security, and compliance of your organization's information systems. They help you identify and mitigate risks, protect sensitive data, and follow best practices and standards

How is Information Security Auditing Conducted?

Auditing procedures are not the same for every type of organization, but the following five steps are almost always a major part of security auditing:

1. Establish the audit's main goals with the company's stakeholders.

2. Define the scope of the audit, in which the company and the auditor make a list of the assets that should be audited, like devices, software, company data, documents, etc.

3. Conduct the audit. This phase identifies the weaknesses in which the auditor lists potential threats related to each auditable component, such as data loss, equipment malfunction, employee negligence or misconduct, faulty procedures, malware, unauthorized users, etc.

Learn how to conduct a vulnerability assessment.

4. Evaluate security and risks. Assess the risk of each of the identified threats happening and how well the organization can defend against them.

Learn how to perform a cybersecurity risk assessment.

5. Determine required controls. Identify what security measures must be implemented or improved to minimize risks

Types of IT audits[edit]

Various authorities have created differing taxonomies to distinguish the various types of IT audits. Goodman & Lawless state that there are three specific systematic approaches to carry out an IT audit:[5]

- **Technological innovation process audit**. This audit constructs a risk profile for existing and new projects. The audit will assess the length and depth of the company's experience in its chosen technologies, as well as its presence in relevant markets, the organization of each project, and the structure of the portion of the industry that deals with this project or product, organization and industry structure.
- **Innovative comparison audit**. This audit is an analysis of the innovative abilities of the company being audited, in comparison to its competitors. This requires examination of company's research and development facilities, as well as its track record in actually producing new products.
- **Technological position audit**: This audit reviews the technologies that the business currently has and that it needs to add. Technologies are characterized as being either "base", "key", "pacing" or "emerging".

Others describe the spectrum of IT audits with five categories of audits:

- **Systems and Applications**: An audit to verify that systems and applications are appropriate, are efficient, and are adequately controlled to ensure valid, reliable, timely, and secure input, processing, and output at all levels of a system's activity. System and process assurance audits form a subtype, focussing on business process-centric business IT systems. Such audits have the objective to assist financial auditors.[6]

- **Information Processing Facilities**: An audit to verify that the processing facility is controlled to ensure timely, accurate, and efficient processing of applications under normal and potentially disruptive conditions.
- **Systems Development**: An audit to verify that the systems under development meet the objectives of the organization, and to ensure that the systems are developed in accordance with generally accepted standards for systems development.
- **Management of IT and Enterprise Architecture**: An audit to verify that IT management has developed an organizational structure and procedures to ensure a controlled and efficient environment for information processing.
- **Client/Server, Telecommunications, Intranets, and Extranets**: An audit to verify that telecommunications controls are in place on the client (computer receiving services), server, and on the network connecting the clients and servers.

What is a Web Application?

A web application is software that runs in your web browser. Businesses have to exchange information and deliver services remotely. They use web applications to connect with customers conveniently and securely.

Web applications include online forms, shopping carts, word processors, spreadsheets, video and photo editing, file conversion, file scanning, and email programs such as Gmail, Yahoo and AOL.

the three tiers are called *presentation*, *application* and *storage*. A web browser is the first tier (presentation), an engine using some dynamic Web content technology (such

as ASP, CGI, ColdFusion, Dart, JSP/Java, Node.js, PHP, Python or Ruby on Rails) is the middle tier (application logic), and a database is the third tier (storage).[6] The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface.

static web applications, dynamic web applications, and progressive web applications

What is a Website?

A website is a group of globally accessible, interlinked web pages which have a single domain name. It can be developed and maintained by an individual, business or organization. The website aims to serve a variety of purposes. Example: Blogs.

A website is hosted on a single or multiple web server. It is accessible via a network like the Internet or a private local area network via IP address.

What is a Web Application?

A web application is a software or program which is accessible using any web browser. Its frontend is usually created using languages like HTML, CSS, Javascript, which are supported by major browsers. While the backend could use any programming stack like LAMP, MEAN, etc. Unlike mobile apps, there is no specific SDK for developing web applications.

Web Applications came to prominence with the advent of Software as a Service (SaaS) movement.

Why you need a Website?

Here, are prime reasons why you need a website:

- An effective method to showcase your products and services
- Developing a site helps you to create your social proof
- Helps you in branding your business
- Helps you to achieve your business goals
- Allows you to increase your customer support

Why you need a Web Application?

