CYBER SECURITY FUNDAMENTALS

DATE: 21.03.2025 & 22.03.2025

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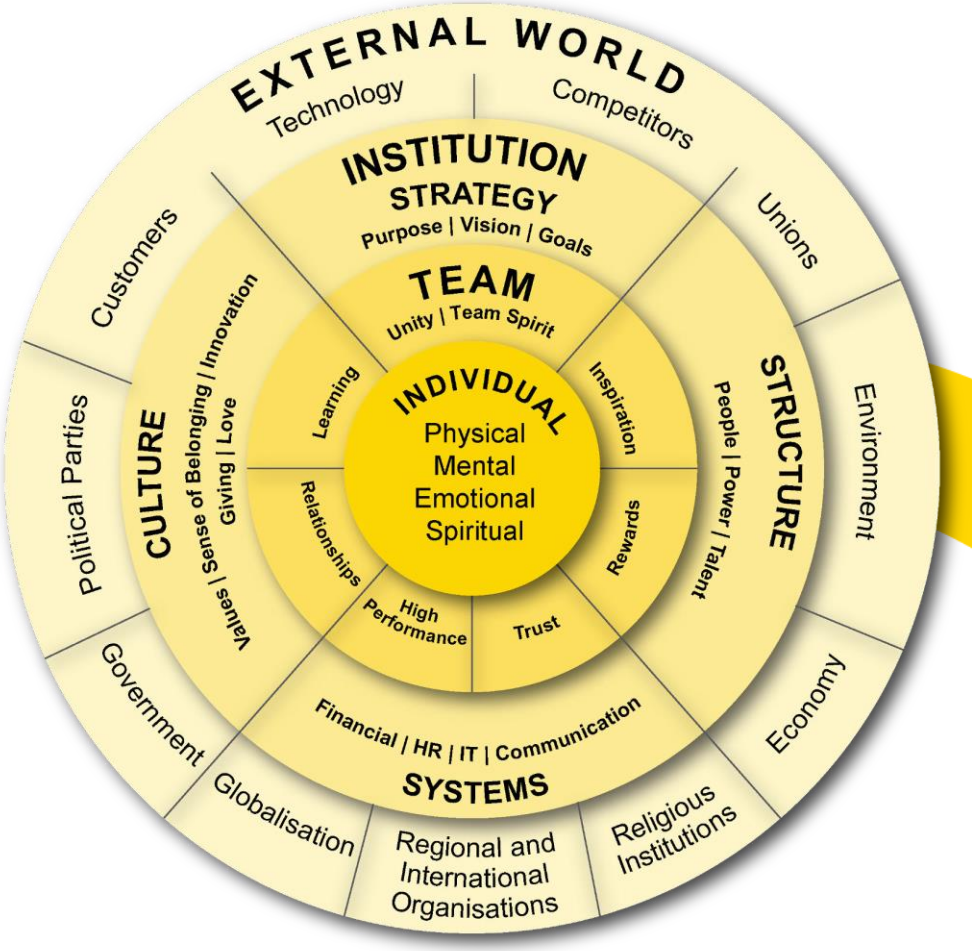
REGENESYS' INTEGRATED LEADERSHIP AND MANAGEMENT MODEL:

- **Holistic** focus on the individual (SQ, EQ, IQ, and PQ)
- **Interrelationships** are dynamic between individual, team, institution and the external environment (systemic)
- **Strategy** affects individual, team, organisational, and environmental performance
- **Delivery** requires alignment of strategy, structure, systems and culture



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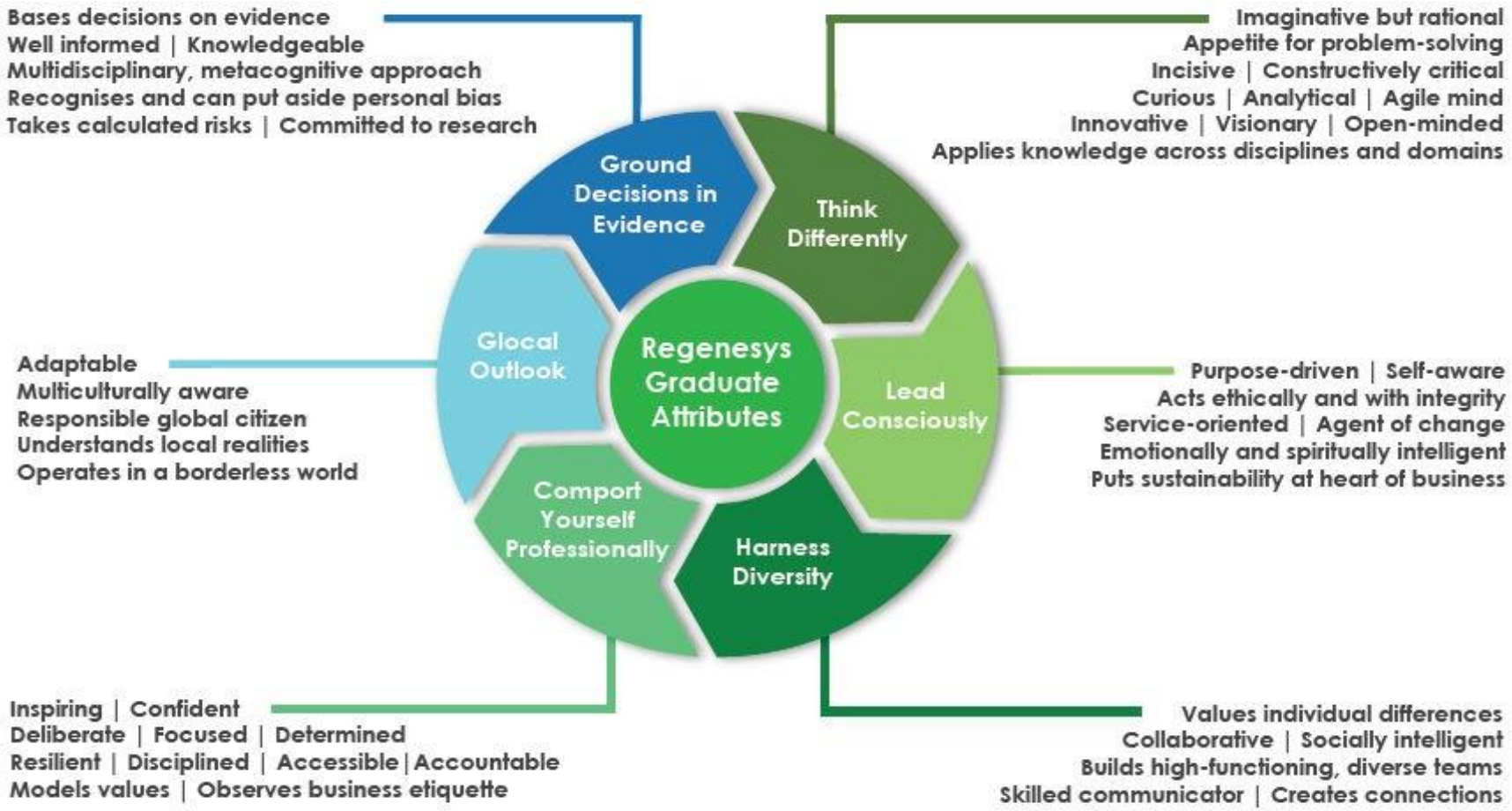
REGENESYS GRADUATE ATTRIBUTES:



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KNOW YOUR FACILITATOR:

Dr. Saquib Ahmad Khan

- Dr. Saquib Ahmad Khan is a highly respected professional in the cybersecurity field.
- He holds a Ph.D. in Computer Science and possesses multiple cybersecurity certifications, establishing him as an esteemed expert in cybersecurity.
- Dr. Khan is a prolific author, with numerous research papers and articles to his credit, focused on advancing the field of cybersecurity.
- He is a frequent speaker at prominent industry conferences and events, where he imparts his knowledge and insights to fellow professionals.
- Dr. Khan also possesses a strong foundation in marketing, management, information technology, and various applications, bolstered by multiple degrees.