Web applications are more popular because of the following reasons:

- Compared to desktop applications, web applications are easier to maintain by as they use the same code in the entire application. There are no compatibility issues.
- Web applications can be used on any platform: Windows, Linux, Mac… as they all support modern browsers.
- Mobile App store approval not required in web applications.
- Released any time and in any form. No need to remind users to update their applications.
- You can access these web applications 24 hours of the day and 365 days a year from any PC.
- You can either make use of the computer or your mobile device to access the required data.
- Web applications are a cost-effective option for any organization. Seat Licenses for Desktop software are expensive where SasS, are generally, pay as you go.
- Web-Based Apps are Internet-enabled apps that are accessed through the mobile's web browser. Therefore, you don't require to download or install them.
- Below given are the prime difference between web application and web site:

Parameter	Web Application	Website
Created for	A web application is designed for interaction with the end user	A website mostly consists of static content. It is publicly accessible to all the visitors.
User interaction	In a web application, the user not only read the page content but also manipulate the restricted data.	A website provides visual & text content which user can view and read, but not affect it 's functioning.
Authentication	Web applications need authentication, as they offer a much broader scope of options than websites.	Authentication is not obligatory for informational websites. The user may ask to register to get a regular update or to access additional options. This features not available for the unregistered website visitors.
Task and Complexity	Web application functions are quite higher and complex compared to a website.	The website displays the collected data and information on a specific page.
Type of software	The web application development is part of the website. It is itself not a complete website.	The website is a complete product, which you access with the help of your browser.

Parameter	Web Application	Website
Compilation	The site must be precompiled before deployment	The site doesn’t need to be pre-compiled
Deployment	All changes require the entire project to be re-compiled and deployed.	Small changes never require a full re-compilation and deployment. You just need to update the HTML code.

Disadvantages of Web Application

- Security is not guaranteed, so it is vulnerable for unauthorized access.
- The web app may not support multiple browsers with equal precedence.
- The web application is built explicitly for a certain operating system, so it is difficult to discover from the app store.
- Limited scope to access the device’s features

Web Application Development Process

The web application development process involves several phases, each with its own set of tasks, activities, and considerations. While the specific steps may vary depending on the project scope, technology stack, and team structure, here is a general outline of the web application development process:

1. Requirement Gathering and Analysis:

- Understand the project’s goals, target audience, and business requirements.
- Collaborate with stakeholders to gather detailed project requirements and expectations.
- Define functional and non-functional requirements for the web application.

2. Planning:

- Create a project plan that outlines the scope, timeline, budget, resources, and milestones.
- Determine the technology stack, frameworks, and tools that will be used.
- Plan the application’s architecture, including data models, components, and interactions.

3. Design:

- Design the user interface (UI) and user experience (UX) of the web application.
- Create wireframes, prototypes, and mockups to visualize the layout and interactions.

- Design database schemas, data flows, and system diagrams.

4. Front-End Development:

- Develop the client side of the web application using HTML, CSS, and JavaScript.
- Implement the UI design, including responsive layouts and interactive elements.
- Integrate front-end frameworks and libraries as needed.

5. Back-End Development:

- Develop the server-side logic, business logic, and APIs using the chosen programming language and framework (e.g., Python with Django or Flask, Node.js with Express, Ruby on Rails, etc.).
- Implement user authentication, authorization, and security measures.
- Create RESTful or GraphQL APIs for communication between the front-end and back-end.

6. Database Development:

- Design and create the database schema based on the application's data requirements.
- Choose an appropriate database management system (e.g., MySQL, PostgreSQL, MongoDB) and set up the database.
- Implement data storage, retrieval, and manipulation operations.

7. Integration:

- Integrate third-party services, APIs, and libraries that enhance the application's functionality (e.g., payment gateways, social media integration, geolocation services).

8. Testing:

- Conduct various levels of testing, including unit testing, integration testing, and user acceptance testing.
- Test the application's functionality, performance, security, and compatibility across different browsers and devices.
- Identify and fix bugs, errors, and inconsistencies.

9. Deployment:

- Deploy the web application to a production environment, such as a web server, cloud platform, or hosting service.
- Configure server settings, domain name, and security measures (SSL/TLS certificates).
- Set up monitoring and error tracking tools to ensure the application's stability.

10. Maintenance and Updates:

- Continuously monitor the application's performance, security, and user feedback.

- Regularly update and maintain the application, including bug fixes, security patches, and feature enhancements.
- Scale the application as needed to accommodate increased user demand and traffic.
  11. Documentation and Training:

- Create user documentation, including user guides and tutorials, to help users navigate and use the application effectively.
- Provide training and support to users, administrators, and other stakeholders as required.
  12. Post-Launch Activities:

- Market and promote the web application to attract users and drive engagement.
- Gather user feedback and analyze metrics to make informed decisions for future updates and improvements.
  Throughout the development process, collaboration, communication, and iterative refinement are essential to ensure the successful creation of a functional, user-friendly, and reliable web application that meets the needs of both users and stakeholder

Benefits

Web applications have many benefits. Some common benefits include the following:

- Multiple users can access the same version of an application.
- Users don't need to install the app.
- Users can access the app through various platforms such as a desktop, laptop or mobile.
- Users can access the app through multiple browsers

Importance of Web Application Development

Web application development is of significant importance in today's digital age due to the widespread use of the internet and the increasing reliance on online services. Here are some key reasons why web application development is crucial:

- **Global Accessibility:** Web applications can be accessed from anywhere in the world with an Internet connection. This global accessibility allows businesses to reach a broader audience and users to access services without geographical limitations.

- **Business Growth and Innovation:** Web applications enable businesses to expand their reach and offer new products or services. They provide a platform for innovation and allow companies to differentiate themselves in a competitive market.
- **Enhanced User Experience:** Well-designed web applications offer a seamless and user-friendly experience. A positive user experience increases engagement, customer satisfaction, and brand loyalty.
- **Efficiency and Automation:** Web applications automate processes, reducing manual efforts and improving efficiency. They can handle tasks such as data entry, transaction processing, and inventory management, saving time and resources.
- **Cost-Effectiveness:** Web applications are often more cost-effective than traditional desktop software. They eliminate the need for distributing and updating software on individual machines, reducing maintenance costs.

Challenges of Web Applications for Businesses

Security, Performance Issue, Data secure, Online Used

Web App Development Example

There are numerous varieties of web applications, each with its own distinct characteristics and use cases. Here are some examples of prevalent types of web applications:

- **ECommerce Applications**: These are web-based applications that facilitate online purchasing and transactions. Amazon, eBay, Shopify, and Etsy are examples.
- **Social Networking Apps**: These applications enable users to communicate and share information. Facebook, LinkedIn, Twitter, and Instagram are examples.
- **CRM Apps**: Consumer Relationship Management (CRM) applications assist companies in managing consumer interactions and reports on a dashboard. Salesforce, Zoho CRM, and HubSpot CRM are examples.
- **Project Management Apps**: Apps for project management facilitate teamwork on projects and task administration. For instance, Trello, Asana, and Basecamp are examples.
- **Health And Fitness Apps**: These applications assist users in monitoring their health and fitness objectives. Fitbit, MyFitnessPal, and Nike Training Club are examples.
- **Real-Time Communication Applications**: These web applications allow users to communicate in real-time. Included are Slack, Zoom, and Google Meet as examples.

These are merely some examples of the various categories of web applications. New varieties of Web applications emerge as technology advances and user requirements change

IaaS stands for infrastructure-as-a-service. It allows organizations to purchase resources like networking and storage on-demand instead of having to buy costly hardware. IaaS is highly scalable and offers businesses more flexibility than on-premise solutions.

IaaS can be seen as the basic layer in cloud computing. The virtualized components available through the internet are equivalent to the servers and hardware companies would traditionally store in their building

IaaS benefits

IaaS offers many benefits to companies who want to migrate to the cloud. The most compelling ones are listed below.

- **Flexibility:** IaaS is more flexible than all the other cloud computing models.
- **Automation:** With IaaS, you can easily automate the deployment of servers, storage, and networking.
- **Cost-reduction:** IaaS lets you purchase resources on an as-needed basis, so you only pay for what you're actually using.
- **Control:** IaaS lets you retain complete control of your infrastructure.
- **Scalability:** Since you're only "renting" IT components, you can easily upscale or downscale your resources.

IaaS disadvantages

IaaS also has some potential drawbacks that you should be aware of before settling on a provider.

- **Legacy systems:** Before migrating to the cloud, legacy apps might have to be enhanced for the new type of infrastructure.
- **Internal training:** Staff might have to undergo additional training to effectively manage and monitor IaaS.
- **Security:** While you are in control over your apps, data, middleware, and the OS platform, you are also responsible for mitigating new security threats

PaaS stands for platform-as-a-service. The platform that can be accessed through the internet provides developers with a framework and tools to build apps and software that are tailored to the organization's individual needs.

PaaS can be seen as a scaled-down version of IaaS. Just like IaaS, the customers have access to servers and data centers which are maintained and managed by the third-party provider. However, they mainly use PaaS for building custom SaaS applications.