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GROUND RULES:

- Be open-minded
- When speaking, use “I think”, “I feel”, etc.
- (you are a very important aspect of this learning)
- Listen carefully
- One conversation at a time
- Respect the opinions of others
  - Give constructive feedback
  - Build on the ideas of others rather than destroying them
- Take some risks and share new ideas

HAVE FUN AND ENJOY THE EXPERIENCE !

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MODULE 06

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Application and Data Security

- Introduction to Application Security
- Web-Based Applications and Associated Vulnerabilities
- Cookies and Tracking
- Data and Database Security
- Phishing and Other Attacks on Identity
- Regulation, Compliance, and Risk Management

On completing this module, you should be able to:

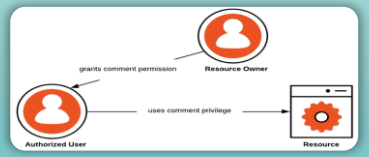
- Understand various application security measures and their significance in protecting software applications from threats and vulnerabilities.
- Comprehend the principles of application security, including identifying vulnerabilities and implementing protective measures against cyber-attacks and data breaches.
- Gain knowledge of the phases involved in web application development, such as planning, designing, development, deployment, and maintenance.
- Understand what web-based applications are, how they differ from traditional software applications, and learn about different categories like e-commerce and social media.
- Identify common security challenges and threats to applications, including vulnerabilities like SQL injection, XSS, and CSRF, and understand mitigation techniques.
- Understand the role and importance of web application firewalls in protecting web applications from various attacks.

On completing this module, you should be able to:

- Learn what computer cookies are, their purpose in web browsing, and the different types, including session and persistent cookies.
- Know how to manage cookies in web browsers, understand their security and privacy implications, and discover methods to remove or block tracking cookies.
- Gain knowledge of practices and regulations for obtaining user consent for tracking cookies and how to implement them effectively.
- Grasp the importance of securing databases, recognize common threats such as SQL injection and insider threats, and understand security layers like authentication and encryption.
- Learn about contemporary IT trends that pose challenges to database security, including cloud computing and big data, and understand their impact.
- Understand the significance of database security in protecting sensitive data from unauthorized access and breaches

TYPES OF APPLICATION SECURITY:

Authentication



Authorization

Encryption

Logging

Application Security Testing

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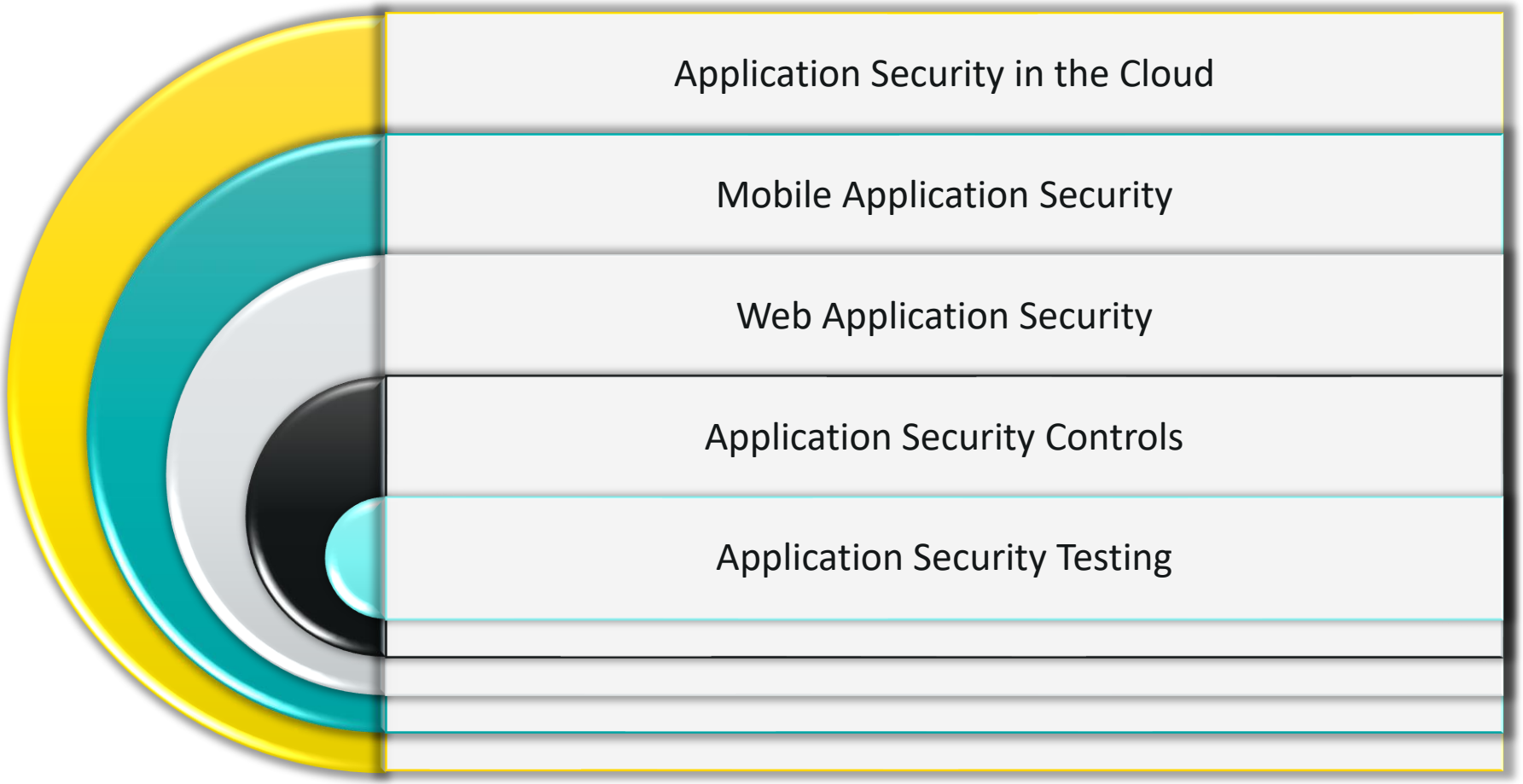
APPSEC:



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THE QUESTION IS….

Why is Application Security important?

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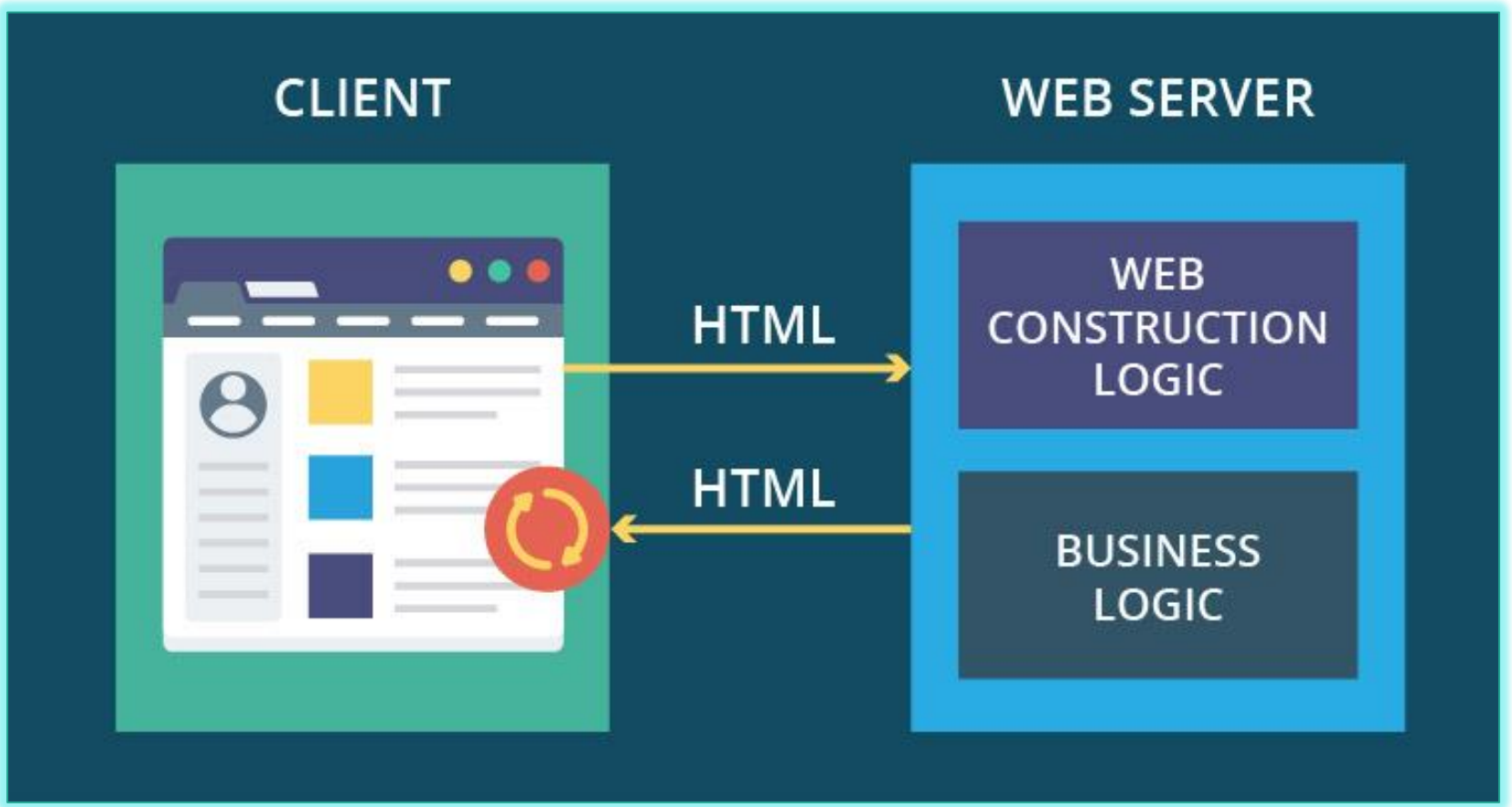
WEB-BASED APPLICATIONS:



(Source: https://lvivity.com)

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WEB APPLICATION DEVELOPMENT PHASES:

Development

- Identify application security requirements

Deployment

- Identify application owner
- Security testing
- Load testing
- Secure OD, Database etc.
- Firewall protection
- Documentation

Maintenance

- Apply patches & updates
- Review security logs
- Change management
- Efficient user provisioning

(Source: https://www.prplbx.com)