PaaS benefits

Below are a few of the biggest benefits that speak for adopting PaaS as a cloud computing model.

- **Cost-reduction:** PaaS is a simple, cost-effective way to quickly develop and deploy new apps.
- **Scalability:** PaaS service models can easily be adjusted to a developer's needs.
- **Migration:** With PaaS, it's easy to migrate to a hybrid cloud model.
- **Less coding:** Your developer teams have to do a lot less coding than before.
- **Freedom:** PaaS frees up time as developers can customize apps without having to maintain the software.

PaaS disadvantages

Not surprisingly, there are also some drawbacks that you need to be aware of before subscribing to a PaaS cloud computing model.

- **Data security:** Using third-party vendor-controlled servers means that there are various security risks to look out for.
- **Runtime issues:** Some PaaS solutions are not optimized for the language or framework that your development teams are used to.
- **Integrations:** You might encounter some challenges with integrating new applications as not every component of your legacy IT system is built for the cloud.
- **Limitations:** Customized cloud operations tend to have automated workflows that might not be compatible with PaaS solutions, thus limiting operational capabilities for your end-user.

SaaS stands for software-as-a-service. These entire cloud application services are the most common form of cloud computing. They are ready-to-use and often run directly through the client's web browser, meaning there is no need for installations or downloads.

SaaS is hosted on remote servers and fully managed, updated, and maintained by a third-party vendor. This results in less responsibility but also less control for the end user.

SaaS benefits

Software-as-a-Service provides several advantages to businesses and their teams.

- **Cost-reduction:** SaaS usually resides in a shared or multi-tenant environment. When managed correctly, the license costs are lower compared to traditional models.
- **Scalability:** SaaS solutions are easy to scale up or down based on your specific needs.
- **Integration:** Many SaaS solutions have integrations with other SaaS offerings, so you don't have to buy another server or software.
- **Upgrades:** With SaaS, you instantly benefit from new software releases and upgrades.
- **Ease of use:** Without installation or download, SaaS is easy to use and comes with baked-in best practices.

SaaS disadvantages

Before opting for a SaaS cloud computing model, you should also be aware of its potential drawbacks.

- **Data security:** Since large volumes of sensitive data are being exchanged with off-premise servers, security and compliance might be compromised.
- **Limited customization:** SaaS only allows for minimal customization when it comes to features and capabilities.
- **Interoperability:** It might be difficult to integrate SaaS with existing apps and services due to dependencies.
- **Less control:** Users have very little control over functionalities, performance, downtime, or how their data is governed.
- **Wasted resources:** With the ease of use and scalability SaaS provides, an organization's SaaS stack includes many overlapping, underutilized, or unused apps. The value of SaaS apps in the organization can drop without automated SaaS Management or SaaS optimization processes in place.
- **Shadow IT:** Employees often purchase or sign up for new SaaS without the knowledge of IT. Unmanaged SaaS apps could have potential security gaps.

Role of IT in Banking Sector

Information Technology has significantly increased the operational effectiveness of banks. Automation has greatly decreased manual labour, minimised errors, and increased overall productivity for regular jobs including account administration, transaction processing, and document verification

As Information Technology (IT) advances, the banking industry continues to change. In recent years, the incorporation of IT has fundamentally changed the way banks run, converting conventional banking procedures into highly effective and client-focused platforms. This abstract seeks to give a thorough overview of the important role information technology plays in the banking industry.

Information Technology has significantly increased the operational effectiveness of banks. Automation has greatly decreased manual labour, minimised errors, and

increased overall productivity for regular jobs including account administration, transaction processing, and document verification.

Secondly, information technology has revolutionized customer interactions and experiences in the banking sector. Internet banking, mobile banking applications, and digital payment solutions have empowered customers with round-the-clock access to their accounts, enabling transactions, bill payments, and fund transfers at their convenience. Furthermore, IT has facilitated the development of personalized services by analyzing customer data, allowing banks to offer tailored products and recommendations, thereby strengthening customer relationships and satisfaction.

Moreover, IT has contributed to enhancing the security and risk management practices in the banking sector. Advanced security measures, including encryption, biometric authentication, and real-time fraud detection systems, have been integrated into banking systems to protect customer data and prevent unauthorized access. IT-driven analytics and predictive models enable banks to assess credit risks, detect potential fraudulent activities, and ensure compliance with regulatory frameworks, thereby safeguarding the financial interests of customers and the stability of the banking industry.

Finally, the adoption of emerging technologies, such as artificial intelligence, blockchain, and big data analytics, presents immense opportunities for the banking sector. AI-powered chatbots and virtual assistants offer personalized customer support, while blockchain technology ensures secure and transparent transactions. Big data analytics enables banks to derive valuable insights from vast amounts of data, facilitating data-driven decision-making and driving innovation.