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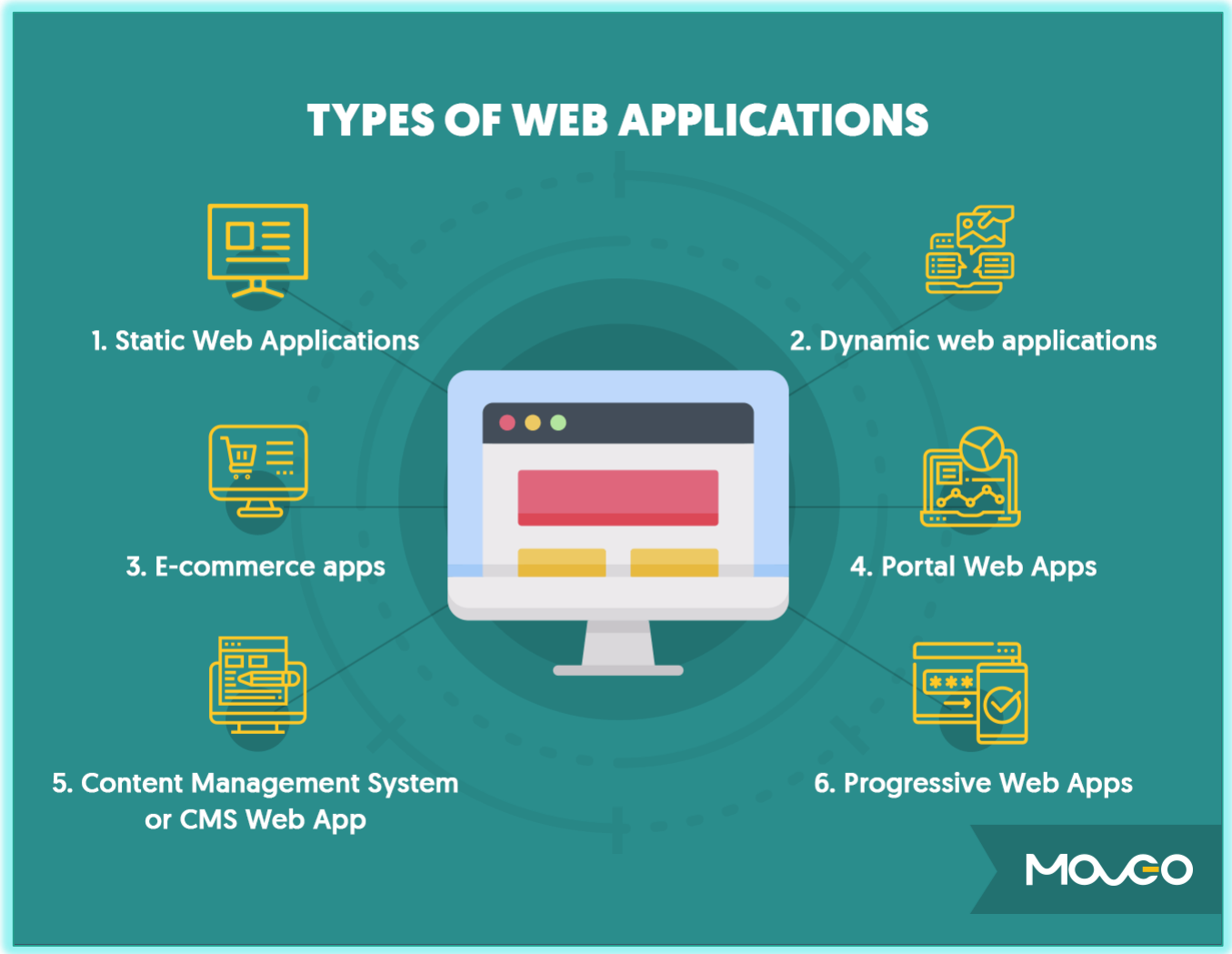
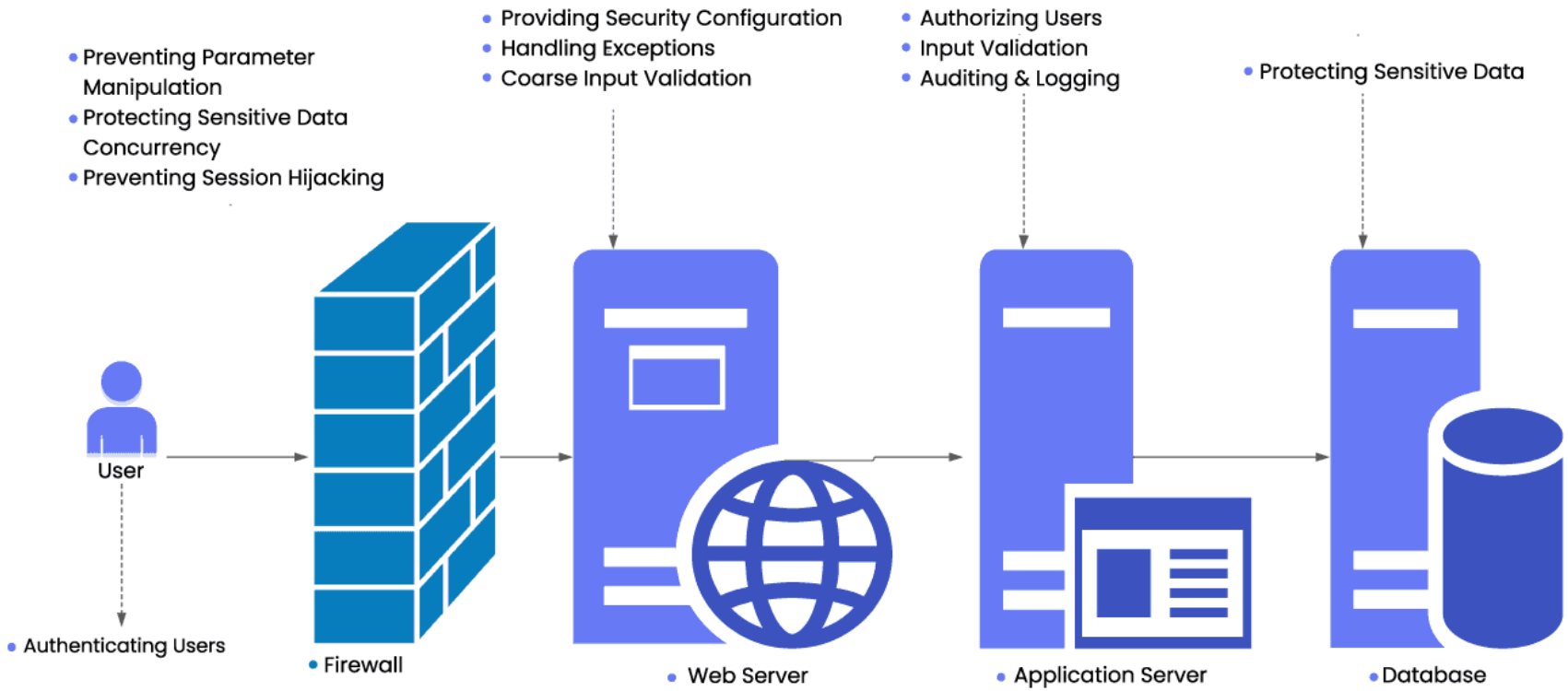
TYPES OF WEB APPLICATIONS:



(Source: https://www.moveoapps.com)

SECURITY CHALLENGES FOR A TYPICAL APPLICATION:



(Source: https://www.prplbx.com)

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WEB APPLICATION DEVELOPMENT PROCESS:

Step 01 – Find a Genuine App Idea

Step 02 – Market Research

Step 03 – Define Functionality – What Does Your Web App Do

Step 04 – Sketch Your Web App Design

Step 05 – Wireframes and Prototypes

Step 06 – Time to Start Validating

Step 07 – Choose Your Technology

Step 08 – Host Your Application on the Web

Step 09– Deploy Your App

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WEB APPLICATION VULNERABILITIES:

- SQL Injection
- Cross-Site Scripting (XSS)
- Broken Authentication and Session Management
- Cross-Site Request Forgery (CSRF)
- Insecure Direct Object References
- Security Misconfiguration
- Insecure Cryptographic Storage

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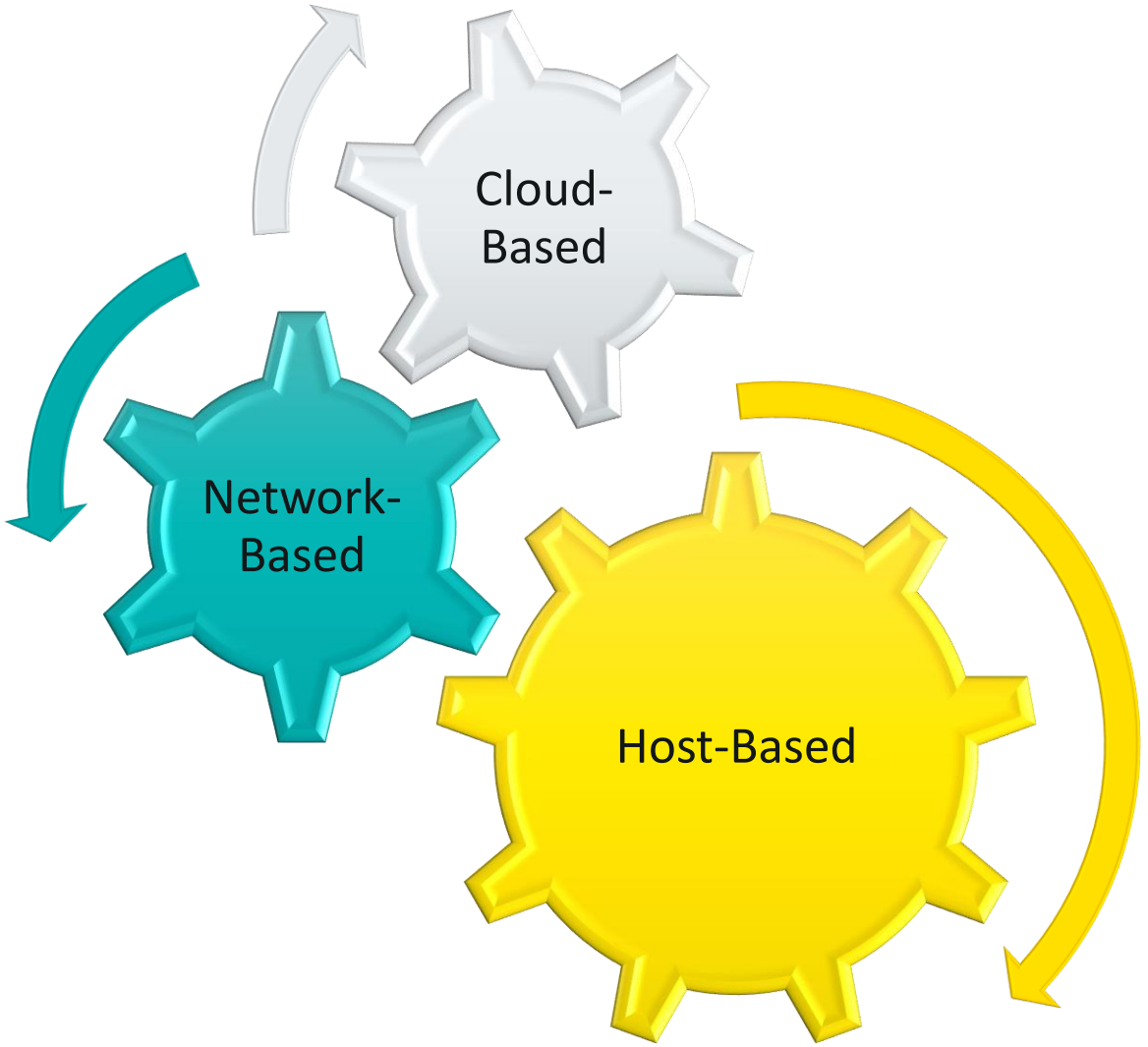
WEB APPLICATION FIREWALLS:



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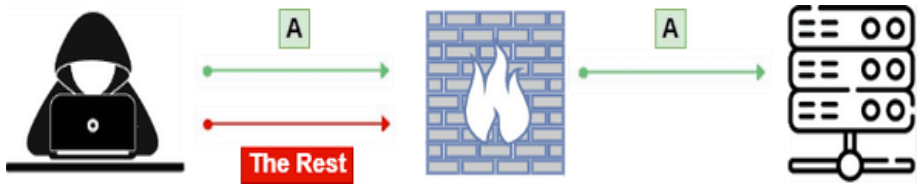
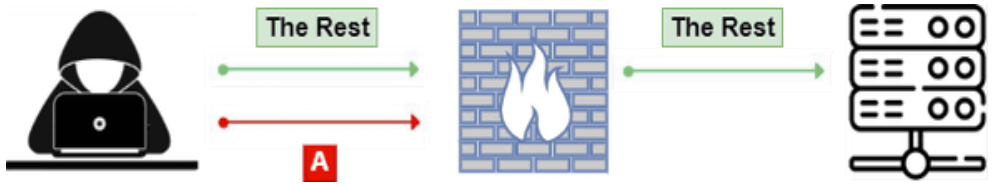
WEB APPLICATION FIREWALLS:

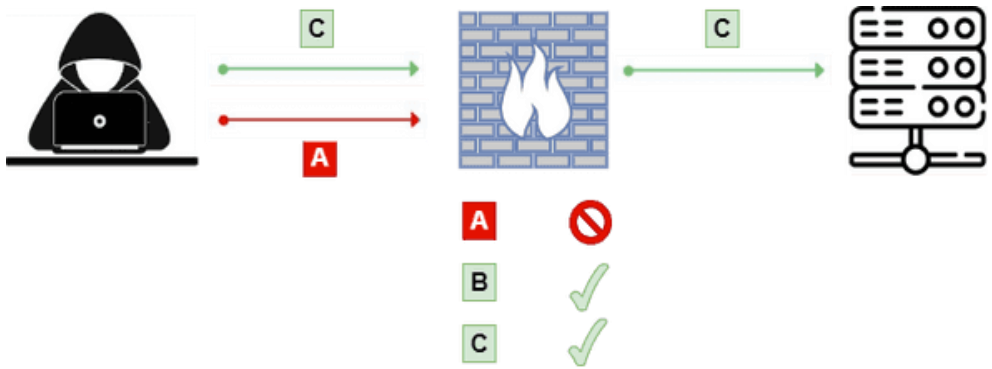
- Positive Security Model



- Negative Security Model

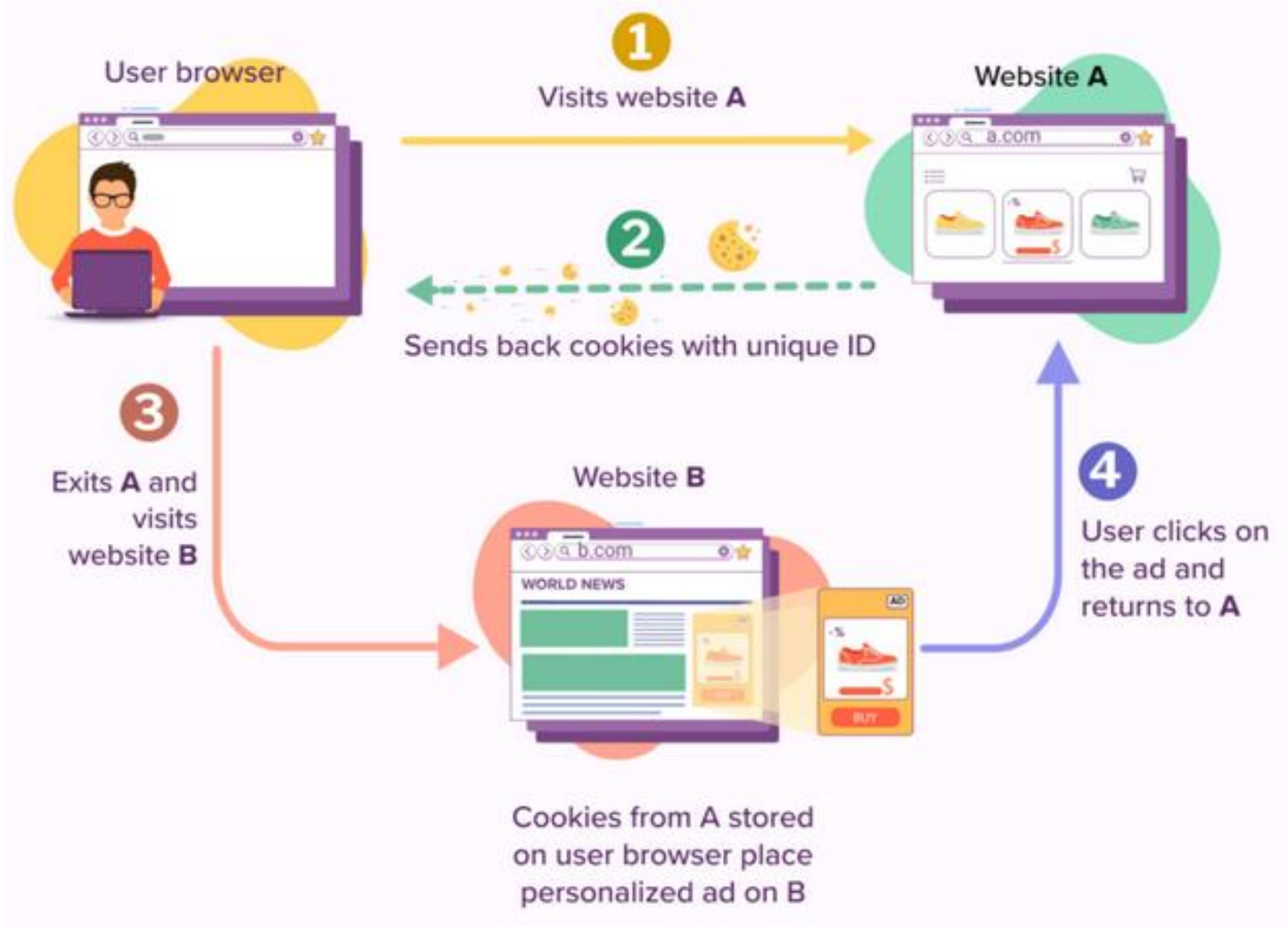


- Mixed Security Model



(Source: https://www.prplbx.com)

COMPUTER COOKIES:



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COOKIES USES AND TYPES:

5 Uses of Computer Cookies

Customize advertisements

Remember login usernames and passwords

Recognize devices

Track website and/or internet activity

Streamline online shopping

Common Types of Cookies

Persistent Cookies

Cookies **stored for an extended period of time.**

Third-party Cookies

Cookies **used to collect data** on people's online activity.

Session Cookies

Cookies **deleted instantly** after closing a browser.

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(Source: https://us.norton.com)

HOW TO ENABLE OR DELETE COMPUTER COOKIES?

1. **Open your browser,** be it Firefox, Chrome, Edge, or Safari.
2. **Navigate to where cookies are stored**. Each browser manages cookies in a different location. For example, in Chrome, choose “Preferences” from the Chrome menu in the navigation bar, which will display your settings. Then select the “Privacy and Security” option. From there, you'll see options to manage cookies, cache, and other kinds of browser data.
3. **Manage your cookies**. Every browser gives you a range of options for enabling or deleting cookies. In Chrome, find where cookies are stored as outlined above, then select “Clear browser data” to delete cookies or “Cookies and other site data” if you want more management options.

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THE QUESTION IS….

ARE

COMPUTER

COOKIES

SAFE?

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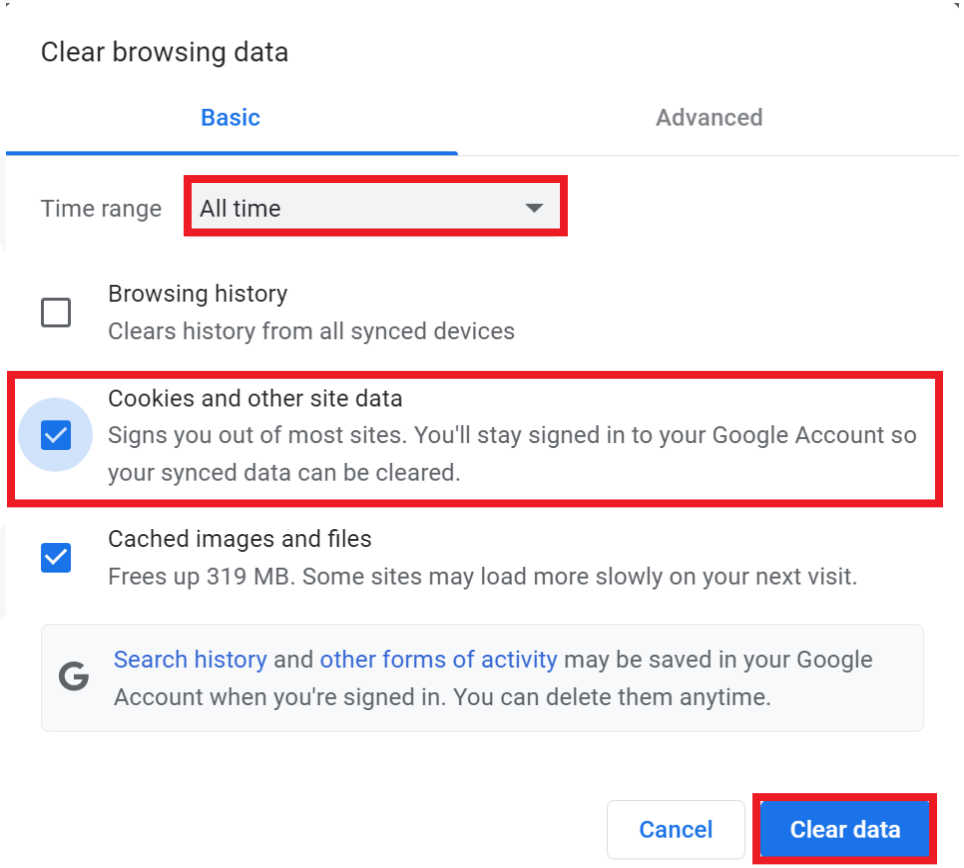
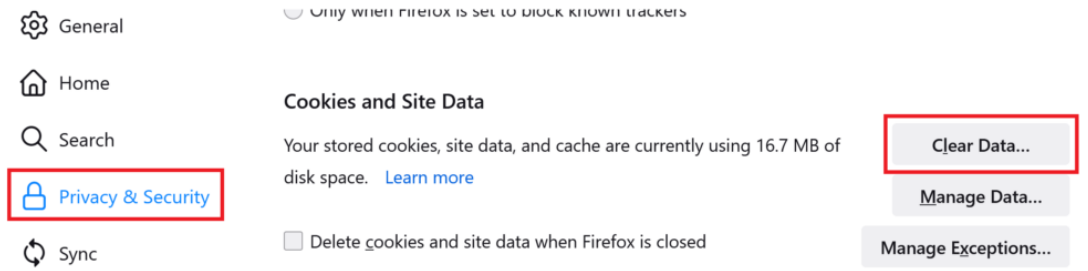
HOW TO REMOVE TRACKING COOKIES?