On the whole information technology has become an indispensable part of the banking sector, revolutionizing operations, enhancing customer experiences, ensuring security and risk management, promoting financial inclusion, and unlocking opportunities for further growth. As technology continues to evolve, banks must adapt and harness the power of IT to stay competitive and meet the ever-changing demands of customers in the digital era.

Information Systems have improved banking in several ways:

- **More work can be done in lesser time-** This benefits both the banks themselves and the bank users, queues are shorter & less staff need to be employed
- **Quicker decision making-** Important decisions can be made a lot quicker- for example when applying for credit, banks can quickly assess the person through the IS system by simply using their name & details.
- **Process the transactions quickly-** Transactions can be done a lot faster not only in the bank but also by use of debit card by bank users elsewhere or at ATMs.

- **Manage online transactions-** People can now do their banking without going near the bank by simply using online banking. This again saves on labour for the banks. You can make payments, transfers or check your bank statement online. Online banking is a result of implementation of Information systems in the banks.
- **Providing better customer care along with other customer support services-** Banks have more information at hand on a person & so can be more helpful. For example if you wanted to cancel your bank card, information systems allow the bank to look up one detail about you and find the account you wish to cancel within minutes.

Difference between Cloud and Data Center:

S.No	Cloud	Data Center
1.	Cloud is a virtual resource that helps businesses store, organize, and operate data efficiently.	Data Center is a physical resource that helps businesses store, organize, and operate data efficiently.
2.	The scalability of the cloud required less amount of investment.	The scalability of the Data Center is huge in investment compared to the cloud.
3.	Maintenance cost is less as compared to service providers.	Maintenance cost is high because the developers of the organization do the maintenance.
4.	The organization needs to rely on third parties to store its data.	The organization's developers are trusted for the data stored in the data centers.
5.	The performance is huge compared to the investment.	The performance is less than the investment.
6.	This requires a plan for optimizing the cloud.	It is easily customizable without any hard planning.
7.	It requires a stable internet connection to provide the function.	This may or may not require an internet connection.
8.	The cloud is easy to operate and is considered a viable option.	Data centers require experienced developers to operate and are not considered a viable option.

Difference between Microprocessor and Microcontroller

The following table highlights all the important differences between microprocessors and microcontrollers –

Parameter	Microprocessor	Microcontroller
Definition	Microprocessors can be understood as the heart of a computer system.	Microcontrollers can be understood as the heart of an embedded system.
What is it?	A microprocessor is a processor where the memory and I/O component are connected externally.	A microcontroller is a controlling device wherein the memory and I/O output component are present internally.
Circuit complexity	The circuit is complex due to external connection.	Microcontrollers are present on chip memory. The circuit is less complex.
Memory and I/O components	The memory and I/O components are to be connected externally.	The memory and I/O components are available.
Compact system compatibility	Microprocessors can’t be used in compact system.	Microcontrollers can be used with a compact system.

Efficiency	Microprocessors are not efficient.	Microcontrollers are efficient.
Zero status flag	Microprocessors have a zero status flag.	Microcontroller doesn’t have a zero status flag.
Number of registers	Microprocessors have less number of registers.	Microcontrollers have more number of registers.
Applications	Microprocessors are generally used in personal computers.	Microcontrollers are generally used in washing machines, and air conditioners.

Microprocessor	**Microcontroller**
Since memory and I/O are connected externally, the circuit becomes large in size.	Since memory and I/O are present together, the internal circuit is small in size.
It cannot be used in compact systems	It can be used in compact systems.
Cost is high	Cost is low
It is not suitable for devices that run on stored power since total power consumption is high due to external components.	It can be used on devices that use stored power since total power consumption is low due to less external components.
RAM, ROM, I/O units, and other peripherals are not embedded on a single chip.	RAM, ROM, CPU and other peripherals are embedded on a single chip.
Do not have power saving mode.	Have a power-saving mode.
Used in personal computers.	Used in embedded systems.
Less number of registers.	More number of registers.
Uses an external bus.	Uses an internal controlling bus.
Based on the Von Neumann model	Based on the Harvard architecture
It is a central processing unit on a single silicon-based integrated chip.	It is a byproduct of the development of microprocessors with a CPU along with other peripherals.
Complex and expensive due to a large number of instructions to process.	Simple and inexpensive due to less number of instructions to process.
Can run at a very high speed.	Can run up to 200MHz or more.