Removing cookies in Chrome

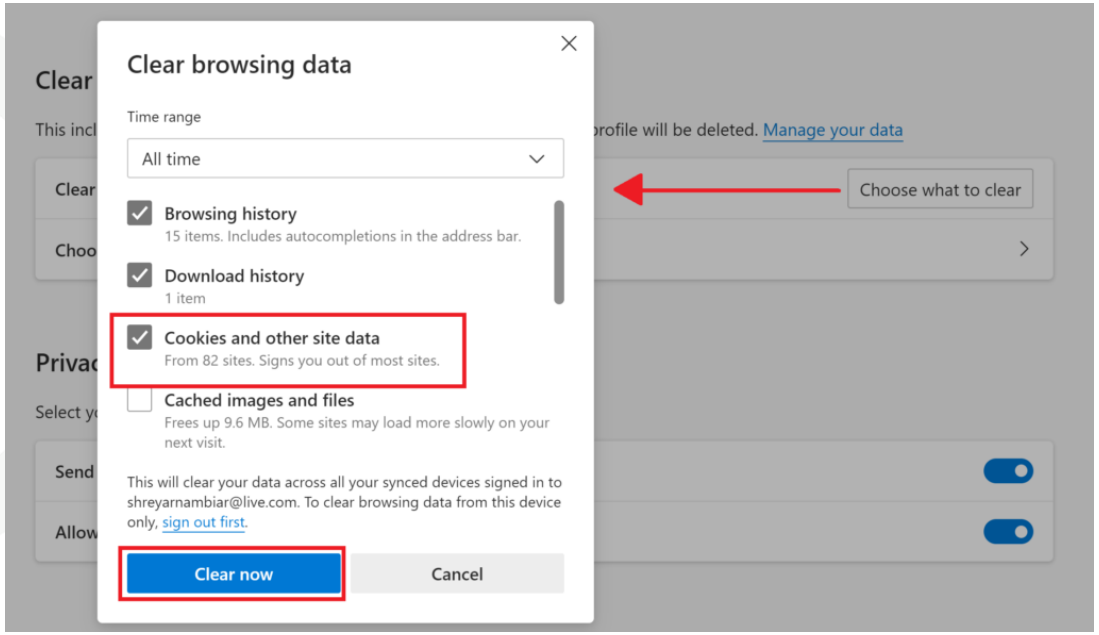


Removing cookies in Firefox

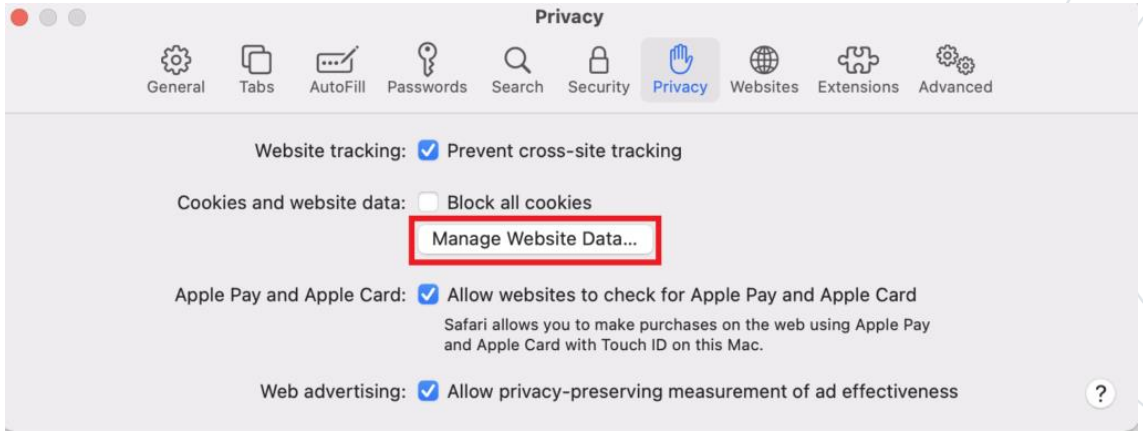


HOW TO REMOVE TRACKING COOKIES?

Removing cookies in Edge



Removing cookies in Safari



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HOW TO BLOCK TRACKING COOKIES?

- In **Chrome**, go to the settings and search for cookies and other site data and enable the option to block third-party cookies. Enabling it will turn off these cookies on Chrome. You can also view all the cookies collected from different websites and delete them.
- In **Microsoft Edge**, the user needs to go to Settings and then to the section Privacy and Security. Here there is an option to block third-party cookies.
- In **Firefox**, go to Open Menu and then Options. Under Privacy and Security, you can find an option to block third-party cookies.
- In **Opera**, go to the Opera icon and search for settings. Go to Advanced settings and the option Cookies. You can block third-party cookies there.
- In **Safari**, go to Preferences and find the option privacy. There you will find the option to block all cookies.

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How to manage consent for tracking cookies?

- Inform users about the cookies on your website and the consequences of consenting to their use.
- Use affirmative action such as a button click or checkbox selection to gain consent.
- Do not store cookies without prior consent from users.
- Allow users to opt out of tracking by cookies when they visit the website.
- Blocking tracking should not interfere with a user's use of a site.
- Let users easily withdraw their cookie consent at any time.
- Review and update your privacy policy to disclose details about all data collection and use via tracking cookies and how to manage them.
- Keep a log of user cookie consent to prove compliance with the law.

DATABASE SECURITY:

PHYSICAL BACKUP CORRUPTION SERVERS
INFORMATION AUDITING RISK ACCESS
DATA DATABASE CONTROLS
PROTECTION SECURITY CONFIDENTIALITY
UNAUTHORIZED INTEGRITY
AVAILABILITY APPLICATIONS ENCRYPTION
DAMAGE SYSTEMS

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THE QUESTION IS….

WHY IS DATABASE SECURITY IMPORTANT?

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I.T. TRENDS MAKING DATABASE SECURITY MORE CHALLENGING:

Growing Data Volumes

Machine Learning (ML)

Cloud Adoption

Internet of Things (IoT)

Distributed Infrastructure

Big Data

Cyber Security Skills Shortage

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DATABASE SECURITY THREATS:

- SQL Injections
- Malware
- Human Error
- DMS Vulnerabilities
- Password Attacks
- Denial of Service (DoS) Attacks

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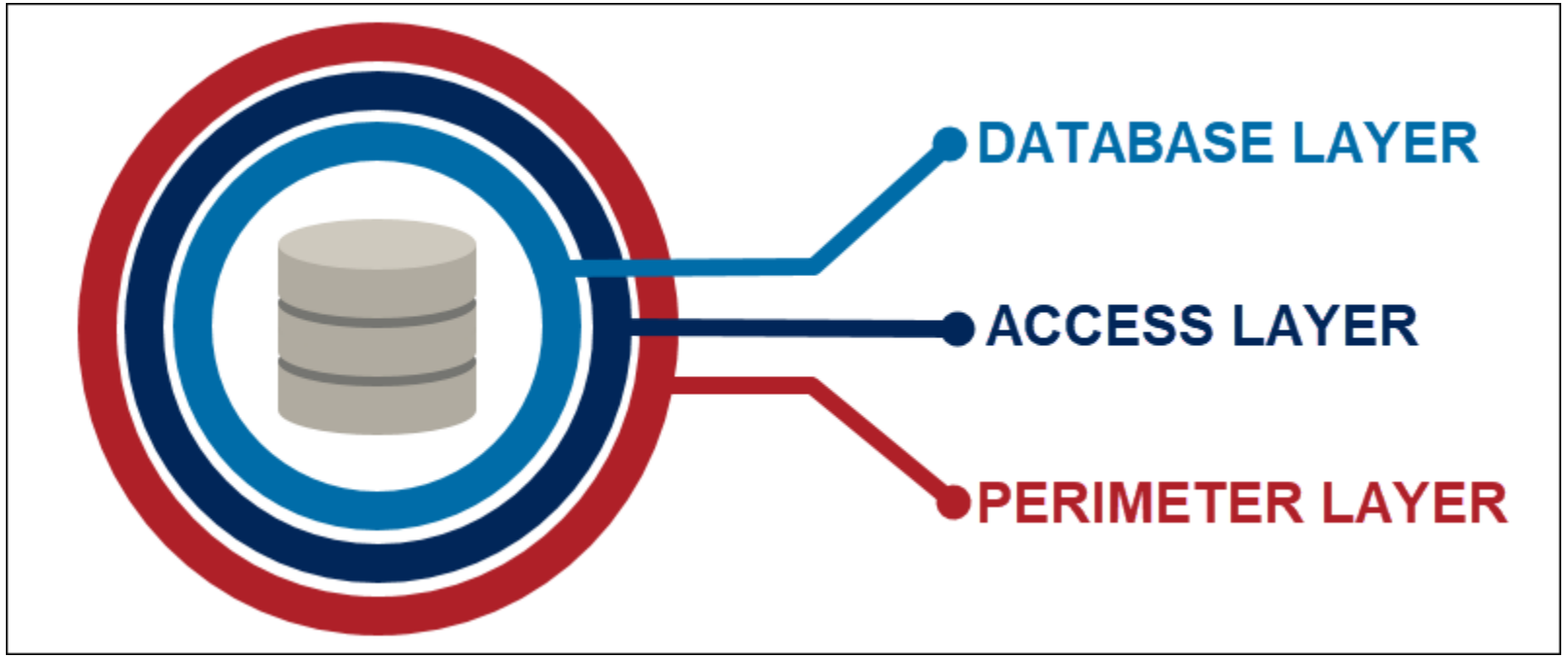
LAYERS OF DATABASE SECURITY:



(Source: https://phoenixnap.com)

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DATABASE SECURITY BEST PRACTICES:

- Automatic Lockdown after Multiple Login Attempts
- Isolate Your Databases
- Run Penetration Tests
- Create Regular Data Backups
- Use Real-Time Database Monitoring
- Have Strict Controls and Policies
- Use Firewalls to Monitor Database Traffic

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PHISHING:

TrustedBank™

Dear valued customer of TrustedBank,

We have recieved notice that you have recently attempted to withdraw the following amount from your checking account while in another country: $135.25.

If this information is not correct, someone unknown may have access to your account. As a safety measure, please visit our website via the link below to verify your personal information:

http://www.trustedbank.com/general/custverifyinfo.asp

Once you have done this, our fraud department will work to resolve this discrepency. We are happy you have chosen us to do business with.

Thank you,
TrustedBank

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HOW DOES A PHISHING ATTACK WORK?

(Source: https://www.valimail.com)

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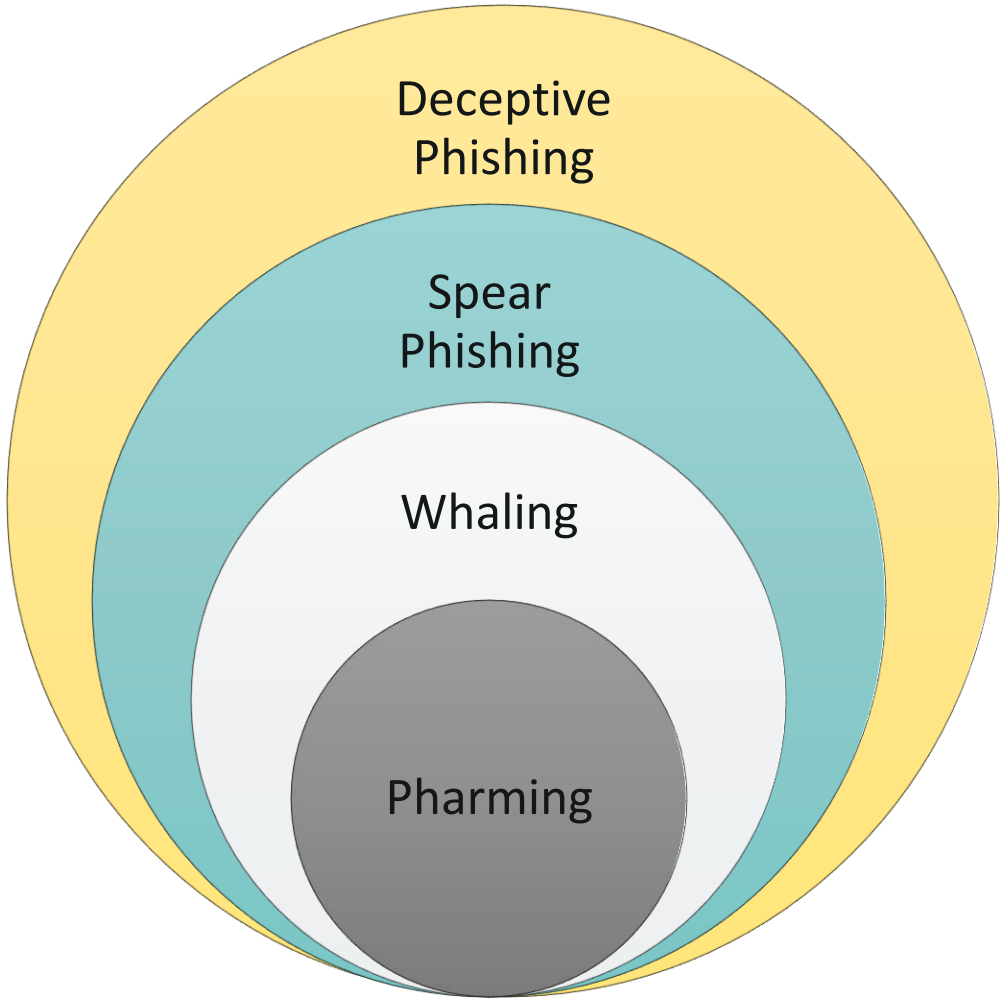
TYPES OF PHISHING ATTACKS:



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HOW TO PREVENT PHISHING ATTACKS?

- Email Authenticity
- HTTPS Webpages
- Avoid Pop-Ups
- Password Rotation
- Anti-Phishing Extensions

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REGULATORY COMPLIANCE RISK:

Compliance risk is the possibility that you might break current laws or regulations. Maintaining compliance risk is a systematic approach. It can also be costly and challenging for companies.

Regulatory risk happens when new changes to laws and regulations might cause losses to your business. The changes could be so drastic that your current business activities could be illegal. Managing regulatory risk requires a forward-thinking strategy that monitors regulatory processes and public opinion.

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MANAGE REGULATORY RISK IN CYBERSECURITY:

- Compliance Management
- Assess the Cyber Threat Landscape
- Perform a Risk Assessment
- Create an Incident Response Plan
- Visualize the Attack Surface
- Use Cyber Security Metrics

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THANK YOU

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